

AUSSEN WIRTSCHAFT BRANCHENREPORT CHINA

GLOBAL VALUE CHAINS

SOURCING FROM CHINA AND ASIA. HOW TO EVALUATE RISKS AND SAFEGUARD RESILIENT SUPPLY CHAINS.

WIE ROBUST IST IHRE LIEFERKETTE AUS ASIEN?

RISIKEN ERKENNEN UND ALTERNATIVE LIEFERANTEN SICHERSTELLEN

AUSSENWIRTSCHAFT Industry
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1 BACKGROUND AND EXECUTIVE SUMMARY

1.1 Executive Summary (Deutsch)

Robuste Lieferketten sicherstellen - Gibt es Alternativen zum Einkauf aus Asien und China?

Die Studie basiert auf einer Bestandsaufnahme der Beschaffung des österreichischen verarbeitenden Sektors aus China und Asien und einer im Dezember 2020 durchgeführten Umfrage unter 20 österreichischen Einkaufsmanagern von mittelständischen Unternehmen. Eine erste Analyse hat ergeben, dass bei der derzeitigen Beschaffung aus Asien vor allem die Volksrepublik China eine große Bedeutung hat. 90% der befragten österreichischen Einkaufsmanagerinnen und -manager waren im Jahr 2020 mit Störungen in ihrer Lieferkette konfrontiert, sei es mit Problemen beim Lieferanten selbst oder mit der Logistik. Die Auswirkungen der Covid-19 Gesundheitskrise und die Handelsstreitigkeiten zwischen China und den USA haben den Druck erhöht, die bestehende Lieferkette aus Asien und China näher zu betrachten und mögliche Alternativen festzustellen („China + 1“), um Risiken zu minimieren und kosteneffizient einzukaufen.

Unabhängig von den jüngsten Entwicklungen hat die Häufigkeit und Intensität von Krisen und Störfaktoren, welche die Lieferketten beeinträchtigen können, zugenommen. Einkaufsverantwortliche sind gefordert die bestehenden Lieferketten genauer und tiefergehend zu betrachten, um Risiken exakt zu bewerten und damit robuste Lieferketten sicherzustellen.

Aufgrund einer gut entwickelten Lieferantenbasis in China, der immer besser werdenden Qualifikation von Arbeitskräften und etablierter Logistiksysteme gibt es für viele Beschaffungsvorgänge kaum kurzfristige Alternativen zu China. Auch innerhalb der Volksrepublik gibt es bei der Lieferantenbasis große Unterschiede, vor allem hinsichtlich der oft im Ökosystem rund um ausländische Investoren reif gewordenen Produktionen an der Ostküste und in Südchina gegenüber dem oft noch weniger entwickelten Westchina. Die Zeiten der verlängerten Werkbank China für die ganze Welt sind jedoch gezählt, und auch aufgrund neuer politischer Ambitionen Pekings nicht mehr unbedingt gewollt. Vor allem arbeitsintensive Produktionen wandern derzeit innerhalb Asiens in billigere Produktionsländer wie nach Vietnam oder in die Philippinen ab und österreichische Einkäufer und Einkäuferinnen von Konsumwaren schauen sich auch in diesen Märkten um.

Die Studie befasst sich mit den wichtigsten Beschaffungs-Kategorien österreichischer Unternehmen, welche eine große Rolle für die weitere Verarbeitung und Wertschöpfung im industriellen Sektor darstellen. Für Einkäufer und Einkäuferinnen im verarbeitenden Sektor rät die Studie am ehesten bei Eisen und Stahl, Werkzeugen, Plastik und Gummi, Aluminium und bei organischen Chemikalien zumindest mittelfristig die Möglichkeiten zu einer Diversifizierung auf Beschaffungsmärkte außerhalb Chinas zu prüfen, insbesondere bei neuen Beschaffungsvorgängen. Voraussetzung ist, dass in diesen neuen Märkten qualifizierte Lieferanten mit ausgebildeten Arbeitskräften und ausreichendem Zugang zu Roh- und Vormaterialien gefunden und weiterentwickelt werden können und auch die entsprechende Infrastruktur bei Logistik und Dienstleistungen vor Ort rund um eine Beschaffung wie für Qualitätskontrolle darstellbar ist. Dabei sollten auch die Kosten und der nötige Ressourceneinsatz für die Entwicklung neuer Lieferanten nicht unterschätzt werden.

Je nach Beschaffungsvolumen, Einkaufs-Kategorien und Qualitätsanforderungen rücken als mögliche Alternativländer zu China neben etablierten Märkten wie Japan, Taiwan und Südkorea vor allem Indien, Malaysia, Vietnam, Thailand und die Philippinen in den Fokus. Aber auch das Beschaffen aus Österreich selbst und in Länder im Umfeld Österreichs, insbesondere in Ost- und Südosteuropa, werden vor allem bei kleineren Stückzahlen und bei Produkten mit höherer Technologieintensität und höherem Logistikanteil wieder attraktiver („near shoring“), um Logistik- und Zollrisiken zu minimieren und die Abstimmung mit Lieferanten zu vereinfachen.

Die Studie enthält praktische Tipps für Einkaufsverantwortliche in der Umsetzung von Maßnahmen sowie einen Einblick in Digitalisierungs-Möglichkeiten in der Beschaffung. Die Studie wurde von MANGGEI CONSULTING im Auftrag der AUSSENWIRTSCHAFT AUSTRIA erstellt und aus Mitteln der Internationalisierungsoffensive go-international, einer gemeinsamen Initiative des Bundesministeriums für Digitalisierung und Wirtschaftsstandort

und der Wirtschaftskammer Österreich finanziert. Die AußenwirtschaftsCenter der Wirtschaftskammer Österreich unterstützen österreichische Einkäufer und Einkäuferinnen des verarbeitenden Sektors beim Aufbau nachhaltiger Lieferketten.

Wie Sie diese Studie nutzen können:

Über die dieser Studie zugrundeliegenden Analyse der derzeitigen Beschaffung des österreichischen verarbeitenden Sektors aus Asien und die Ergebnisse einer Umfrage unter österreichischen Einkäufern lesen Sie in Kapitel 1.

Um mehr über Veränderungen im Haupt-Beschaffungsmarkt China zu erfahren lesen Sie Kapitel 2.

Eine Bewertung von potentiellen alternativen Beschaffungsmärkten zu China finden Sie in Kapitel 3.

Eine Übersicht über aktuelle Trends in China und Asien und mögliche Alternativen zum Sourcing aus China für die wichtigsten Materialgruppen, die derzeit für die Weiterverarbeitung in Österreich aus China beschafft werden, gibt es im Kapitel 4.

Um praktische Tipps in der Beschaffung und Beispiele aus der Praxis zu bekommen, lesen Sie Kapitel 5.

Einen kurzen Einblick über Digitalisierungs-Möglichkeiten in der Beschaffung finden Sie in Kapitel 6.

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- Lieferanten-Scouting: Recherchen nach potentiellen Lieferanten für bestimmte Produkte (Long-Lists)
- Kontakthanbahnung: Unterstützung bei der Kommunikation mit diesen (Kontaktherstellung, nötigenfalls Übersetzung, Übermittlung von Spezifikationen...), auf Wunsch auch ohne Nennung der österr. Firma
- Add-on: Informationen über Portale/Verzeichnisse für die jeweilige Produktgruppe
- Lieferantencheck I: Desk-Überprüfung potenzieller Geschäftspartner durch lokale Mitarbeiterinnen und Mitarbeiter der AußenwirtschaftsCenter (insbesondere mittels Einsichtnahme öffentlicher lokaler Register, Webseiten, Rücksprache mit Behörden oder Vereinigungen, auf Wunsch auch telefonische Kontaktaufnahme - je nach Umfang kostenlos oder gemäß Angebot)
- Lieferantencheck II: in Zusammenarbeit mit österr. Unternehmen Bewertung von potenziellen Lieferanten gem. vereinbarter Kriterien (Score Cards)
- Bonitätscheck: Einholung einer gewerblichen Auskunft, wenn möglich mit Bonitätsbeurteilung. Die AußenwirtschaftsCenter arbeiten dazu mit externen Dienstleistern Ihres Vertrauens zusammen. Kosten variieren je nach Bearbeitungszeit.
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1.2 Executive Summary (English)

Ensuring Robust Supply Chains - Are There Alternatives to Sourcing from Asia and China?

The study is based on an analysis of the Austrian manufacturing sector's procurement from China and Asia and a survey conducted in December 2020 among 20 Austrian purchasing managers of medium-sized companies. An initial analysis showed that the People's Republic of China is particularly important in current procurement from Asia. 90% of the Austrian purchasing managers surveyed were confronted with disruptions in their supply chain in 2020, due to problems either with the supplier itself or with logistics. The impact of the Covid-19 health crisis and the trade disputes between China and the US have increased the pressure to take a closer look at the existing supply chain from Asia and China and to identify possible alternatives ("China + 1") in order to minimise risks and purchase cost-efficiently.

Regardless of recent developments, the frequency and intensity of crises and disruptions that can affect supply chains has increased altogether. Purchasing managers are required to take a closer and deeper look at the existing supply chain to accurately assess risks and thus ensure robust supply chains.

Due to a well-developed supplier base in China, an increasingly skilled workforce and established logistics systems, there are few short-term alternatives to China for many sourcing operations. Even within the People's Republic, there are major differences in the supplier base. The established production facilities on the coast and in southern China have often matured in the ecosystem around foreign investors. In the west of China the supplier base and corresponding eco system is generally less developed. The days of China as the "extended workbench for the whole world" might however be numbered. Beijing's government would like Chinese manufacturing and exports to become more tech intensive and moving up the value stream. Serving the growing Chinese middle class and its demand for products and services will reduce the dependency on exports (dual economy). Chinese labor-intensive production in particular has been migrating within Asia to cheaper production countries such as Vietnam or the Philippines, and Austrian buyers of consumer goods are expanding their sourcing radius accordingly as well.

The study looks at the most important procurement categories of Austrian companies, which play a major role in further processing and creating value in the industrial sector. For buyers in the manufacturing sector, the study suggests that buyers of iron and steel, in the tools sector, in plastics and rubber, aluminium and in organic chemicals evaluate possibilities to procure from markets outside of China, at least in the medium term and for new procurement processes. The prerequisite is that qualified suppliers with trained workers and sufficient access to raw and primary materials can be found and developed in these new markets, and that the corresponding infrastructure in logistics and services (e.g. for quality control) can be guaranteed locally as well. The costs and resources required for the development of new suppliers should not be underestimated.

Depending on the procurement volume, purchasing categories and quality requirements, India, Malaysia, Vietnam, Thailand and the Philippines could come into focus as possible alternative countries to China, in addition to established markets such as Japan, Taiwan and South Korea. Also sourcing within Austria itself and from countries near Austria, especially in Eastern and South-Eastern Europe, is becoming more attractive again, especially for smaller quantities and for products with higher technology intensity and a higher logistics share in overall cost. "Near shoring" helps to minimise logistics and customs risks and normally simplifies coordination with supplier.

The study also provides practical tips for purchasing managers in the implementation of measures and an insight into digitalisation in procurement. The study was conducted by MANGGEI CONSULTING on behalf of AUSSENWIRTSCHAFT AUSTRIA and financed with funds from the programme go-international, a joint initiative of the Austrian Federal Ministry for Digitalisation and Economic Location and the Austrian Federal Economic Chamber WKO. The international offices of the Austrian Federal Economic Chamber WKO (AußenwirtschaftsCenter) support Austrian buyers in the manufacturing sector in building sustainable supply chains.

How to use this study

For an analysis of current Austrian sourcing from Asia and a summary of interviews conducted with Austrian sourcing managers read Chapter 1.

For trends in the Chinese economy that are relevant for sourcing managers read Chapter 2.

For an overview of countries that could become alternative sourcing markets to China, see Chapter 3.

For an overview of trends in the respective industry in China for the most important material groups that Austria's processing industry currently sources from China and suggested alternative sourcing markets read Chapter 4.

Practical tips and tools for assessing procurement alternatives can be found in Chapter 5.

To get some insights for digitalisation in procurement read Chapter 6.

1.3 Background and Approach of the Study

For the analysis of the status quo, MANGGEI CONSULTING compared Austrian imports from different Asian countries for the years 2020 and 2019. Asia. The import statistics of 2019 was thoroughly analysed for and the most important commodity groups and supplier countries from Asia for Austria's value added industries were identified.

In addition, at the end of 2020 the authors conducted interviews with 20 purchasing managers of Austrian companies in various sectors to learn more about their current sourcing patterns in Asia and their challenges and considerations.

1.3.1 Austrian Imports from Asia in 2020 compared to 2019

Imports by Austrian companies from China amounted to over 10 billion EUR, an increase of over 3% compared to 2019. A detailed analysis of the 2019 import value shows that more than a third of which (around 6.8 billion EUR) is further processed by the companies or is subject to further value creation.

The study focuses on the eight procurement categories with the highest import value (in EUR) from China, which are subject to further value creation by Austrian companies. It provides a detailed overview of the procurement clusters in China as well as information on possible alternative countries for the selected categories.

Analysis of Current Austrian Sourcing from Asia (Overall Imports in 2020, 2019 and change in %)

ASIA	Austrian Imports 2020 (in EUR)	Austrian Imports 2019 (in EUR)	Change 2020 to 2019 (%)
China	10,146,577,243	9,828,028,807	+3.2
Japan	2,047,017,547	2,245,055,422	-8.8
Vietnam	963,932,109	997,182,754	-3.3
India	892,858,394	1,021,254,198	-12.6
Kazakhstan	878,642,106	1,509,218,861	-41.8
Korea, Republic	813,560,633	757,291,464	+7.4
Taiwan	798,683,442	798,057,203	-3,3
Bangladesh	736,701,411	807,304,067	-8.8
Thailand	592,598,721	718,336,195	+0.4
Malaysia	395,710,684	404,146,939	-2.0
Indonesia	285.350.037	292,837,650	-2.6
Iraq	261,462,947	545,895,787	-52.1
Pakistan	237,055,515	314,425,953	-24.6
Singapore	207,297,855	213,175,401	-2.8
Cambodia	211,912,156	274,311,515	-22.8
Israel	161,772,837	161,952,555	-0.1
Philippines	153,105,681	184,684,263	-17.1
Myanmar	152,862,000	153,530,718	-0.4
Azerbaijan	110,978,778	438,625,472	-74.7
Hong Kong	107,669,999	98,170,169	+9.7
...			
ASIA Total	20,561,040,520	22,191,219,688	-7.4

Source: Statistik Austria, Foreign Trade Data, Imports from Asia to Austria per country

The year 2020 has strengthened China's position as by far the most important supplier from Asia. The analysis shows that in the pandemic year 2020, when Austria's overall imports from Asia and the world decreased, deliveries from the PR China were on the rise: Austrian imports from China increased in 2019 by over 3% to 10.1 billion EUR. China's share of all Austrian imports increased from 6.2 to over 7%, the share of the PR China in overall sourcing from Asia from 44.3 to 49.3%.

A considerable part of China gaining shares is due to its manufacturing sector being able to supply throughout most of the year 2020 and experienced only minor shutdowns. Chinese Covid-19 articles like face masks and consumer electronics were also in big demand.

1.3.2 Austrian imports in 2019 for Austria's Value-Added Industry

For the detailed analysis, the authors looked at the more "regular import year 2019". Imports by Austrian companies from China in 2019 amounted to nearly 10 billion EUR. After scrutinizing Austrian Foreign Trade Data provided by Statistik Austria by HS codes (on a 4-digit level), the authors estimate that more than a third of which (around 3.4 billion EUR) is further processed by Austrian companies or is subject to further value creation.

The following table summarizes the authors' analysis of Austria's Foreign Trade Data 2019 on a 4-digit level and shows the most important import positions for Austria's value-added sectors from Asia. The analysis shows that the following countries (in order) are the most important suppliers for Austria: China, Japan, Taiwan, India, South Korea, Malaysia, Vietnam, Thailand and the Philippines. China has a 50% share in overall sourcing from Asia.

HS Code	Product Name	Asia									
		Total (Mio. EUR)	China	Japan	Taiwan	India	South Korea	Malaysia	Vietnam	Thailand	Philippines
85	Electrical machines, apparatus and electrotechnical goods	2 423	1 303	248	221	85	118	172	109	59	109
	Nuclear reactors, boilers, machines, apparatus and mechen. equipment	1 533	663	565	60	86	82	31	12	27	5
87	Tractors, automobiles, tractors, motorcycles, bicycles	405	98	78	85	37	47	9	8	42	0
29	Organic compounds	404	226	101	5	62	9	0	0	0	0
	Optical, photographic apparatus, measuring and testing instruments	346	151	96	12	13	12	42	3	15	1
39	Plastics and goods made therefrom	338	178	54	18	8	54	3	13	8	2
73	Articles of iron or steel	325	201	16	66	17	9	4	7	5	1
64	Shoes, gaiters, parts thereof	250	133	0	1	18	0	0	96	1	0
40	Rubber and goods made therefrom	168	37	25	10	25	13	29	5	22	2
82	Tools, cutlery, cutlery	154	92	20	28	4	3	1	6	0	0
72	Iron and Steel	99	29	27	2	17	24	0	0	0	0
76	Aluminum and articles thereof	77	61	2	2	8	1	1	0	2	0
81	Other common metals; Cermets; Goods from it	64	53	7	1	3	0	0	0	0	0
70	Glass and glassware	34	23	5	2	0	1	2	0	0	0
54	Synthetic and artificial filaments	27	16	2	2	2	3	0	1	1	0
74	Copper and articles thereof	24	12	5	4	2	2	0	0	0	0
80	Tin and goods made from it	19	3	0	0	0	0	16	0	0	0
59	Impregnated, coated fabrics, technical textile articles	19	11	1	0	0	6	0	0	0	0
44	Wood and goods made from it; Charcoal	18	18	0	0	0	0	0	0	0	0
86	Rail vehicles, track material, signaling devices	18	15	2	0	0	0	1	0	0	0
48	Peper and cardboard; Goods from it	17	17	0	0	0	0	0	0	0	0
56	Wadding, felt, special threads, rope goods	14	10	2	0	1	0	0	1	0	0
55	Synthetic or man-made staple fibers	12	6	4	0	0	0	0	0	0	0
69	Ceramic products	11	10	0	0	0	0	0	1	0	0
83	Various goods made of common metal	6	4	0	0	1	0	0	0	0	0
58	Special fabrics, tufted flat products, lace, embroidery	6	3	0	0	1	0	0	1	0	0
66	Umbrellas, parasols, sticks and parts thereof	4	4	0	0	0	0	0	0	0	0
79	Zinc and articles thereof	3	2	0	0	1	0	0	0	0	0
75	Nickel and articles thereof	1	0	0	0	0	0	0	0	0	0
78	Lead and articles thereof	0	0	0	0	0	0	0	0	0	0
Total:		6 820	3 377	1 262	521	390	383	313	263	185	120

Source: Analysis by AUSSENWIRTSCHAFT AUSTRIA on Austrian imports from Asia in 2019 which undergo further processing in Austria (used in the manufacturing industry, raw data based on Statistik Austria's Foreign Trade Data)

1.3.3 Interviews with Austrian Purchasing Managers

1.3.3.1 WKO Survey April 2020

In April 2020, the Austrian Federal Economic Chamber (WKÖ) surveyed over 100,000 members about their state of doing business and projections for the next months. The results of this survey were further analysed by Complexity Science Center (CSH) in regards to the state of the supply chain of Austrian companies. According to the analysis “[How Robust are Austrian Supply Chains](#)”, the Chamber survey showed that one third of the companies had at least one supplier whose failure would mean a complete standstill of operations after the current stocks have been used up. For 55 percent of these critical suppliers (or 40 percent of all suppliers) there are no alternatives. Relatively high inventories buffer the risk, so that in the event of delivery failures, there is no immediate loss of production across the board.

1.3.3.2 MANGGEI CONSULTING Interviews Nov/Dez. 2020

MANGGEI CONSULTING focused on getting the feedback and input from sourcing specialists. From November to December 2020 MANGGEI CONSULTING interviewed 20 chief procurement officers (CPOs) of Austrian companies in various sectors to find out what measures the purchasing managers have taken to secure their supply chain during the Covid-19 crises and to identify trends in Austrian procurement.

The interviews showed that 30% of the Austrian companies had been strongly affected by supply chain disruptions due to Covid-19, 60% slightly. 70% of the purchasing managers mentioned issues in logistics, 40% experienced issues with a supplier in lockdown and 20% of the issues were due to unavailable input of raw materials. Some companies or their suppliers were considered “system-relevant” and got special concessions (e.g. certain suppliers in China/Asia were able to restart production earlier). Procurement and logistics executives of Austrian companies have to dive deeper into issues regarding logistics, transport, container capacity and customs, to be able to evaluate risks and foresee potential bottlenecks regarding deliveries from Asia. It is more important than ever to have intelligence on the suppliers’ business operations, financial number and liquidity.

A good partnership with suppliers and logistics partners became a crucial success factor. The interviews clearly pointed out that well-established and long-term relationship with suppliers as well as personal connections helped in most cases to overcome supply shortages and to work together for finding solutions. In general, companies were able to safeguard the supply chain and to deal with problems by a very high level of staff engagement, by coordinating closer with suppliers and by giving them longer notice and forecasts for future orders, and by accepting more expensive transport options. Most of the CPOs mentioned that it was critical to establish a reliable communication channel with suppliers and that the frequency and depth of communication with suppliers had to be intensified dramatically. This posed a big challenge for the purchasing departments, especially when having to deal with a high number of key suppliers located time-zones away from Austria.

Covid-19 posed also big challenge for inventory and logistics management. Inventory of critical parts in-house, at consignment warehouses or at suppliers’ sites had to be increased. Going one-step deeper in the value chain, some of the CPOs asked the suppliers to build safety stocks of raw or pre-materials and (partly) pre-financed these safety stocks. Approximately 50% of the CPOs mentioned that they had ordered safety stocks at key suppliers. Managers had to pay more attention to safeguard logistics by switching between transportation modes, working with new service providers or teaming up with other companies to use full container capacities. One major task was, and still is, to secure container and freight capacity and to cope with or to negotiate transportation prices. The cost of container freight from Asia to Europe was approximately four times as high as before the health crisis and is expected to remain at a high level for most of 2021 as well. Out of the box thinking and flexibility are essential. One Austrian company that imports from China started a cooperation with another Austrian company that exports to China to secure container volumes and prices.

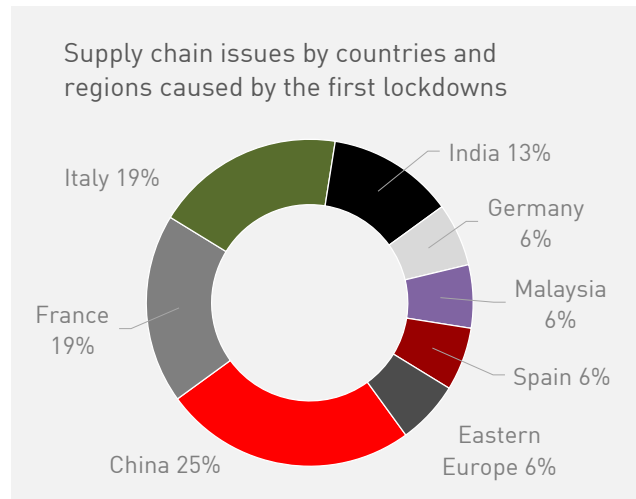
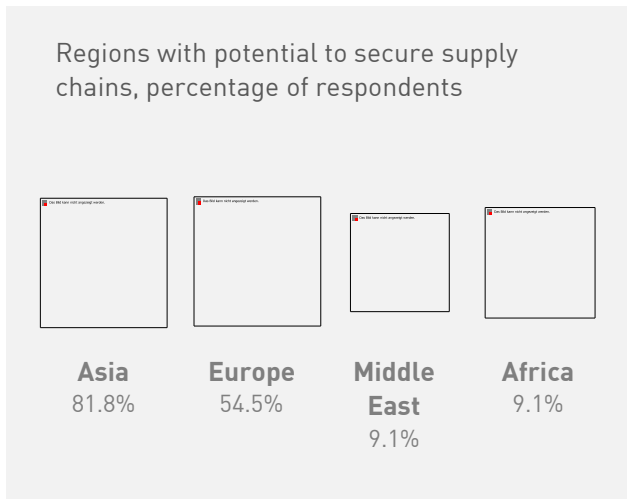
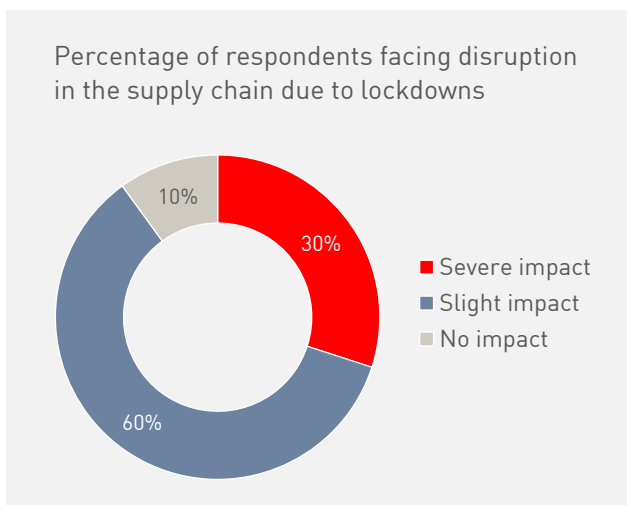
More than half of the purchasing managers expect that the increased risk in the supply chain will remain for a longer period. Also post Covid-19 prices for raw material and logistics might stay at a higher level than before. Supply Chain risks will have to be monitored more consistently and systematically. Risk analysis tools

implemented before proved to be very helpful whereas more-informal observations and ad hoc checks and evaluations showed their weaknesses.

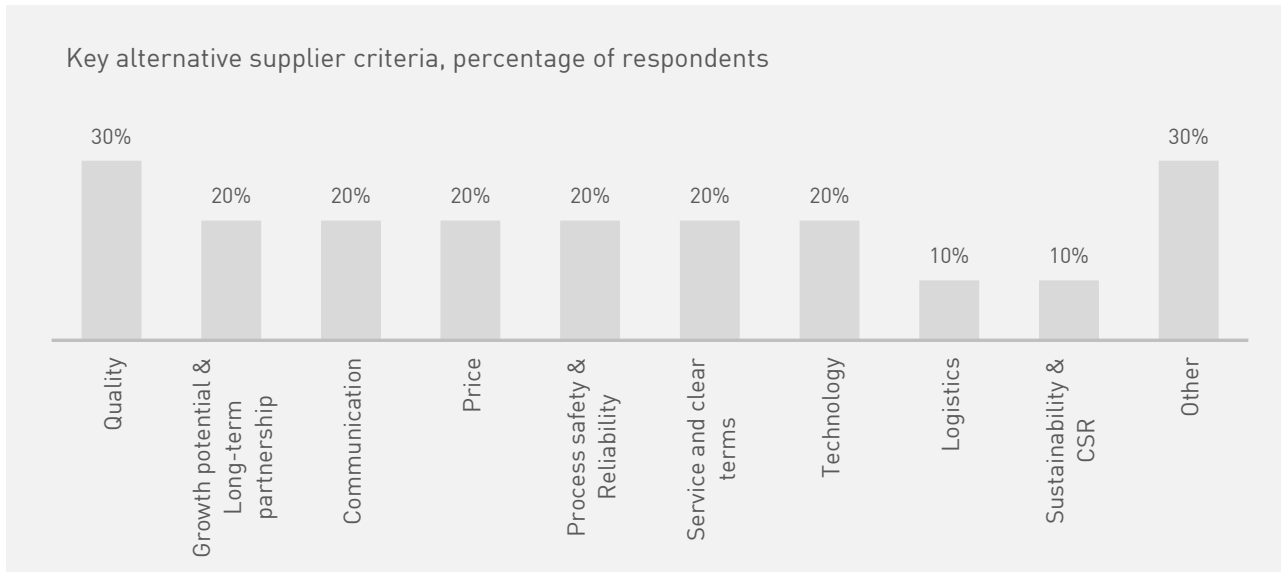
Looking ahead, more than half of the companies with currently only one supplier for critical components intend to secure a secondary supplier. In some industries such as medical technology or in the automotive industry, the onboarding of additional suppliers proves to be especially complex and requires extensive screening from a company's customers or from regulatory agencies.

80% of the companies named Asia and more than 50% named Europe as their focus regions to identify further suppliers. Within Asia India, Taiwan, Malaysia, Thailand and Vietnam were named most often as sourcing markets. Within Europe Poland, the Czech Republic, Slovakia, Romania, Hungary, Serbia and Turkey were mentioned several times.

Austrian Interviews: Summary



Source: MANGGEI CONSULTING



Source: MANGGEI CONSULTING

2 CHINA - ECONOMIC DATA AND ENVIRONMENT

In this chapter, the authors provide an overview of China's political and economic system and trends that are relevant to Austrian sourcing managers. You can find detailed up-to-date info [on the Chinese economy at AUSSENWIRTSCHAFT AUSTRIA China's pages](#) including the "AUSSENWIRTSCHAFT Wirtschaftsbericht China". The [International Monetary Fund](#) also provides a rich set of data on China's economy.

The political landscape of China is still dominated by the Chinese Communist Party that aims to pursue a "socialist system with Chinese characteristics". The consistency of this system allows the setting of medium and long term goals and corresponding plans and visions, most notable:

- the "Five-Year Plans" (currently for the period from 2021 – 2025),
- the less communicated "Made in China 2025" Strategy to become one of the world's strongest manufacturers,
- President Xi Jinping's vision to overtake the U.S. as the world's largest economy by 2035 and
- to become by the year 2049, the Centennial of China's Communist party, a "modern socialist country that is prosperous and harmonious"

China, for a long time considered as the "world's factory", is confronted with less availability of labor and rising labor cost. The country strives to move up on the value added chain in manufacturing. The economic and political system behind China's success in conducting international business are not without critics. Major trading partners like the U.S. perceive an unfair competition field for their own companies. In the "Dual Circulation" strategy announced in its latest economic policies, China wants to place more importance in offering products and services for its 1.4 billion people while at the same time reducing the dependency on international trade. For Austrian companies China is the second most important source of imports world-wide. Due to its established manufacturing and logistics infrastructure and experience in dealing with international partners, it will remain an important supplier for Austrian processing companies.

2.1 Political Status and Outlook

Since the inception of China's reform and the opening up policy, the theoretical system of "socialism with Chinese characteristics" has been formed to incorporate all economic and social-political theories and policies that are seen as consistent with Marxism-Leninism adapted to Chinese circumstances and that are crucial for China's development.

The Chinese Communist Party (CCP) sets policies and controls its execution. It has a pyramid-like structure of party congresses and committees at various levels, culminating in the National Party Congress which meets every five years and elects General Secretary, Central Committee, which in turn, elects the Political Bureau. It is within the Political Bureau and its Standing Committee that power is concentrated, and they make the state's highest-level decisions.

The head of the state is the President. The National People's Congress elects the President for a five-year period. In 2018, the National People's Congress passed a constitutional amendment that allowed the President to serve an unlimited number of five-year terms. In general, the President is also the General Secretary of the CCP. His or her function is to represent China in international relations, the President is also the Chairman of the Central Military Commission and serves as the Commander-in-chief of the People's Liberation Army.

The executive power is vested in the State Council, approved by the National People's Congress, and consisting of ministries, commissions and other organizations with the rank of a ministry. Though the majority of important political measures are decided by the Political Bureau of the Chinese Communist Party, the Council plays an important role in the economic domain.

The legislative power belongs to the National People's Congress (NPC). There are approximately 3,000 deputies in the NPC elected indirectly by provincial parliaments with five-year terms. The NPC meets once per year in a plenary session. Its Standing Committee exercises all its powers and functions on a daily basis. It is composed of a President, 15 vice-presidents and 176 permanent members. Eligibility of the NPC deputies is controlled by the CCP and they can be recalled by voters or the respective electoral units.

“Socialism with Chinese Characteristics”

(Party-State System, Communist Party Leadership)

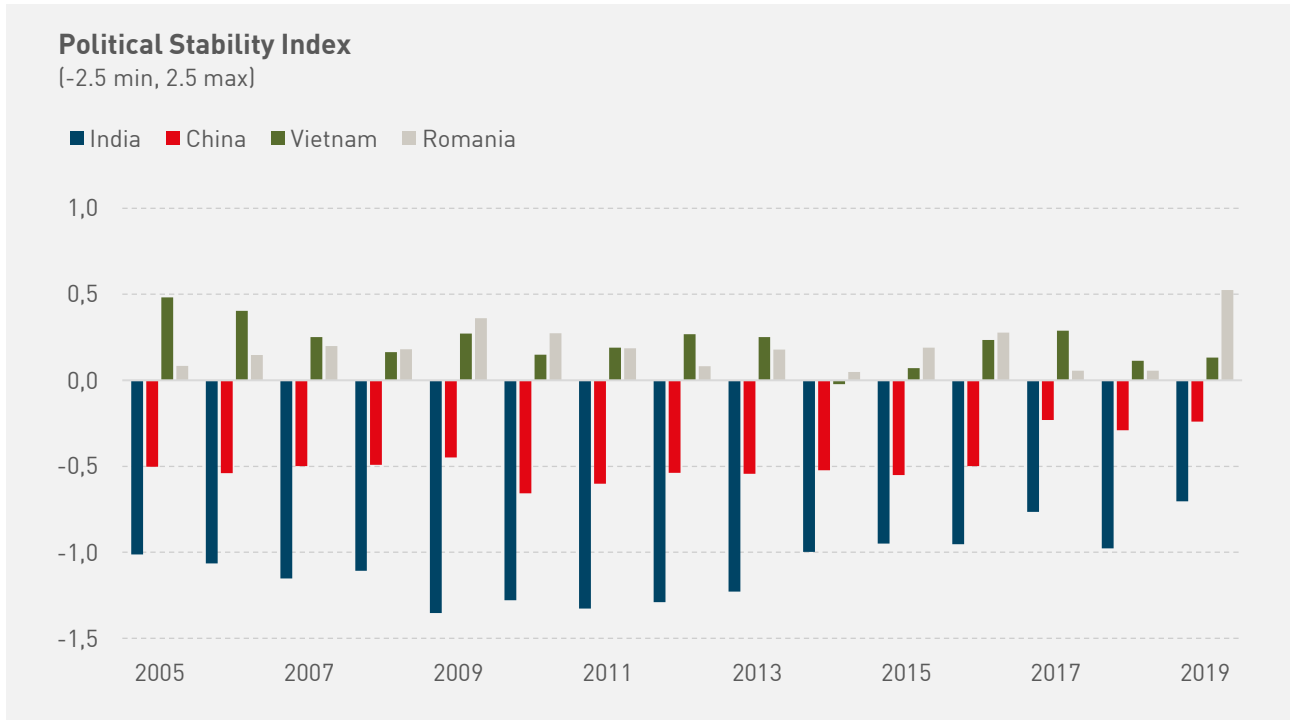
Five-Year-Plan	Made in China Strategy	Xi Jinping's "2035 Vision"	2049 Centennial of People's Republic of China
<p>China's 14th five-year-plan (2021 – 2025) No significant changes in policy direction but progression of many familiar themes from past plans</p>	<ul style="list-style-type: none"> ▪ 2025: To become one of the world's strongest manufacturing powers ▪ 2049: To become the leading manufacturer in the world ▪ Focus on State Owned Companies and Institutes 	<ul style="list-style-type: none"> ▪ Escape Middle Income Track ▪ "Dual Circulation" Strategy ▪ Growth rates (5 – 6 % p.a.) ▪ China to overtake the U.S. as the world's largest economy 	<p>The Chinese government aims to build a „modern socialist country that is prosperous, strong, democratic, culturally advanced and harmonious”</p>

Source: AUSSENWIRTSCHAFT AUSTRIA

Medium Term Outlook: Political stability

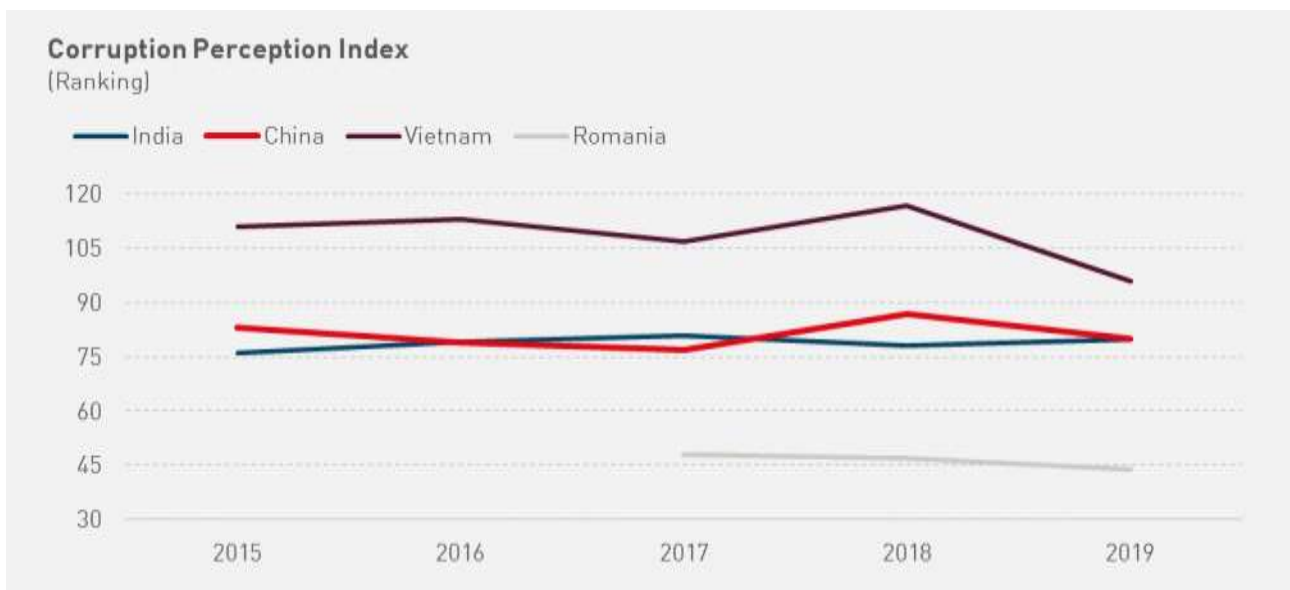
Risks to the PR China's domestic political stability, including those stemming from the coronavirus (COVID-19) outbreak, are considered as low. The power is centralized in Mr. Xi Jinping, the President who also heads the Chinese Communist Party and the military. "Xi Jinping Thoughts on Socialism with Chinese Characteristics for a New Era" are incorporated even into the party constitution.

Compared to other emerging markets the political stability of PR China is rated higher than in India but lower than in Vietnam or Romania. China's "Political Stability Index" has improved over the last 10 years:



Source: *The Global Economy, Carnegie Endowment*

President Xi Jinping considers corruption as one of the major risks that might destabilize the Chinese Communist Party. Accordingly, he installed a powerful anti-corruption mechanism within the party. China's ranking in "the Corruption Perception Index", a leading global indicator of public sector corruption, has improved over the last years (2020 ranking world-wide: 78th out of 180 countries) which is a better ranking than India's (86th) or Vietnam's (104) ranking but still fairly high if compared to European countries (e.g. Romania 44th, Austria 15th). It is also important to know that China still has a fairly high share of state-owned enterprises which contribute around 30% to the country's GDP and which are important players in international trade and finance.

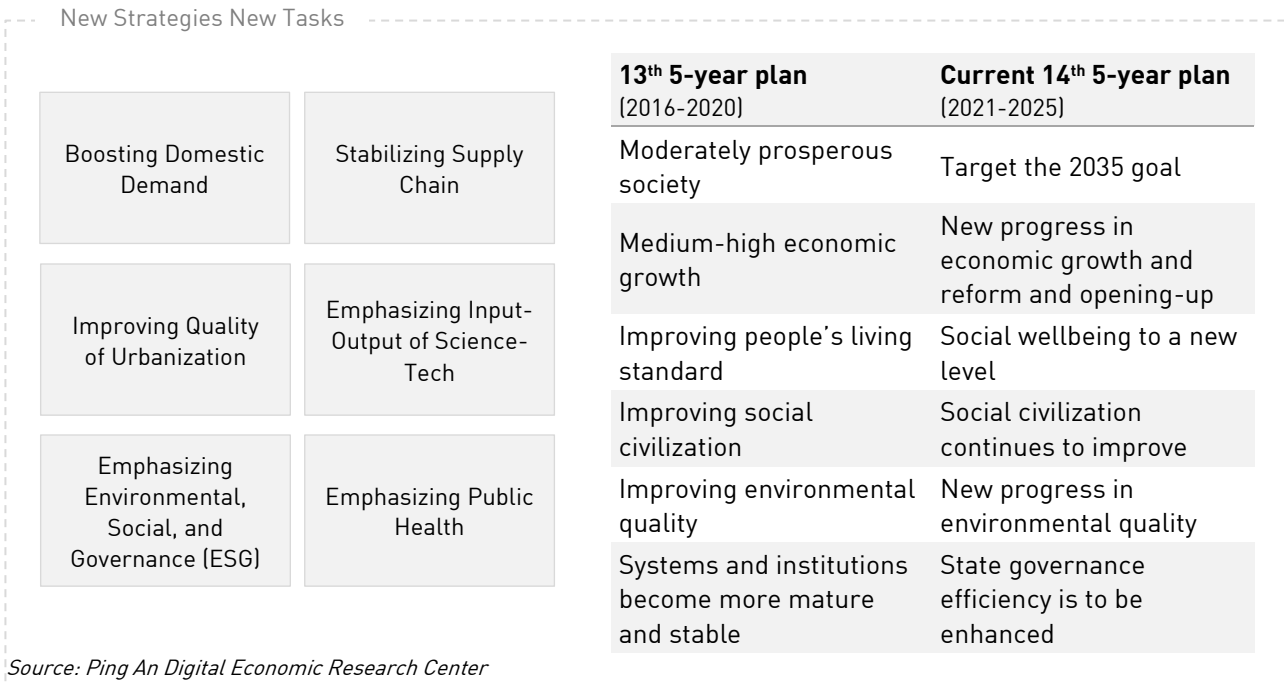


Source: *The Global Economy, Carnegie Endowment*

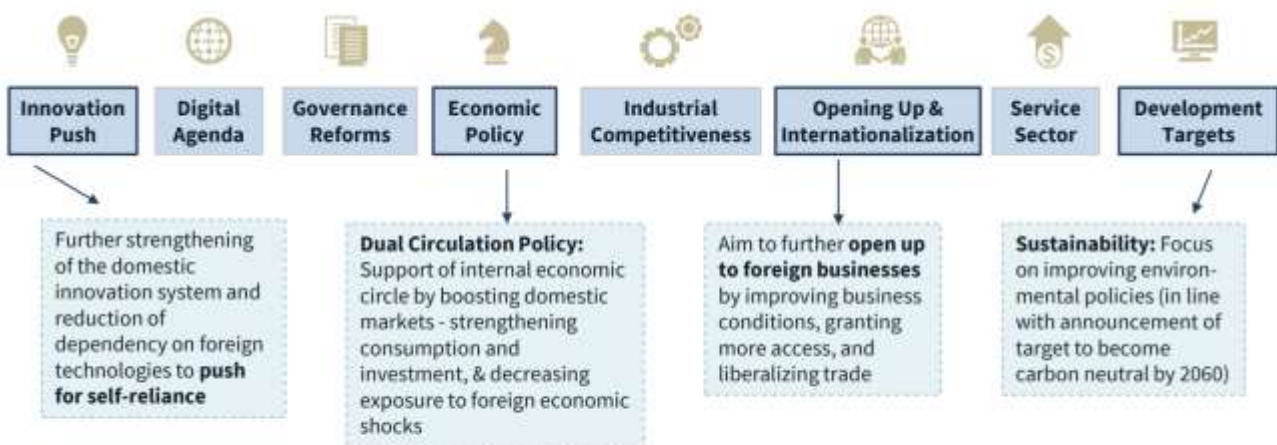
2.2 China's Five-year Plan

China has been using five-year time periods to steer its economy since 1953. In the meantime, the focus of the five-year plans (FYP) has shifted from socialist top-down economic planning to acting more as a “guideline” – setting targets and aligning incentives. The current 14th plan (2021-25) was passed in March 2021 at the Two Sessions, one of China’s major political meetings. More detailed implementation plans for major sectors, ministries, and regions will follow in the months ahead. In addition, this time the FYP was also accompanied by a so-called “Vision 2035”, a long-term blueprint for China’s economic trajectory.

14th Five-year Plan (2021-2025) is targeting a long-term goal 2035



China's 14th Five-year Plan – Themes and Selected highlights



High-level document published by China's "Fifth Plenum" provides a guideline and first indication on the country's general targets – **More important for implementation will be corresponding sub-plans by ministries and provinces after final plan is released**

Source: EAC Consulting

Within its 192 chapters on 140 pages, the plan covers a broad range of socio-economic topics and goals. There are some selected highlights below relevant for international companies operating in or with China:

Highlight	Description
Gross Domestic Growth	While the economic growth target for 2021 was set at “above 6%”, no definite mid-term target was defined, which gives economic policy more room for adjustments and reform
Economic Model	The new so-called “Dual Circulation” strategy primarily aims to support the internal economic circle by boosting domestic markets (strengthening consumption and investment), while decreasing exposure to foreign economic shocks. At the same time, China aims to further open up to foreign businesses by improving business conditions, granting more access, and liberalizing trade
Innovation and R&D Push	Current R&D expenditures in % of GDP: 2.4% (Austria: 3.2%). Domestic innovation capabilities and technological self-reliance are considered national strategic imperatives. R&D expenditures to be raised by 7% p.a., companies will receive further incentives and tax breaks. Focused industries include AI, quantum computing, semiconductors, neurosciences, genetic research and biotechnology, advanced clinical medicine and healthcare, aerospace technologies
Energy Security & Sustainability	Goal to reduce energy consumption intensity and carbon emission intensity per unit of GDP, while expanding the scale of wind and solar power, and reducing China’s reliance on foreign sources for coal, crude oil, and natural gas

A central role in the China’s economic development in the next five years and beyond will play the “Dual Circulation” model (DCM) seeking to achieve mutual reinforcement of domestic and international markets to form long-term and sustainable consumption patterns, and deal with external shocks and instability in the global environment. The 14th five-year plan keeps emphasizing a switch from high-speed to high-quality development.

Innovation based advanced manufacturing, technological independence and self-reliance are seen as the main driving forces behind China’s continuous modernization and development. The 14th five-year plan continues the transition from China being a producer of cheap-low-tech goods into being a high-end and specialized producer of goods and it encourages the transition to “tech self-sufficiency.” Big data, 5G, artificial intelligence integration in advanced manufacturing clusters, digital development in industrialization, and particularly chip-making industry are the key focuses in the plan, as well as protecting intellectual property rights, talent attraction, tech infrastructure, and investment in R&D.

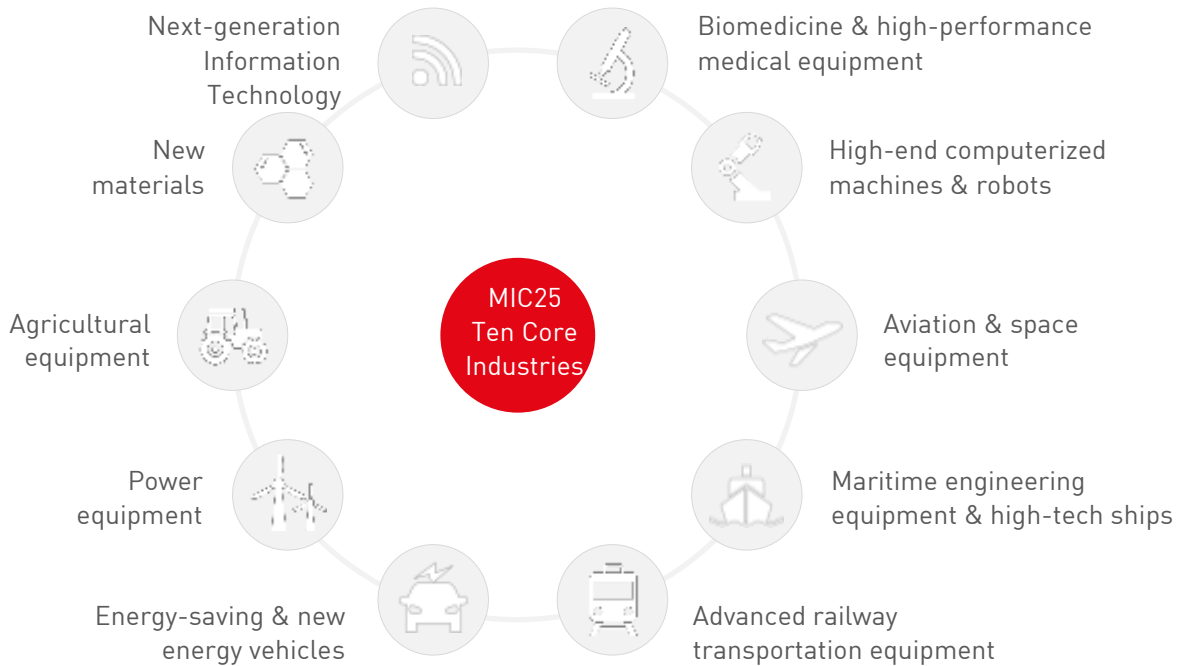
The 14th Five-Year Plan keeps addressing environmental and climate change issues, recognizing again ecological and environmental protection as a central policy priority. China is expected to implement a series of ambitious and aggressive plans for green and low-carbon development in order to reach a peak of carbon emissions by 2030 and become carbon neutral by 2060 (goals set out by President Xi Jinping at the United Nations General Assembly in September 2020). Areas that will be supported include: green finance; green technological innovation; clean production facilities; environmental protection industries; green transformation of key industries and important fields; clean, low-carbon, safe and efficient use of energy; green buildings and green life creation activities.

2.3 Flagship Industrial Policy Plan: MADE IN CHINA 2025

“MADE IN CHINA 2025” (MIC25) is a strategic transformation plan for the Chinese economy issued in 2015. The goal of MIC25 is to increase China’s national industrial capacity, similar to “Germany 4.0” or “Make in India” and to position China as a leading industrial nation by 2049. The focus of MIC25 is on shifting the economy from labor-intensive, low-value manufacturing to high-value production. MIC25 is a strategy that aims to upgrade the entire Chinese economy by becoming more self-sufficient in R&D and production in 10 strategic 21st-century economic sectors.

The policy plan has recently not been mentioned anymore in speeches and publications after having received too much (negative) attention from abroad but remains in place. When looking at the key industries for MIC25 one can understand that countries like France, Germany and the U.S. got nervous about the concentrated force of funds and resources poured into certain industries from government, state owned enterprises and related entities as these are the same sectors that these economies would like to be strong at. In addition, it also shows that the times of China as the “world’s factory” and supplier of cheap low-tech goods facilitated by low labor cost are coming to an end.

Ten core industries set the basis of Made in China 2025

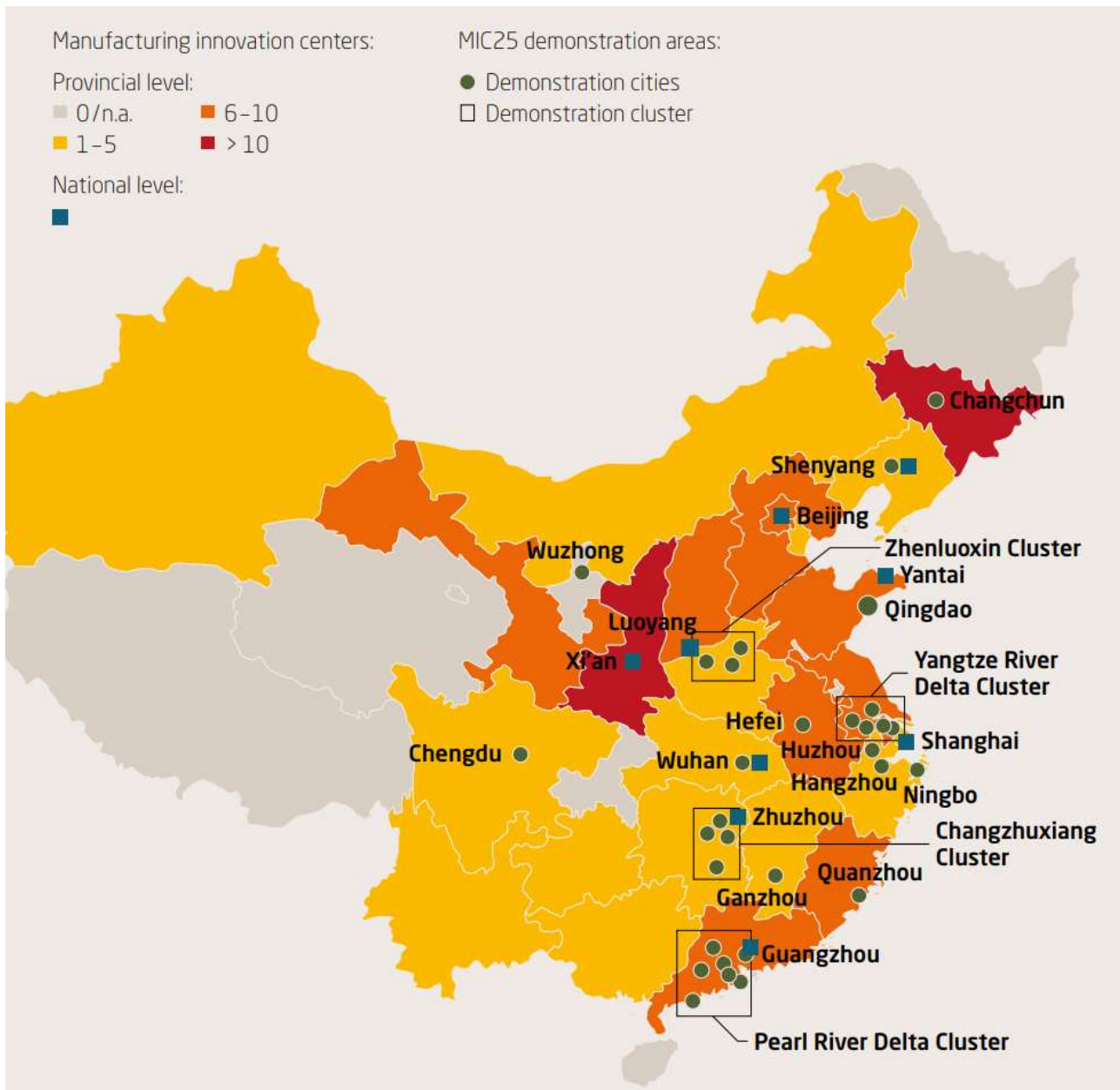


Main steps	Milestones
2025	Major manufacturing power
2035	Global manufacturing power
2049	Leading manufacturing superpower

Source: State Council

12 manufacturing innovation centres				
Beijing Batteries (06/2016)	Shenyang (Liaoning) Robots (01/2018)	Xi'an (Shaanxi) 3D printing (08/2016)	Yantai (Shandong) (Automotive) light-weight material forming technology & equipment (04/2019)	
Zhuzhou (Hunan) Advanced railway transportation equipment (01/2019)*	Guangzhou (Guangdong) Print & flexible displays (01/2018)	Luoyang (Henan) Smart agricultural machinery	Shanghai (Shanghai) Chips (07/2018) Smart sensors (07/2018) Maritime equipment (09/2018)*	Wuhan (Hubei) Information & optoelectronics (04/2018) Digital design (10/2018)

Source: MERICS



MIC = Made in China
 Source: MERICS

2.4 Industry Clusters in China

The vast majority of China's industrial clusters are still located near China's east coast, where infrastructure is much stronger. The government launched its "Go West" policies nearly two decades ago, intended to encourage broader geographic distribution of development. Much of the outside investment seems however to be focusing on pre-existing clusters especially around Chengdu, Chongqing and Xi'an in which a number of multinational companies and also Chinese investors from the East Coast or the South have set up plants in less-advanced interior cities, lured by the prospect of cheaper land, labor and tax benefits.

The following shows for major Chinese provinces their important industry clusters:

Province	Industry
Anhui	Tools
Fujian	Packgaing
Jilin	Tools
Guangxi	Aluminium
Guangdong	Electric & Electronics, Tools, Packaging, Plastics, Organic Chemicals
Guizhou	Aluminium
Hebei	Industrial Machinery, Iron & Steel, Tools
Henan	Aluminium
Hubei	Optical Devices, Plastics & Rubber, Tools, Industrial Machinery, Automotive
Hunan	Tools, Industrial Machinery
Inner Mongolia	Aluminium
Jiangsu	Industrial Machinery, Electric & Electronics, Packaging
Jiangxi	Industrial Machinery
Liaoning	Iron & Steel, Industrial Machinery
Shandong	Electric & Electronics, Industrial Machinery, Organic Chemicals
Shanghai	Plastics & Rubber, Organic Chemicals, Packaging, Automotive
Shanxi	Aluminium, Industrial Machinery
Yunnan	Aluminium
Zhejiang	Automotive, Plastics & Rubber, Electric & Electronics, Packaging

Source: MANGGEI CONSULTING

The following map of China suggests where the industry clusters are located from which Austria's industry is currently mostly sourcing from. The map also shows the size of the country and while as sourcing opportunities might exist in several regions of China, buyers are often well advised to focus on a certain area:

Chinese Regions of biggest interest for Austrian Buyers



Source: MANGGEI CONSULTING

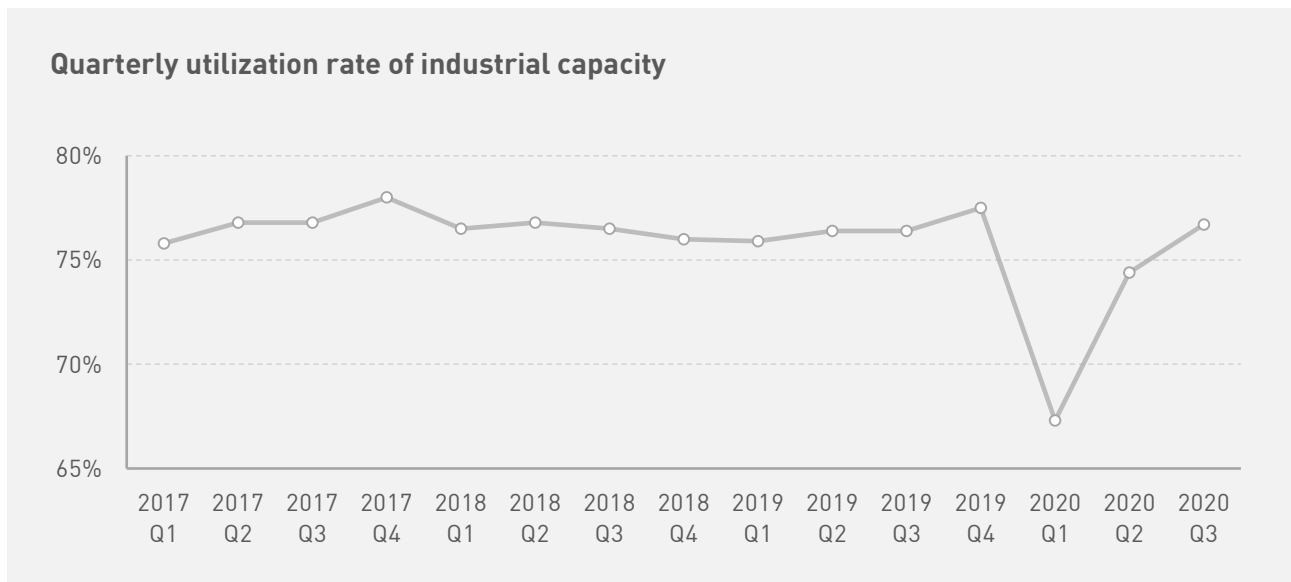
2.5 Economic Snapshot

2.5.1 Summary

China is the world's second-largest economy (after the U.S.) with a 16% share of the global economy. Its economy is highly diversified, dominated by the manufacturing and agricultural sectors. With 1.4 billion people, it is the most populated country in the world. By 2026, India will rise into in this position and overtake China's population figures. China's industrial sector contributes to approximately 40% of its GDP and employs 28.2% of the population (2020 figures). China has become one of the most preferred destinations for the outsourcing of global manufacturing due to its relatively low labor costs and good manufacturing and logistics infrastructure. However, labor costs are on the rise, especially in the regions on the Coast and in the South of China. China's economic development has coincided primarily with the development of a competitive and outward-oriented manufacturing sector. Companies with foreign capital are responsible for more than half of all Chinese exports. Their shares in the benefitting sectors vary: from more than 60% for electronics to less than 20% for the majority of consumer products. State owned companies still contribute approximately 40% to the GDP. The services sector's share in the GDP is approximately 54% and it employs around 47% of the workforce.

In 2020, the Chinese economy was the only major economy with a positive GDP growth. China's unexpectedly rapid recovery from the pandemic which was supported by strict containment measures, more exports (boosted also by the demand for medical goods and home electronics) and domestic consumption returning almost to normal, resulted in a GDP growth of nearly 2 percent. The economy is expected to grow by 8 percent in 2021. Given the world-wide economic crisis and problematic political relations with some key trading partners, further restoring domestic demand will be a key priority for China under its newly proclaimed "Dual Circulation" model.

China's industrial capacity utilization reached in Q3/2020 the same 76% level as in pre-Covid times. The following chart shows industry utilization as a percentage of total capacity per quarter:



Source: Investopedia, Focus-Economics

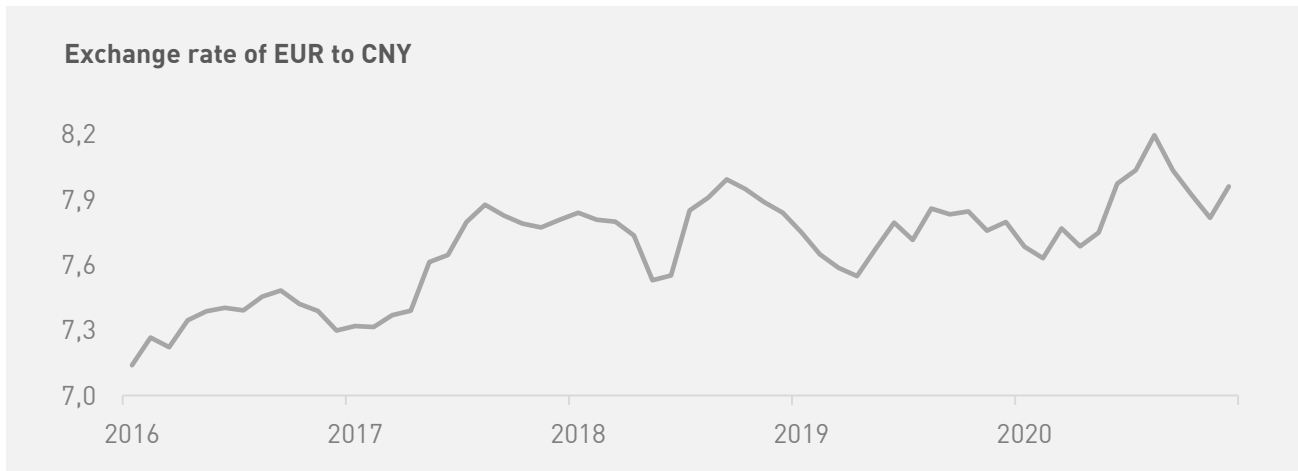
The following table shows some key economic indicators and estimates relevant to sourcing managers:

Key Indicators	2020	2021	2022	2023	2024	2025
Population in Mio.	1,395	1,399	1,402			
Gross Domestic Product (per head, in USD, adjusted for purchasing parity)	17,649	19,399	20,708			
Real GDP growth (%)	1.8	7.3	5.4	5.2	5.0	4.7
Consumer price inflation (av; %)	2.9	2.8	2.8	2.5	2.4	2.2
Government balance (% of GDP)	-5.6	-5.0	-4.4	-4.5	-4.3	-4.1
Current-account balance (% of GDP)	1.7	1.6	1.5	1.3	1.1	0.8
Money market rate (av; %)	2.1	2.4	2.7	2.8	2.9	2.9
Unemployment rate (%)	5.5	5.6	5.4	5.2	5.1	4.8
Exchange rate RMB:USD (av)	6.90	6.83	6.96	7.00	6.97	6.84
Goods exported (billion USD)	2,497	2,816	2,964			

Source: Economist Intelligence Unit Estimates and Forecasts

2.5.2 Currency and Exchange Rate

Despite the size of China's economy and its currency and the Renminbi (RMB) being upgraded to an international reserve currency by the International Monetary Fund in 2015, the share of RMB payments in cross-border transactions is currently less than 2%. China's exchange rate regime remains under the strict control of Chinese regulators who want to reduce the risk of capital outflows. This means that the currency is not convertible, which limits its attractiveness for international transactions. Most companies still prefer to use the USD, even when exporting goods from China to the Asia Pacific region. From 2008 to 2020, the exchange rate of the Chinese yuan to the USD has remained in a range of 6.1 to 7.1.



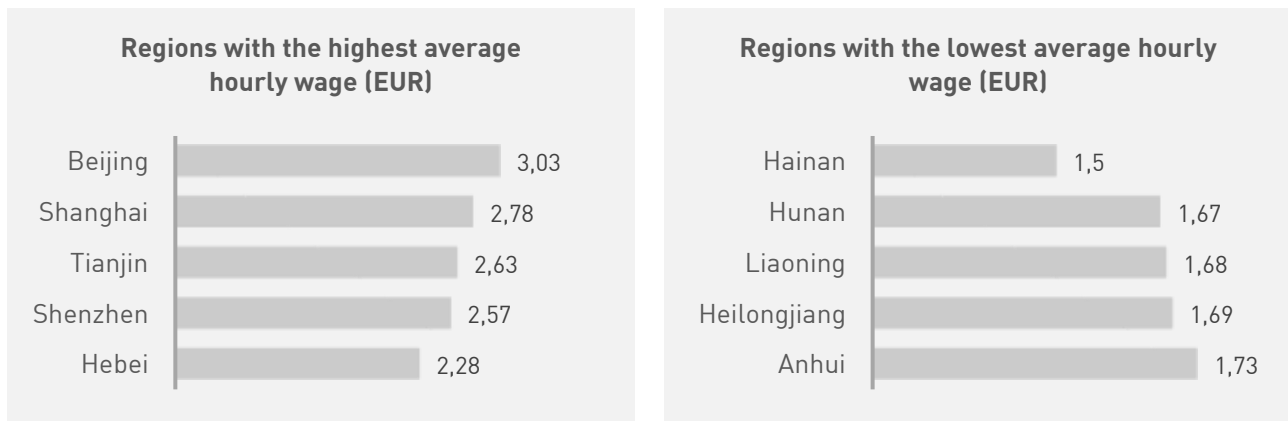
Source: Investopedia, Focus-Economics

Most analysts expect the Renminbi to fluctuate at around RMB7:USD1 in the years 2022-24 amid the maintenance of strong capital controls, before rebounding to an average of RMB 6.84 : USD1 by 2025. Consumer price inflation is expected to remain in the range of 2.5 to 3% p.a. until 2025.

2.5.3 Labor Cost

Chinese manufacturing in most parts of the country cannot rely anymore on an abundant supply of workers and low wages. Factories, especially in more developed areas on the coast and in the south, are struggling to fill a shortage of blue-collar workers. The use of automation is on the rise. Monthly wages for qualified workers in factories near Shanghai surpass the 10,000 RMB/month range, well above the average starting wage for university graduates.

In 2019, average hourly paid wages in large cities equalled EUR 2.50, in "A" class cities – EUR 2.20, in "B" class cities – EUR 2, in "C" and "D" class cities – EUR 1.80. Wages vary a lot across regions:



Source: China-briefing

Despite of increases over the past years, wages in China are relatively low when compared internationally. Statista quotes that in 2018, manufacturing labor costs in China were estimated to be 5.51 USD per hour, compared to 4.45 USD in Mexico, 2.73 USD in Vietnam, 27 USD in the U.S. and in the range of USD 5.55 (for Bulgaria) and USD 55.70 (for Norway) in Europe.

Manufacturing, especially for more specialized product or for such products which require vertical integration, will stay in China despite rising labor costs. China benefits from having an advanced supply chain as factories are no longer just assembly lines. Chinese producer also benefit today from being able to source also most components locally. Productivity is growing faster than in other Asian countries due to automation and better organization. Rising labor costs will attract more investment into China's more underdeveloped hinterlands.

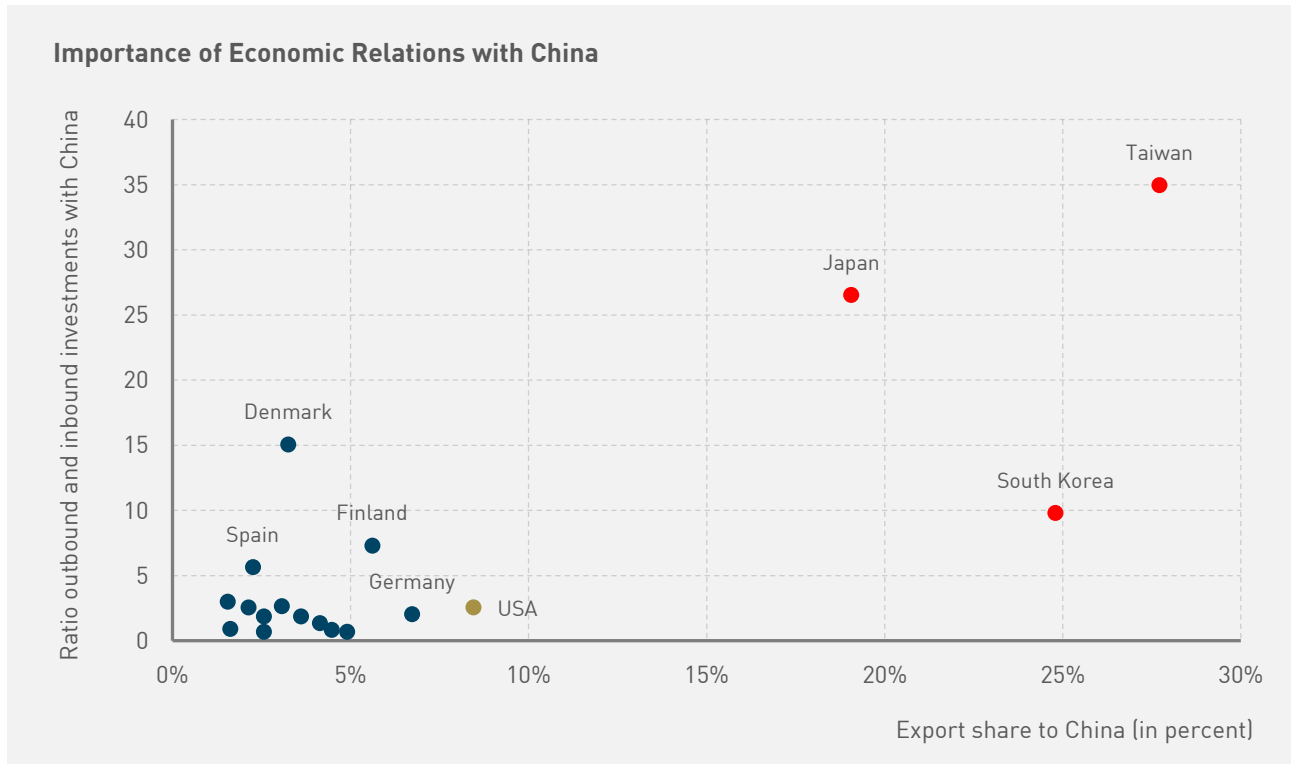
New factories producing low cost, low technology items with small margins are being set up in other Asian countries with lower wages like Vietnam, Thailand, Bangladesh and Indonesia or existing factories are moving there from more developed parts of China. Some of the labor cost savings might be counterbalanced by higher logistic costs for suppliers, lower productivity rates and additional costs of operating in a more complex economic ecosystem.

2.5.4 China's Environment

To curb environmental pollution, the Chinese government has dramatically strengthened the enforcement of environmental regulations under the leadership of President Xi Jinping. Several crackdowns have been initiated on heavily polluting industries that do not comply with current environmental regulations. These measures have affected business in various sectors and have had rippling effects throughout the economy. Thousands of factories have been permanently closed disrupting the supply chain.

2.5.5 China's Integration with Other Economies

China's economy is today a vital part of the World's economy. The following chart places countries and regions according to their China export share and foreign direct investment (FDI) intensity ratio. Looking at the horizontal axis, it shows that Taiwan, South Korea, Japan, the U.S. and Germany have a fairly high dependency on exporting to China. Looking at the vertical axis, it shows that Taiwan, Japan and Denmark have invested multiple times more in China than foreign direct investments received from China.



Sources: China's Ministry of Commerce, UN Comtrade, Bureau of Foreign Trade of Taiwan

For the Austrian economy, the P.R. of China is its second most important import country (after Germany) and tenth most important export country worldwide. In 2020, Austrian companies imported 10.1 billion EUR from China (+3.2%) and had invested over 5.5 billion EUR in China (including in its Special Administrative Region Hong Kong) employing 33,000 people (for details see [AUSSENWIRTSCHAFT AUSTRIA Wirtschaftsbericht China](#)).

In 2020, China was the most popular foreign investment destination worldwide and received further 163 billion USD of international investments (UNCTAD).

2.5.6 Free Trade Agreements

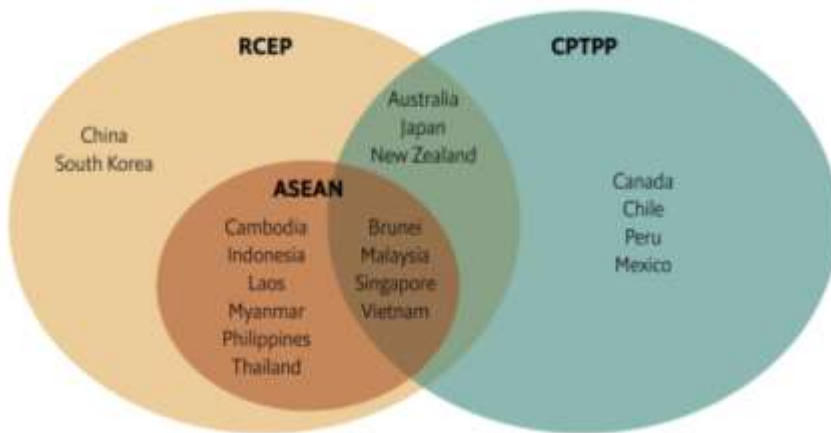
China signed its first free trade agreement with the Association of Southeast Asian Nations (ASEAN) in 2002. Since then China signed a number of other free trade agreements, noticeably mostly with other Asian countries and in 2020 the "Regional Economic Partnership Agreement".

China's bilateral agreements: Hong Kong, Chile, Pakistan, New Zealand, Singapore, Peru, Taiwan, Costa Rica, Iceland, Switzerland, Macau, Australia, Korea, Georgia, Maldives, Mauritius, Cambodia

China's regional multinational agreements: Association of South Eastern Nations (ASEAN, 10 nations, signed in 2002) and Regional Economic Partnership (15 nations, signed in 2020)

Companies from signatory countries of the free trade agreements benefit from streamlined rules of origin, simplified customs procedures and easier cross-border production opportunities. Chinese companies are actively looking to set up production sites in other Asian signatory countries.

Asia-Pacific Trade Groupings



RCEP = Regional Comprehensive Economic Partnership

CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership

Source: *The Economist Intelligence Unit*

The United States is notably absent in RCEP and CPTPP.

Association of Southeast Asian Nations ASEAN

The Association of Southeast Asian Nations (ASEAN), which includes Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brunei, Vietnam, Lao People's Democratic Republic, Myanmar and Cambodia, is home to more than 600 million people. It has the third largest labor force behind India and China; more than 213 million are between the age of 15 and 34. Since its founding, the bloc has seen growth in sectors such as manufacturing and transportation. Indonesia represents about 40 percent of the bloc's economic output.

Regional Economic Partnership RCEP

The Regional Comprehensive Economic Partnership (RCEP) is a free trade agreement connecting ASEAN with China, South Korea, Japan, Australia and New Zealand. RCEP's 15 signatory countries have altogether 2.2 billion people and a 30% share in the world's global economic output. It is the first time that China, Japan and South Korea have signed the same trade deal. The noticeable member missing is India. India was part of the negotiations until 2019 when the government decided to opt out of the agreement due to the perceived risk of its domestic industries being overwhelmed by imports of Chinese goods. It was also disappointed by the lack of progress on services trade—an export strength for the country. The inclusion of India would have been a huge feather in RCEP's cap, given not just the size of its economy, but also the fact that it has largely held back from trade liberalization so far.

RCEP it is not primarily a tariff-focused trade deal. Many goods categories already qualify for duty-free status through existing free trade agreements via the ASEAN Economic Community and bilateral deals between ASEAN and other participant countries. The tariff reductions between China, Japan and South Korea are more significant, although these schedules will be introduced gradually and will extend into the late 2020s.

2.5.7 Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)

China is not part of CPTPP, but in the context of looking into Asia the agreement is worth mentioning. The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) is a free trade agreement between Australia, Japan, New Zealand, Brunei, Malaysia, Singapore, Vietnam, Canada, Chile, Peru and Mexico which was signed in 2018 and is being implemented in stages. More countries are expected to join. The agreement provides more investment opportunities among its members with a population of altogether 495 Mio. people. The CPTPP removes 99% of tariffs on goods and services among its members.

2.5.8 EU-China Investment Agreement (CAI)

At the end of 2020, the EU and China have concluded negotiations in principle for a Comprehensive Agreement on Investment (CAI). The European Commission's expectations of the concrete benefits of this agreement - which still has to be ratified in the EU member states - are high: China has committed to a greater level of market access for EU investors than ever before, including some new important market openings. China is also making commitments to ensure fair treatment for EU companies so they can compete on a better level playing field in China, including in terms of disciplines for state owned enterprises, transparency of subsidies and rules against the forced transfer of technologies. For the first time, China has agreed to ambitious provisions on sustainable development, including commitments on forced labor and the ratification of the relevant ILO fundamental conventions.

https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2541

Surveys among Austrian, German and other European investors in China show that they currently face many challenges at an indirect level. Regulatory challenges and administrative and bureaucratic hurdles are among the biggest obstacles: Customs regulations and procedures, obtaining necessary licenses, requirements of the Cyber Security Act, the Corporate Social Credit System, as well as capital transfers and cross-border payments are mentioned as being cumbersome. Most of these obstacles are also problematic for domestic companies and will not be solved by the agreement.

2.5.9 Trade Decoupling / US-China

Talk of economic "decoupling" between China and the United States, the world's two largest economies, surfaced amid their prolonged trade war, rising tech rivalry and general geopolitical tensions which have edged up in recent years. Decoupling transcends trade and investment could mean a peeling back of trade in goods and services, divestment from China and a shift of U.S. manufacturing presence out of China, and could mean a fragmentation of the global supply chain. A major decoupling move would mark the end of a long period of globalization.

Major current disputes, also followed up by the U.S. President Biden and his administration, are about the following concerns:

Tech Rivalry

The technologies in which China is investing are the same ones U.S. firms are investing in and are considered foundational for future innovation: artificial intelligence, autonomous vehicles, augmented-virtual reality, robotics, block chain technology and more. The U.S. accuses China of unfair trading practices regarding technology transfer and intellectual property. Targeted restrictions on the sale and export of critical goods – such as semiconductors, related manufacturing equipment, software or even rare earths – have become a more pressing concern for companies operating in China and globally. China sees a danger in being cut off from crucial inputs for its industries and wants to increase its own abilities in producing cutting-edge technologies (see also Made-in-China-2025). China's new export controls towards the U.S. increase risks as well, as locally developed goods and solutions could be blocked from export.

Xinjiang

Criticism about China's treatment of the mostly Muslim Uighur population in its autonomous region Xinjiang (Northwest China) is rising. Xinjiang produces a fifth of the world's cotton and is rich in oil and natural gas. The U.S. imposed financial sanctions and travel restrictions against certain Chinese officials and organizations.

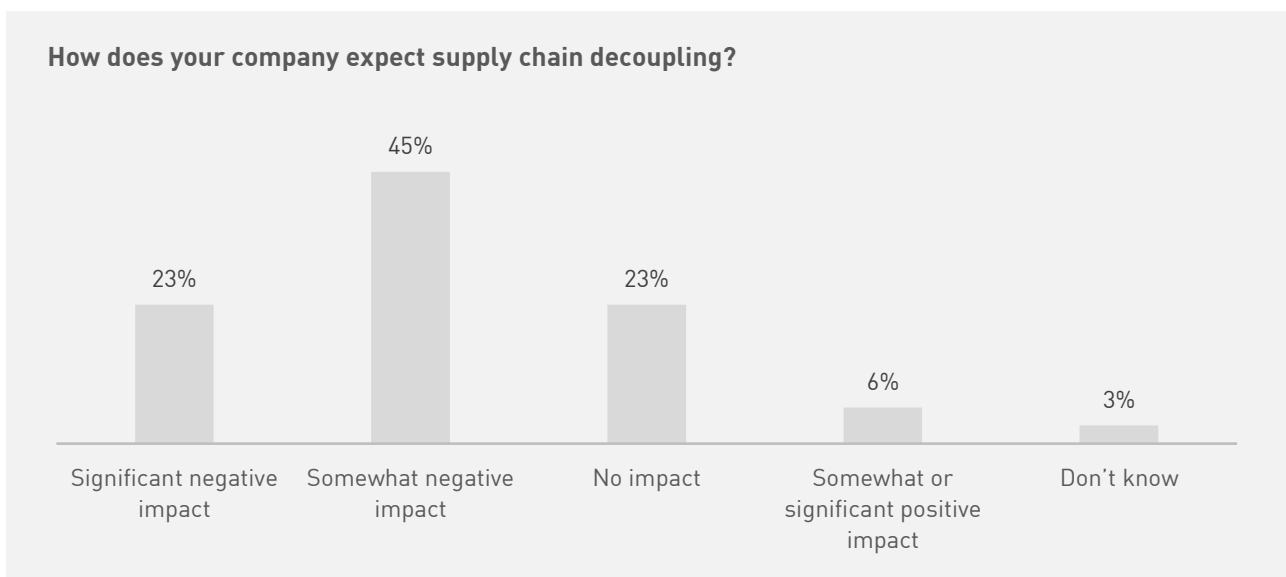
Hong Kong

Under the "one country, two system" principle, the Special Administrative Region Hong Kong has been granted a fairly high level of independency especially in regards of its economic system until the year 2047. Western partners of Beijing and Hong Kong heavily criticized the passing of a National Security Bill (2020) and an electoral system overhaul (2021). As a response, the U.S. does not consider Hong Kong as an independent system from China anymore in terms of trade policy issues. Certain Hong Kong officials were targeted with financial sanctions and travel bans to the U.S. Export control restrictions for sensitive U.S. technologies were broadened to include Hong Kong. Political attention and threat of sanctions also come from other countries like Australia and the European Union.

The impact on European companies currently sourcing from China includes increasing risks due to a souring of the public opinion in home markets towards China, a drop in business sentiment and uncertainty for operations due to the securitization of business flows. Also, the tariff landscape became somehow more unpredictable, especially in regards to the U.S. – China trade flows. Even companies with little to no risk might be hit if a Chinese link in their supply chain can no longer source components or equipment from abroad.

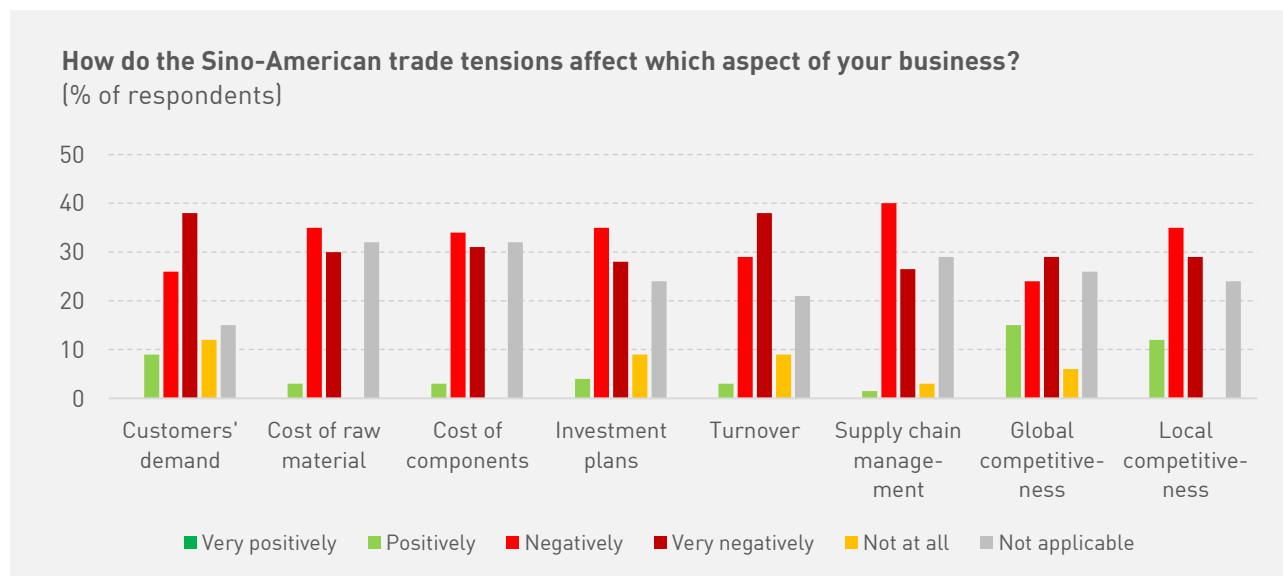
A survey among European investors in China shows that the majority expects consequences for the supply chain from the strained relations between China and the U.S. and possible other countries. Most European productions in China follow the "in China, for China" localization strategy. The survey also shows that even if the production for the Chinese markets is in China, they still need to import materials and machineries from abroad. Unpredictability from political disputes will motivate the decision makers to maximize onshoring (source from within China) to secure their operations.

"Trade decoupling and the Effect on Supply chains:



Source: European Chamber survey on decoupling conducted in September 2020

Also, Austrian companies in China who were surveyed by the AUSSENWIRTSCHAFT AUSTRIA see a rise of the costs of raw materials and components and experience more complexity in managing their supply chain:



Source: *The Austrian Business Confidence Survey 2020*

Some Chinese and international producers might want to mitigate the risks from political disputes and put further investments into markets outside of China, especially into lower labor cost countries in South- and Southeast Asia. Supply chain members would have to follow accordingly. Several chemical and refining companies as well as machinery producers already announced that their global strategy includes an increase in investments into India and Southeast Asia to court companies from China moving there.

Some companies operating in or with China are worried about China's dependency on the access to the USD dominated financial system. China's strong position in international merchandise trade means that the country is highly dependent on unrestricted access to the USD. To address this reliance, China's regulators have aimed to internationalize the RMB for years, with limited success. As long as China lacks a fully convertible capital account and an internationalized renminbi (RMB), its reliance on the USD remains its 'Achilles heel'. Efforts to internationalize both its currency and financial markets are likely to accelerate, but liberalization is needed to do so. Any broad restrictions on access for China to the USD would amount to a 'nuclear option' that would bring considerable economic damage to the U.S. and the rest of the world. Only a massive escalation of political tensions seems likely to trigger it, as happened with Russia and Iran.

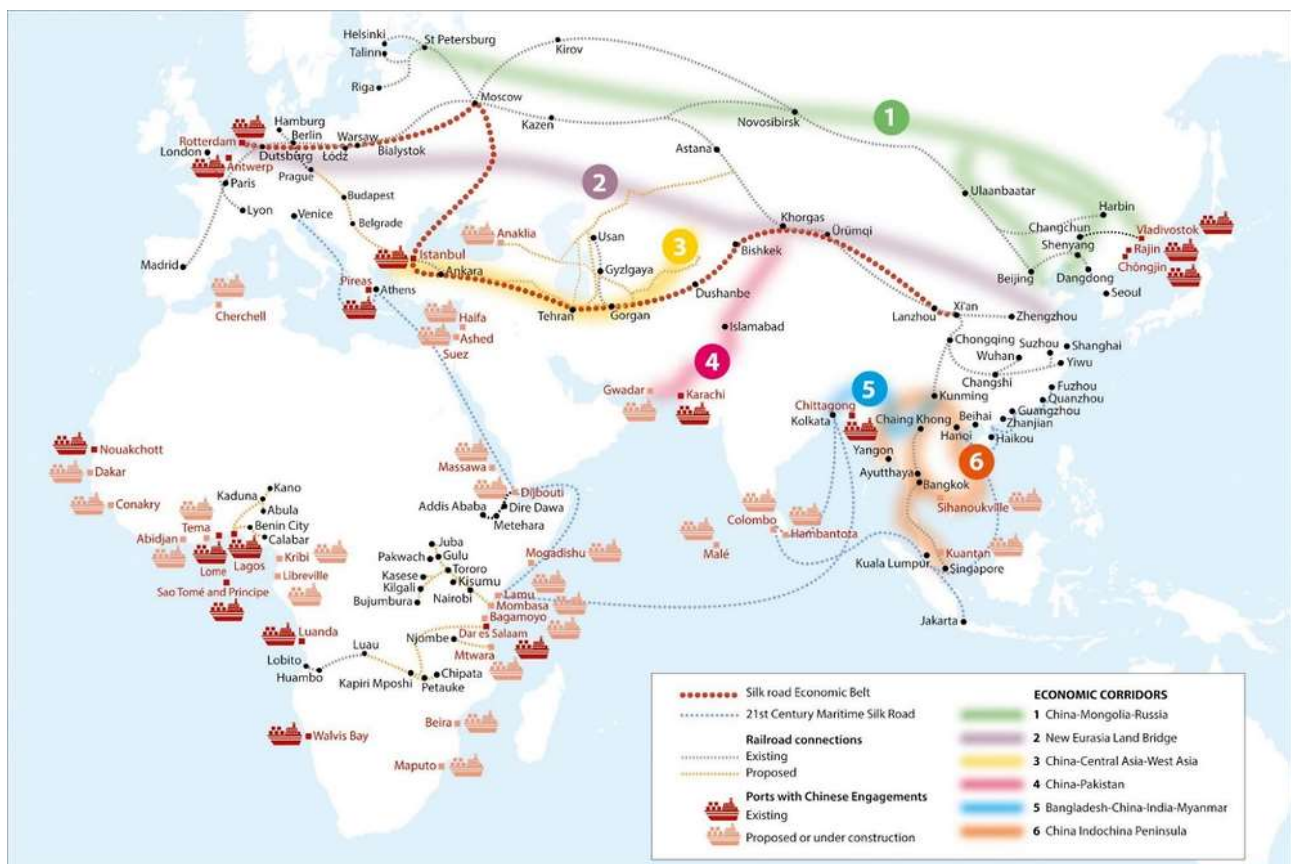
2.6 Logistics Trends

China possesses a massive network of ports, railways, roads and industrial parks that enable an efficient and speedy transport of materials and products within China and abroad.

The global COVID-19 pandemic effected primarily the international networks. The conditions under which logistics providers normally operate were disrupted and are far from normal. At the beginning of 2021, prices for sea and airfreight from China to Europe were at a historically high level. The dramatic reduction of passenger flights that normally also transport goods, and delays in bringing shut container ships back into operations means that 30 – 40 % of the usual freight capacity is not available. There is also a disparity in freight volumes. While Chinese exports to Europe are booming, European deliveries decreased, and delays in unloading containers in Europe resulted in a shortage of available containers in China. In addition, freight trains from China to Europe (only 2% of overall volume) face capacity constraints at railway and transit railway stations in Europe. Some products are even transported to Europe via trucks. The high transportation prices make the sourcing of some cheap materials and products from China not commercially viable anymore and Austrian buyers might have to look into sourcing markets closer to home. Freight forwarders like DB Schenker provide **timely updates** on the most recent developments.

Belt and Road Initiative's "Maritime Road" and overland "economic belts"

China pursues an ambitious plan to create and operate global logistics networks. Under the umbrella of the "Belt and Road Initiative", the Chinese government supports national champions in the logistics sector to compete on the global stage. China invests heavily in a high-tech upgrade of the logistics sector in China and along six economic corridors towards major trading partners. The goal is to offer more connectivity, and support logistics operations and hubs (ports and railway stations) along the routes. The following chart shows corridors that are supported:



Source: OECD research from multiple sources

Major ports

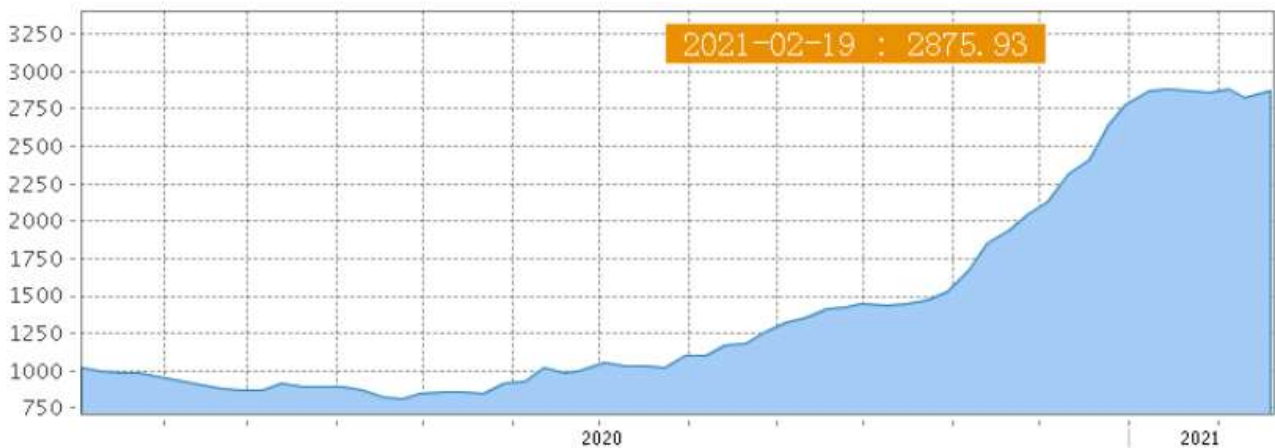
China's seaports belong to the largest in the world. China massive investments into the port infrastructure are a major growth factor for the regional economies, especially in the Yangtze River Delta region (Shanghai), the Bohai Rim region (Tianjin) and the Southeast region (Guangzhou). The State Oceanic Administration estimates that China's "blue GDP" (encompassing all sectors of the maritime economy) represents 10% of the country's GDP, and seven Chinese ports are in the world's top ten. The growth of these ports has transformed urban life in coastal China. Shanghai, today the largest container port in the world with a container traffic of 43 million TEUs, managed only 2 million TEUs in 1996.



Source: Marine Insight

The Shanghai Export Containerized Freight Index (SCFI) reflects the ocean freight and the associated seaborne surcharges of shipping from Shanghai to Europe, the U.S and other major container trade routes. The following charts shows that sea freight from Shanghai is currently trading nearly three times as much as normal:

Shanghai Containerized Freight Index



Units: USD/TEU

Source: Container News

EU-China Freight Trains

Freight trains between China and Europe have played a crucial role in helping to stabilize the international logistics supply chain and setting record numbers in terms of trips and volume in 2020. In 2020, more than 12 thousand trains – carrying goods with a value of USD 50 billion – ran the New Silk Road rail route between China and Europe. Rail freight has taken market share away from the ocean-going vessel sector, which leads Asia-Europe trade in terms of volume. According to Eurostat, rail freight between Europe and China accounted for 1.4 million tons and 0.9 million tons in imports and exports respectively.

The main route of the new Silk Road connects northeast China via Xi'an and Beijing and the south of the country via Chongqing with Europe and the central ports of Duisburg and Lodz in Poland. The increase over the past months is part of a longer trend that has been accelerated by the coronavirus pandemic. A dramatic reduction in air transport capacities caused by the loss of regular passenger flights, less sea freight capacity from east to west, increased complexities of border crossings and Covid-19 rules in overland transportation provide an even greater window of opportunity for rail freight from China.



Amid China's economic recovery and limited international air/ sea transport, freight trains have played a crucial role in helping to stabilize the international logistics supply chain.



More than 12,000 cargo trains ran between China and Europe in 2021 (8,200 in 2019)



They transported 927,000 twenty-foot equivalent units of cargo, up 54% from a year earlier



The number of China Rail Express trains arriving in Duisburg, Germany has risen from 30-35 per week before the pandemic to up to 60 per week. Also Austrian companies make use of this railway link.



Turkey also launched its 1st China-bound freight train departing in Istanbul and reaching Xi'an within 12 days

Source: EAC research, China Daily

Looking ahead, despite rail transport on the Asia-Europe route growing quickly, its share, accounting for only around 3% of all cargo travelling between China and Europe, remains limited. For shipping between China and Austria, rail freight is faster than sea freight and more cost-effective than airfreight. Cargo-only train services have been available between China and Austria since 2018, and some companies including the Austrian fiber producer Lenzing AG which for the first time in the history of Austria sent goods that were 100% produced in Austria directly to China by train in 2020, have already been chartering their own trains. For Austria, the discussed extension of the broad-gauge railway (for the movement of containers between the broad-gauge (1,520 mm) trains used in former Soviet countries, such as Russia, Kazakhstan and Belarus, and the standard-gauge (1,435 mm) trains used in China and the EU) from Slovakia to Austria would greatly enhance efficiency.

3 ALTERNATIVE MARKETS TO CHINA - MACRO ANALYSIS

Buying from China – Should I stay, or should I go?

The impact of the COVID-19 health crises, natural disasters, global trade disputes involving China, more complex logistics arrangements and changed production pattern in Europe are some of the reasons European buyers see benefits in diversifying their supplier base also geographically. At least one alternative supplying market would often be desirable (“China Plus One – Strategy”). However, with strong supplier networks, flexible & skilled workforce, efficient ports and transportation infrastructure it could be challenging for certain material groups currently being sourced by Austrian companies from China to add on other supplying countries and regions or to replace China sourcing altogether.

“Nearshoring”, which would mean for Austria developing suppliers in Austria or Central- Eastern and South-Eastern Europe (CESEE), might become more attractive. Rising labor and cross-continent logistics costs and challenges experienced when health or other crises arose, make some Austrian procurement managers to look out for suppliers closer to home. It is also easier to accompany and develop suppliers from the buyer’s operations in Austria and cost borne out of engaging local support in the supplier’s country and/or an own presence there can be reduced. Austrian producers have made good use CESEE as a potential supply base or have set up their own manufacturing operations there. Some of them ship material back for further manufacturing in Austria and benefit from short distances, easier coordination and less complexity than dealing with partners in a very different culture far away. It is interesting to see, however, that in 2020, Austrian imports from all EU-27 countries decreased by 9%. If one looks only into the 13 new EU-Countries (joining the EU after 2003) the decrease was 7%. Those “new” EU-countries (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia) had a share of 15% of all goods Austria imported, in 2020.

Potential Alternative Supplying Countries and Regions for Austrian Sourcing

The authors tried to identify sourcing markets which could be interesting as an alternative to sourcing from China. The approach took into account an aggregate of the products that the Austrian industry currently sources from China, the overall production volume of countries and regions for these products (as such, smaller countries in CESEE might not be shown) and relevant sourcing factors such as labor cost and the availability of skilled labor. The rough approach does not mean that other countries and regions might not be relevant for Austria or individual purchasing operations. Therefore, the authors recommend companies to conduct their own analysis. It might be useful for them to include some of the criteria and tools used for this analysis.

Factors/Indices used to evaluate the economic and political environment of potential alternative sourcing markets:

Factor	Description	Source
Supply Base	Number of Suppliers (approximate range)	MANGGEI CONSULTING procurement intelligence
Skilled Labor	The Global Competitiveness Report 2019 (Ranking - Out of 141 Countries; 1 = Highest)	http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf
Infrastructure	Statista - Quality of infrastructure Ranking in 2019 (Scale of 0 to 100, 100= Highest)	https://www.statista.com/statistics/264753
Market Opportunity	Global Edge - Market Potential Index (MPI) 2020 Ranking (1 = Highest)	https://globaledge.msu.edu/mpi/data/2020
Inflation	Inflation Rate in %	https://tradingeconomics.com/country-list/inflation-rate

Political Stability	Political Stability Index (-2.5 weak; 2.5 strong)	https://www.theglobaleconomy.com/rankings/wb_political_stability
Corruption	Corruption Perceptions Index (Ranking Out of 198 Countries, 1 = Highest)	https://www.transparency.org/en/cpi/2019/results/mex
International Relations	Economic Freedom Index (Ranking. 1 = Highest)	https://www.heritage.org/index/ranking

Source: MANGGEI CONSULTING

Data:

Country/Region	Supply Base	Skilled Labor	Infrastructure	Market Opportunity	Inflation	Political Stability	Corruption	International Relations
India	>200	107	68.1	4	4.59%	-0.70	80	120
Vietnam	26-75	93	65.9	27	0.19%	0.13	96	105
Malaysia	76-125	30	78	33	-1.70%	0.11	51	24
Thailand	76-125	73	67.8	44	-0.27%	-0.54	101	43
Taiwan	>200	23	86.7	n.a.	0.06%	0.72	28	11
Czech Rep	<25	29	83.8	28	2.30%	0.95	44	23
Poland	<25	34	81.2	26	2.40%	0.52	41	46
Russia	<25	54	73.8	51	4.90%	-0.54	137	94
Turkey	76-125	78	74.3	48	14.60%	-1.34	91	71
United Arab Emirates	26-75	39	88.5	13	-2.41%	0.70	21	18
Saudi Arabia	26-75	25	78.1	54	5.30%	-0.43	51	83

Source: MANGGEI CONSULTING









Scoring:




Supply Base	Rating (1 to 5)	Skilled Labor	Rating (1 to 5)	Infrastructure	Rating (1 to 5)	Market Opportunity	Rating (1 to 5)
>200	5	0 – 30	5	65 – 70	1	1 – 15	5
126-200	4	31 – 50	4	71 – 75	2	16 – 25	4
76-125	3	51 – 70	3	76 – 80	3	26 – 35	3
26-75	2	71 – 90	2	81 – 85	4	36 – 45	2
<25	1	> 90	1	> 85	5	46 – 55	1
Inflation	Rating (1 to 5)	Political Stability	Rating (1 to 5)	Corruption	Rating (1 to 5)	International Relations	Rating (1 to 5)
1 – 3%	5	< 0.1	1	20 – 50	5	10 – 30	5
3.1 – 5%	4	0.1 – 0.3	2	51 – 80	4	31 – 50	4
-2.5 – 1%	3	0.31 – 0.5	3	81 – 100	3	51 – 70	3
5.1 – 8%	2	0.51 – 0.6	4	101 – 120	2	71 – 90	2
> 8%	1	0.61 – 1	5	> 120	1	> 90	1

Source: MANGGEI CONSULTING

Overall, this approach resulted in the following suggestions for alternative sourcing countries and regions for product categories focused on in this study (main product categories Austrian companies currently source from China for further processing in Austria). The below mentioned countries were chosen based on factors such as export value, number of suppliers and macroeconomic indicators:

● Recommended destination; ● Partly recommended, requires more company specific research;

	Electric & Electronic	Industrial Machinery	Iron & Steel Products	Optical Devices	Tools	Plastics & Rubber	Aluminum Products	Organic Chemicals
Dependency on China	High	Medium	Low	Medium	High	Medium	High	High
Ease of Moving	Low	Low	High	Low	Medium	Medium	Medium	Medium
Major Challenges Expected								
India			●		●	●	●	●
Japan			●					●
Malaysia	●			●		●	●	●
South Korea	●		●					●
Taiwan	●	●		●	●	●	●	●
Thailand		●		●				●
Vietnam	●		●	●	●			
Czech Republic	●	●	●		●			
Poland		●	●		●	●	●	
Romania			●		●	●		
Russia			●				●	
Turkey		●	●		●	●		
United Arab Emirates*							●	

 Capital  Labor  Logistics

* due to low energy prices

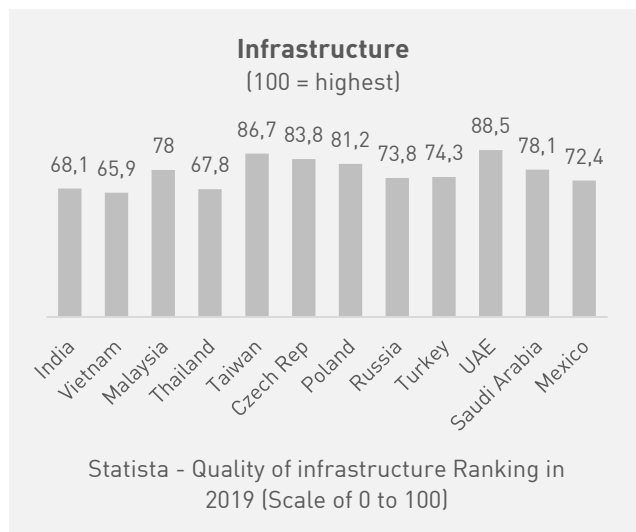
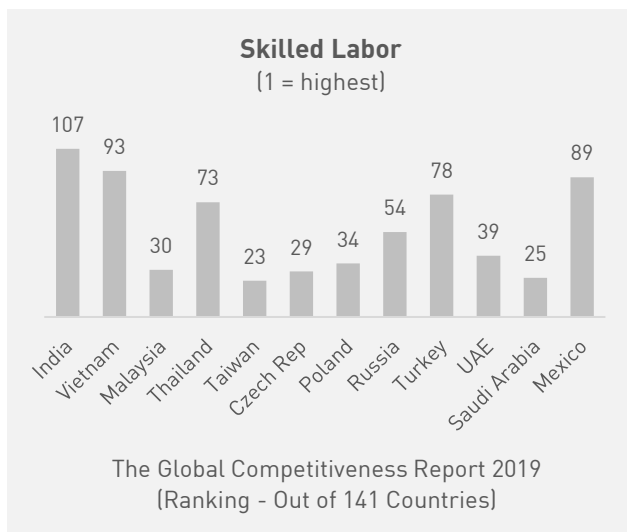
Source: MANGGEI CONSULTING

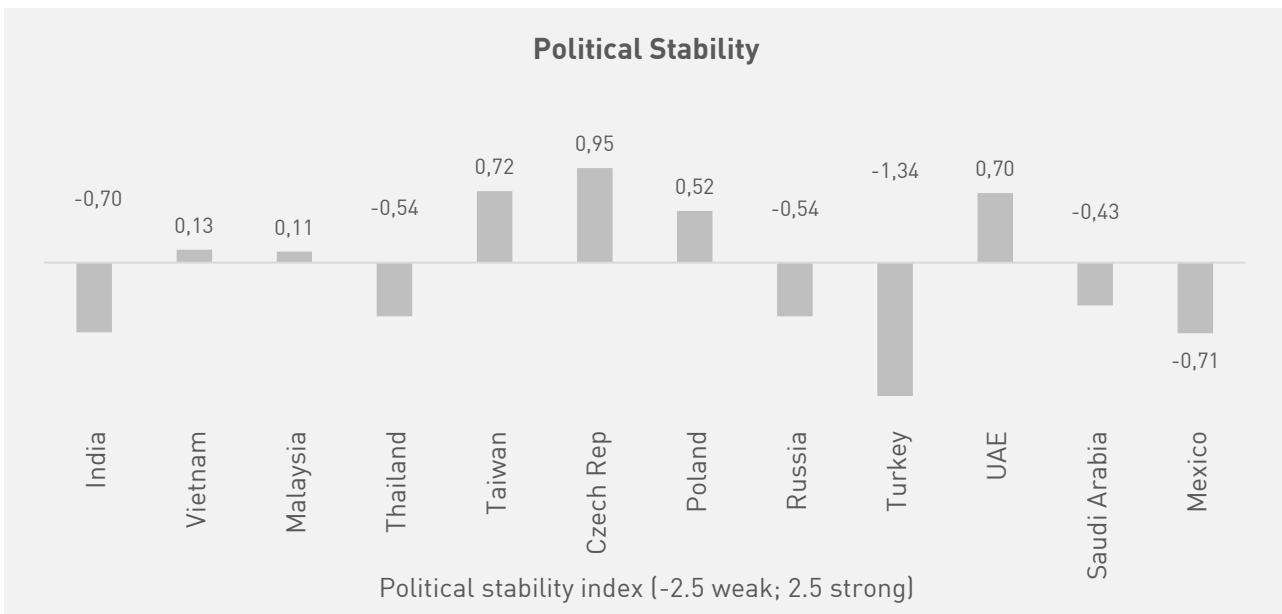
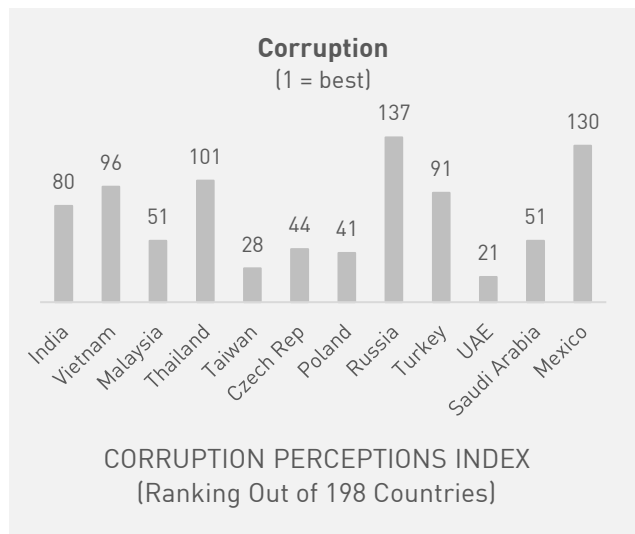
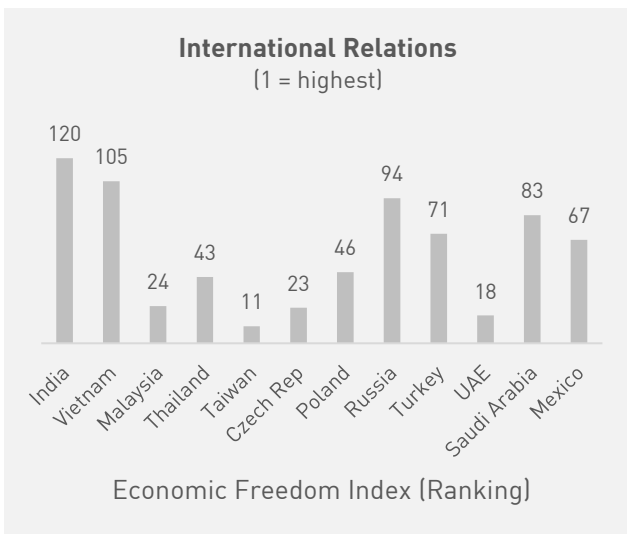
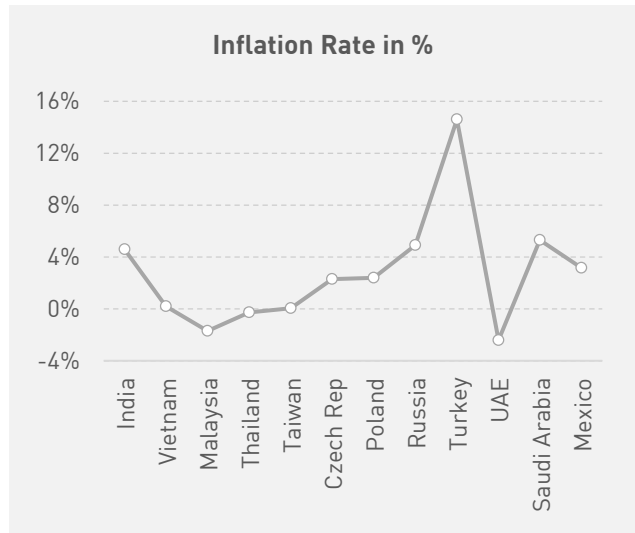
3.1 Major Factors for Alternative Sourcing Destinations

The following shows some of the factors and indices used to compare these alternative sourcing markets:



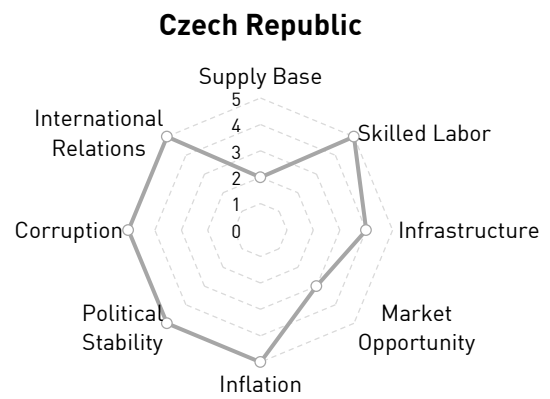
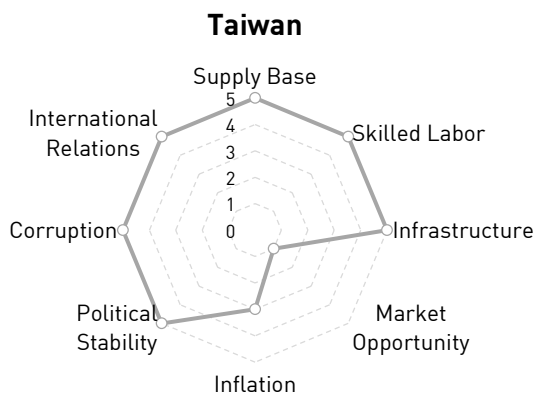
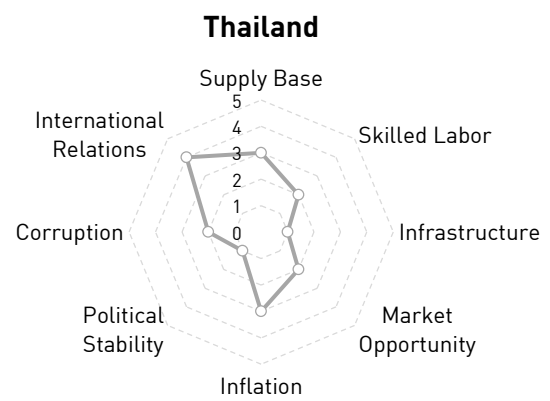
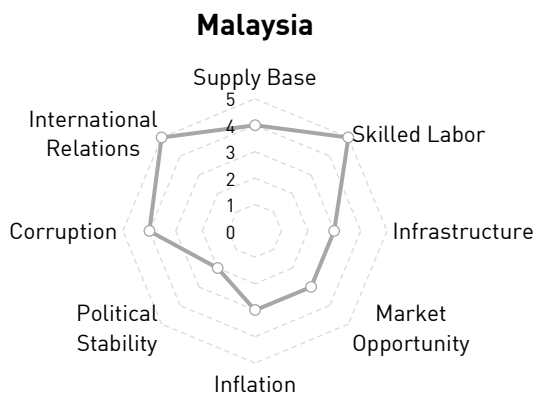
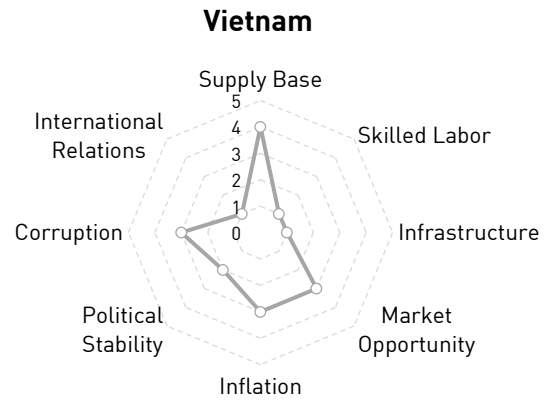
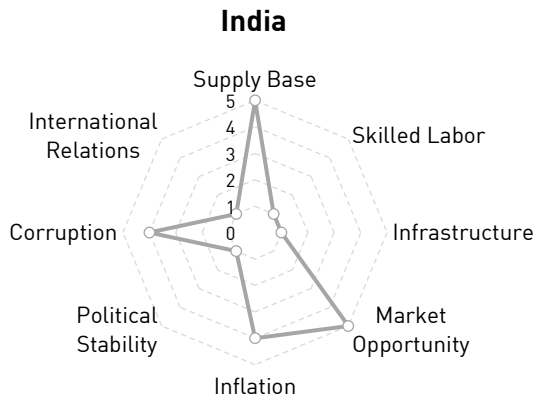
Source: MANGGEI CONSULTING

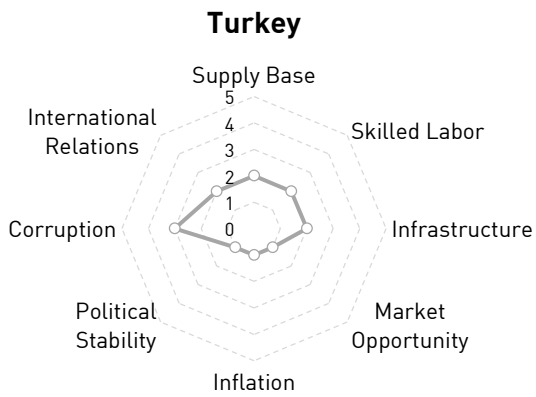
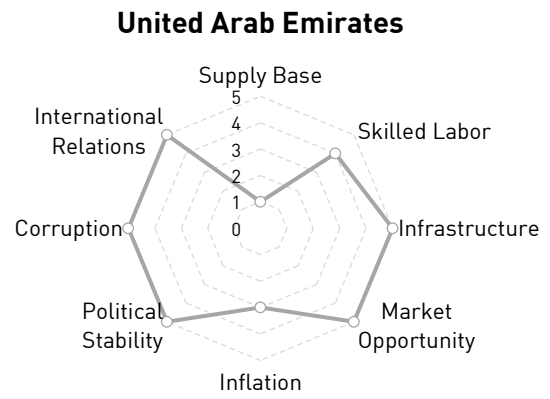
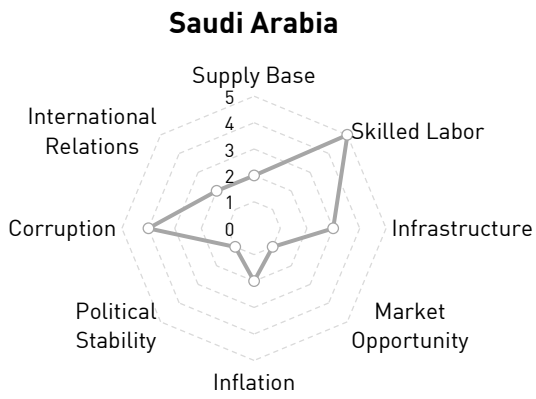
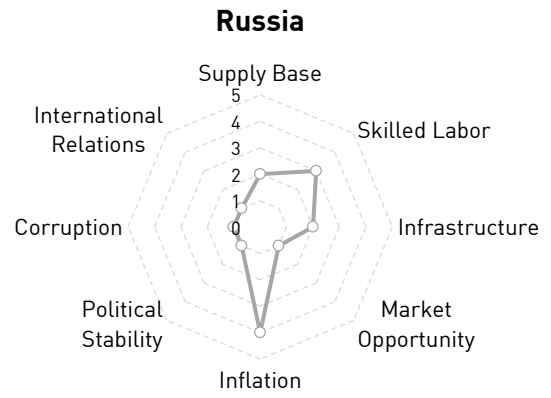
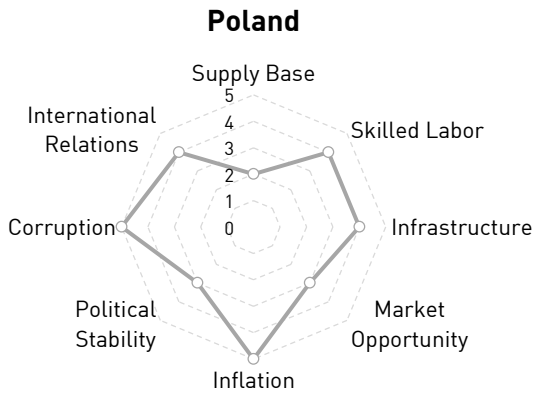




Source: MANGGEI CONSULTING

The following graphs show the specific rating for each country/region for different criteria according to the scoring model used (from 5 = best to 1 = Lowest Rating):





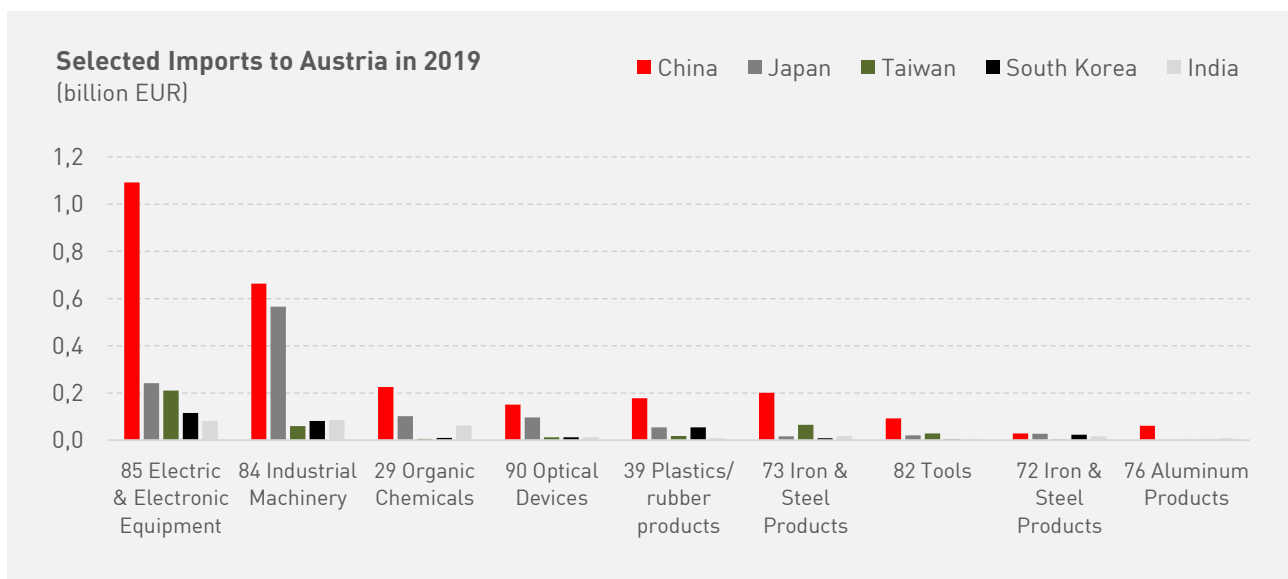
Source: MANGGEI CONSULTING

4 INSIGHTS INTO SOURCING CATEGORIES

4.1 Major Sourcing Categories for Austria from Asia

Definition and How they are Further Analyzed

The study focuses on the major categories which have a significant importance for Austrian companies in regard of further value added by the Austrian companies and which are sourced mainly in China and Asia. For the classification of products the "Harmonized System" (HS), the international nomenclature for the classification of product for customs purposes, as also used by the [EU's TARIC database](#), is applied. The following shows the major HS categories imported in 2019 from Asia to Austria for further processing and where they are sourced from:



Source: Statistics Austria

In the following the authors analyze for each of these sourcing (HS 2 digits groups) major trends for the relevant industry in China and the world and suggest possible countries and regions that could be considered for sourcing:

- Austria's existing sourcing from Asia: Which products are imported from Asia on a HS-4 digits level and which countries/region are the most important exporters?
- Global Snapshot: Which countries and regions are the world's biggest exporters and where do they deliver?
- China Snapshot: How have China's exports developed over the years, where are there industry clusters and which are key suppliers and which trends are relevant for Austrian buyers?
- Potential Alternative Sourcing Markets: Which others sourcing markets might be an alternative to sourcing from China and which countries already buy from them?

4.2 Electric & Electronic Equipment (HS 85)

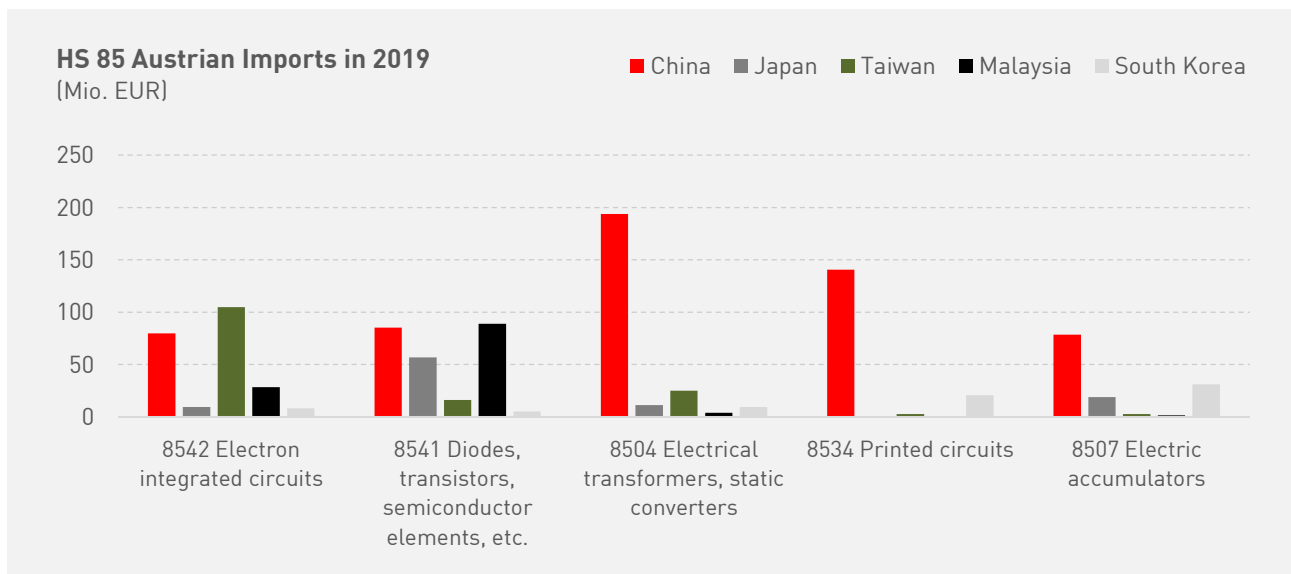
4.2.1 Austrian Sourcing

The biggest part of Austrian imports from Asia is Electric & Electronic Equipment. Thereof, China is the biggest sourcing market for transformers, converters and printed circuits. Multinational Electric and Electronic manufacturers are shifting their manufacturing already into other lower cost countries such as Vietnam. Especially for lower value and lower tech products, these alternative sourcing markets could be taken into account.

In the Electric & Electronic Equipment category, the success of a sourcing strategy strongly depends on the buyer's early clarification of the process and requirements. It is important to determine if components to be sourced will be a "new product development" together with a supplier or if it could be an "off-the-shelf product purchase" (often slight changes are possible). Off-the-shelf products enable the buyer in most cases to reach out to more potential suppliers/regions and to get offers that are more competitive.

Austrian companies are facing supply restraints in processors and circuit boards.

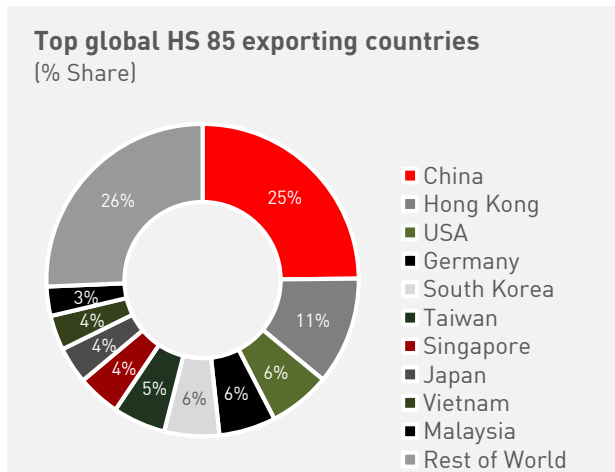
The following chart describes the major HS 85 product categories Austria imports from Asia and shows the most important supply markets:



Source: Statistics Austria

4.2.2 Global Snapshot

The world's most important suppliers for Electric and Electronic Equipment (HS 85) are China, Hong Kong, the United States, Germany and South Korea. China is the top exporter of HS 85 category with a market share of 25%.



Source: UN Comtrade

The following tables show the countries and regions with leading exports worldwide for the selected HS 85 product categories, which are most relevant for Austria:

<i>HS 8542 - Electronic integrated circuits</i>	
Exporters	Exports 2019 in 1,000 USD
Hong Kong	134,483,068
China	102,187,884
Taiwan	100,408,126
South Korea	79,082,276
Singapore	76,868,051
Malaysia	44,794,109
USA	40,099,507
Japan	27,791,254
Philippines	18,991,451
Germany	14,923,059

<i>HS 8541 - Diodes, transistors and similar semiconductor devices; photosensitive semiconductor devices</i>	
Exporters	Exports 2019 in 1,000 USD
China	34,599,090
Hong Kong	13,718,484
Malaysia	8,727,133
Japan	8,604,960
Singapore	7,354,959
Germany	6,732,523
USA	6,688,830
South Korea	5,237,116
Taiwan	4,698,683
Vietnam	3,658,783

<i>HS 8504 - Electrical transformers, static converters (for example, rectifiers) and inductors</i>	
Exporters	Exports 2019 in 1,000 USD
China	27,711,364
Hong Kong	9,887,714
Germany	9,172,966
USA	5,953,409
Japan	4,055,261
Mexico	3,238,800
Netherlands	2,803,832
Italy	2,591,448
South Korea	2,037,544
Philippines	1,992,083

<i>HS 8534 - Printed circuits</i>		<i>HS 8507 - Electric accumulators, including separators therefor, whether or not rectangular (including square)</i>	
Exporters	Exports 2019 in 1,000 USD	Exporters	Exports 2019 in 1,000 USD
China	14,653,143	China	16,888,731
Hong Kong	9,808,620	South Korea	7,417,594
Taiwan	5,289,025	Japan	4,654,775
South Korea	4,797,820	Germany	4,216,767
Japan	2,763,492	USA	3,767,086
USA	1,286,423	Hong Kong	3,413,747
Thailand	1,211,629	Poland	2,798,100
Germany	1,138,631	Mexico	1,603,475
Malaysia	1,074,872	Vietnam	1,573,704
Vietnam	1,064,644	Hungary	1,454,778

Source: Trade Map

Some global industry trends observed:

- Any efforts by the EU to increase the production of Electric & Electronic Equipment such as in electric vehicles and wind turbines etc. involves challenges such as higher costs and environmental impacts.
- While the United States designs advanced chips, their manufacturing is highly concentrated in places like South Korea and Taiwan.
- Overall, Asia accounts for more than 95% of outsourced semiconductor assembly and testing capacity. This concentration brings potential risks. MGI research has found that companies sourcing advanced chips from South Korea, Japan, Taiwan, or other hubs in the western Pacific can expect that hurricanes severe enough to disrupt suppliers will become two to four times more likely by 2040. Other dynamics can also lead to potential complications, e.g., a single firm leads production of lithographic machines, which place circuits on the wafers.
- Nearly 80% of the world's semiconductor production is located in various Asia-Pacific regions. Economies of scale and high barriers to entry leave very little room for semiconductor production to move on its own. A semiconductor fabrication plant can cost more than 10 billion USD and the industry requires specialized engineers. One has to consider, however, that geopolitical and trade tensions could reshape the value chain in a way that market forces alone might not. National security and competitiveness concerns could lead governments to take action.
- Industry leaders like DELL expect the shortage of semiconductors and microprocessors in the global supply market to stay critical for a few years, as the ramp up of manufacturing takes time and the market demand will grow further.

Installed global wafer capacity 2019 (in %)



Source: McKinsey Global Institute

Asia's share of global Information and communications technology (ICT) exports, 2000-2015

China's share in ICT exports worldwide has increased considerable from the year 2000:

	Country/Region	2000		2010		2015	
		USD billion	% global share	USD billion	%	USD billion	%
All products	China	44	4	460	27	608	31
	South Korea	59	6	100	6	114	6
	Taiwan	63	6	95	5	110	6
	Singapore	76	8	121	7	116	6
	ASEAN-5	-	-	132	8	173	9
Computers and peripheral equipment	China	18	5	197	39	184	39
	South Korea	20	5	14	3	11	2
	Taiwan	29	8	11	2	9	2
	Singapore	31	8	22	4	16	3
	ASEAN-5	-	-	51	10	45	9
Communication equipment	China	6	4	107	32	214	41
	South Korea	7	4	26	8	30	6
	Taiwan	3	2	10	3	7	1
	Singapore	3	2	7	2	11	2
	ASEAN-5	-	-	7	2	39	7

Consumer electronics	China	11	11	65	28	74	37
	South Korea	6	5	4	2	5	2
	Taiwan	2	2	3	1	3	1
	Singapore	4	3	4	2	2	1
	ASEAN-5	-	-	19	8	16	8
Electronic components	China	7	2	74	13	120	18
	South Korea	25	8	46	8	62	9
	Taiwan	26	8	66	12	83	12
	Singapore	35	11	87	15	85	13
	ASEAN-5	-	-	51	9	70	10

ASEAN-5 refers to Malaysia, Thailand, Indonesia, Philippines, and Vietnam

Source: DBS Bank, UNCTAD, CEIC

4.2.3 China Snapshot

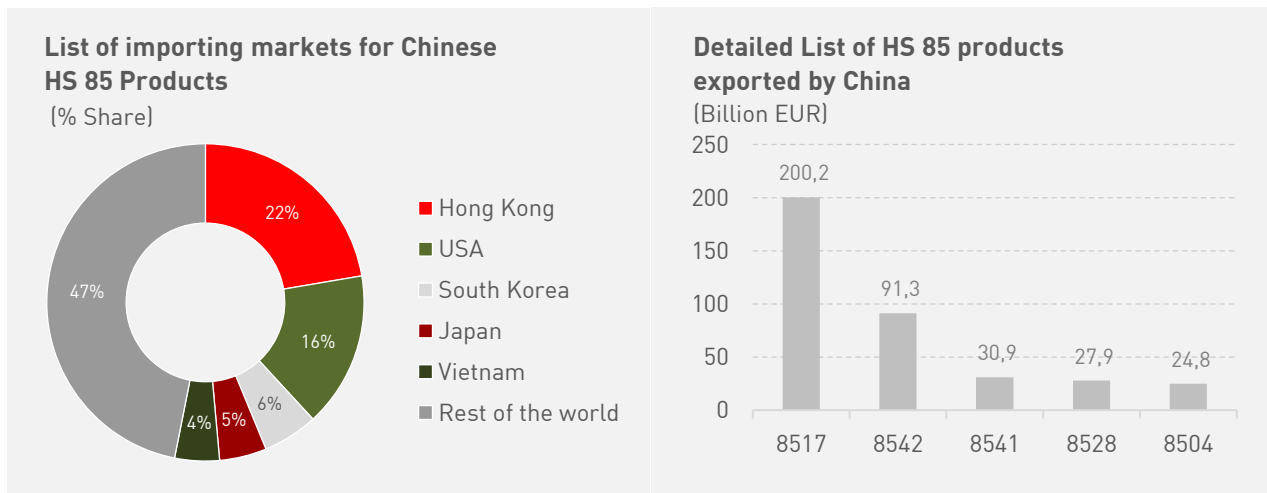
China's exports have been increasing steadily since 2017, also in the Covid-19 year 2020. The following shows China's exports of HS 85 products worldwide:



Source: UN Comtrade

China is the leading exporter for HS 85 products and serves some of the world's most innovative markets such as Japan and the U.S. with electric and electronic equipment.

The following charts show the major importing markets for products made-in-China and which sub-categories are most substantial:



* 8517 Telephone sets, including telephones for cellular networks or for other wireless networks; other apparatus for the transmission or reception of voice, images or other data (including wired/wireless networks), excluding items of 8443, 8525, 8527, or 8528

* 8528 Monitors and projectors, not incorporating television reception apparatus; reception apparatus for television, whether or not incorporating radio-broadcast receivers or sound or video recording or reproducing apparatus

Source: UN Comtrade

Current situation:

- At the moment, China is the leading electrical and electronics manufacturer world-wide. Supply chain disruptions during COVID-19 and the high dependency on China will make importing countries to look at possible alternative destinations in the future.
- China still controls key materials, manufacturing processes, and intellectual property in the global electrical and electronics supply chain. China is, e. g., leading in rare earth materials used in mobile electronics and vehicle batteries and in electric vehicles and solar panel technologies.

Electric & Electronic Equipment Sourcing Clusters Map

The main sourcing clusters include Shandong, Jiangsu, Zhejiang and Hong Kong SAR:



Source: MANGGEI CONSULTING

Key Suppliers in China are:

Grand Tech Group, Wuxi Meida Electro Technical, Changqinglin Electronic, Suyuanyineng Electricity Machinery Equipment (Wuxi), Henan North Xingguang Machinery & Electric, Foshan Risen Electronics, Foxconn Technology Group, Tianjin Jinya Electronics, Chaozhou Three-circle, Guangdong Fenghua Advanced Technology, Shenzhen Sunlord Electronics, BenQ.

Regional foci of IC-related production

The production of Information and communications technology (ICT) is fairly spread out to several regions of China:



Source: MIIT, Chinese research institutes

4.2.4 Potential Alternative Sourcing Markets for the Electric & Electronic Equipment Category

The following graphs give an overview for selected alternative sourcing markets and provide information about their export performance and growth rates, main markets being served and a rough estimation for the size of the supplier base:



CAGR = compound annual growth rate

Source: MANGGEI CONSULTING

Manufacturers in Potential Alternative Countries for the Electric & Electronic Equipment Category

This is a list of a selected few manufacturers, which serve international markets:

Taiwan	Vietnam	Malaysia	Czech Republic
Wistron	Sunching Electronics	Aiwa Electronics	HC Electronics
Sinbon	Sun Field Electronics	Avaxx Corp	Sanmina
ASE Tech	TPC Mechatronics	Panasonic	Elmet
Delta Electronics	Jing Gong Electronics	TTE Electronics	EverMax
TPK Holding	Than Long JSC	Qualitek Electronics	Iqtronic

Source: MANGGEI CONSULTING

Recommendation

Sub-categories such as insulated wire, wire-assemblies or medium/low-tech electronic equipment are rather easy to be shifted into new sourcing markets. Several Austrian companies are considering switching to suppliers outside of China and are also looking into opportunities to source in Eastern Europe.

Suppliers in Central- and Eastern Europe could become more interesting for Austrian companies with lower purchasing volumes and a more diverse sourcing portfolio. Especially for the assembling of cables and of electric/electronics products these European area can be an alternative (near-shoring).

Within Asia, alternative sourcing markets could be Taiwan, Malaysia, Vietnam, India or Thailand. For circuits Taiwan offers a range of suppliers being able to deliver small to medium and also large volumes.

4.3 Industrial Machinery (HS 84)

4.3.1 Austrian Sourcing

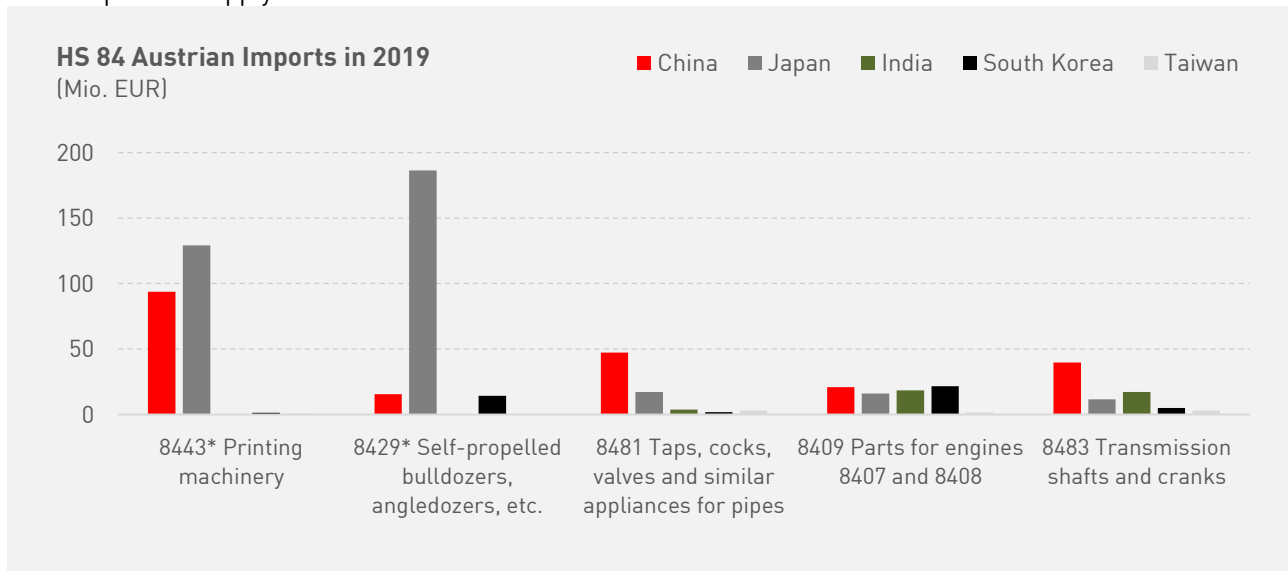
For Austrian companies, China is the top exporter of HS 84 category with a market share of 19%. The main sourcing clusters include Liaoning, Hebei, Shandong, Jiangsu and Jiangxi.

The attractiveness of alternative sourcing markets strongly depends on the yearly demand and the needed quality level. Potential suppliers can be found in Central and Eastern Europe as well as in Asia, strongly depending on individual needs.

A common challenge faced in the HS 84 category is that “Made for China” machineries are not compliant with mechanical and electrical safety standards followed by Europe. The importer is responsible for the product compliance and has to ensure that applicable standards are met. Some suppliers such as China Machinery Engineering Corporation have significant intellectual property (IP) assets and brand building to succeed in high-end machinery market and strategic sub-sectors.

One Austrian company surveyed that operates in the field of injection molding machines is just ramping up purchasing from India for some Industrial Machinery components.

The following chart describes the major HS 84 product categories Austria imports from Asia and shows the most important supply markets:



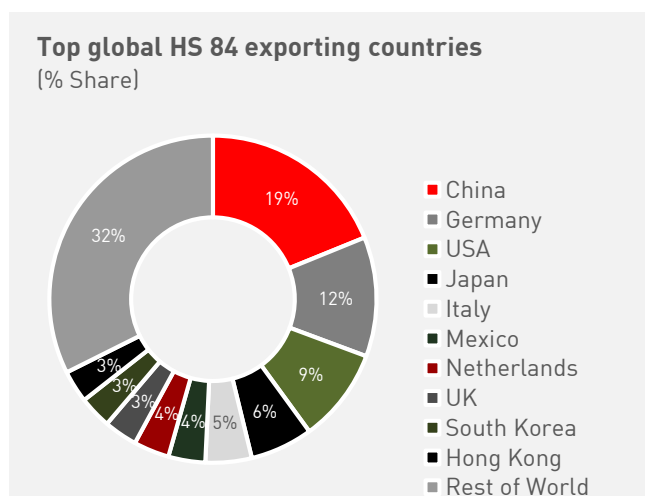
* 8443 Printing machinery used for printing by means of plates, cylinders and other printing components

* 8429 Self-propelled bulldozers, angledozers, graders, levellers, scrapers, mechanical shovels, excavators, etc

Source: Statistics Austria

4.3.2 Global Snapshot

The world's most important suppliers for Industrial Machinery (HS 84) are China, Germany, the United States, Japan and Italy. China is the top exporter of HS 84 category with a market share of 19%.



Source: UN Comtrade

The following tables show the countries and regions with leading exports worldwide for the selected HS 84 product categories, which are most relevant for Austria:

HS 8481 - Taps, cocks, valves and similar appliances for pipes, boiler shells, tanks, vats or the like

Exporters	Exports 2019 in 1,000 USD
China	16,237,582
Germany	14,105,428
USA	12,112,171
Italy	8,077,748
Japan	4,653,444
UK	3,223,152
Mexico	2,793,576
France	2,790,695
South Korea	2,078,629

Source: Trade Map

HS 8409 - Parts suitable for use solely or principally with the engines of heading 8407 or 8408

Exporters	Exports 2019 in 1,000 USD
Germany	13,150,600
Japan	6,608,831
USA	5,980,999
China	5,717,549
Mexico	4,282,999
South Korea	3,187,841
Italy	2,463,812
Poland	1,940,157
France	1,917,678
UK	1,655,317

HS 8483 - Transmission shafts (incl. cam shafts and crank shafts) and cranks; bearing housings and plain shaft bearings

Exporters	Exports 2019 in 1,000 USD
Germany	12,642,755
China	7,600,894
USA	6,228,037
Japan	4,904,025
Italy	3,431,779
France	2,016,099
South Korea	1,499,538
Taiwan	1,450,901
UK	1,402,778
Belgium	1,361,209

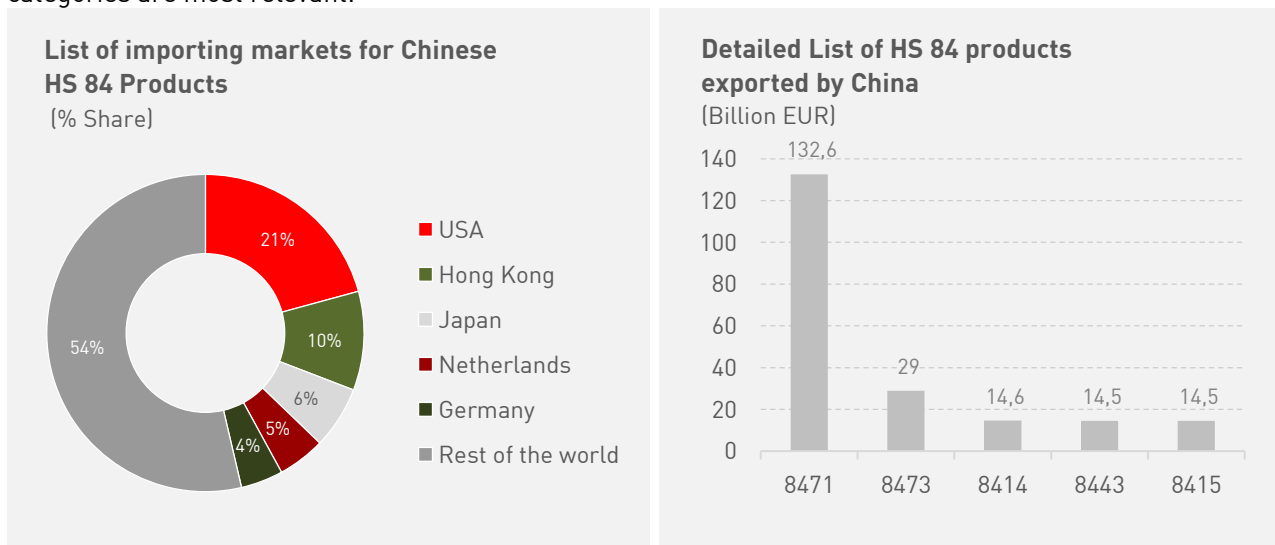
4.3.3 China Snapshot

The following shows China's exports of HS 84 products worldwide:



Source: UN Comtrade

The following charts show the major importing markets for products made-in-China and which sub-categories are most relevant:



* 8471 Automatic data processing machines and units thereof, magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, not elsewhere specified or included

* 8473 Parts and accessories (other than covers, carrying cases and the like) suitable for use solely or principally with machines of heading 8469 to 8472

* 8414 Air or vacuum pumps (excluding gas compound elevators and pneumatic elevators and conveyors); air or other gas compressors and fans; ventilating or recycling hoods incorporating a fan, whether or not fitted with filters; parts thereof

* 8415 Air conditioning machines comprising a motor-driven fan and elements for changing the temperature and humidity, incl. those machines in which the humidity cannot be separately regulated; parts thereof

Source: UN Comtrade

Industrial Machinery Clusters Map

The eastern provinces of Zhejiang, Jiangsu and Shandong constitute over 50% of China's machinery exports. The Chinese manufacturing sector has gradually moved inwards towards Central- and Western China. This is mainly due to an industrial policy effort to further develop Western China and also to enable exports through land routes to Eurasia.



Source: MANGGEI CONSULTING

Due to a high demand of technology transfer to China, the Chinese government is providing financial and tax incentives for companies introducing advanced technologies from developed countries. For example, China has exempted import duties and its related value-added tax (VAT) for imports of major R&D equipment, raw materials, and components. Custom rates for imported machine tools have also been reduced over time to an average of 8.8%.

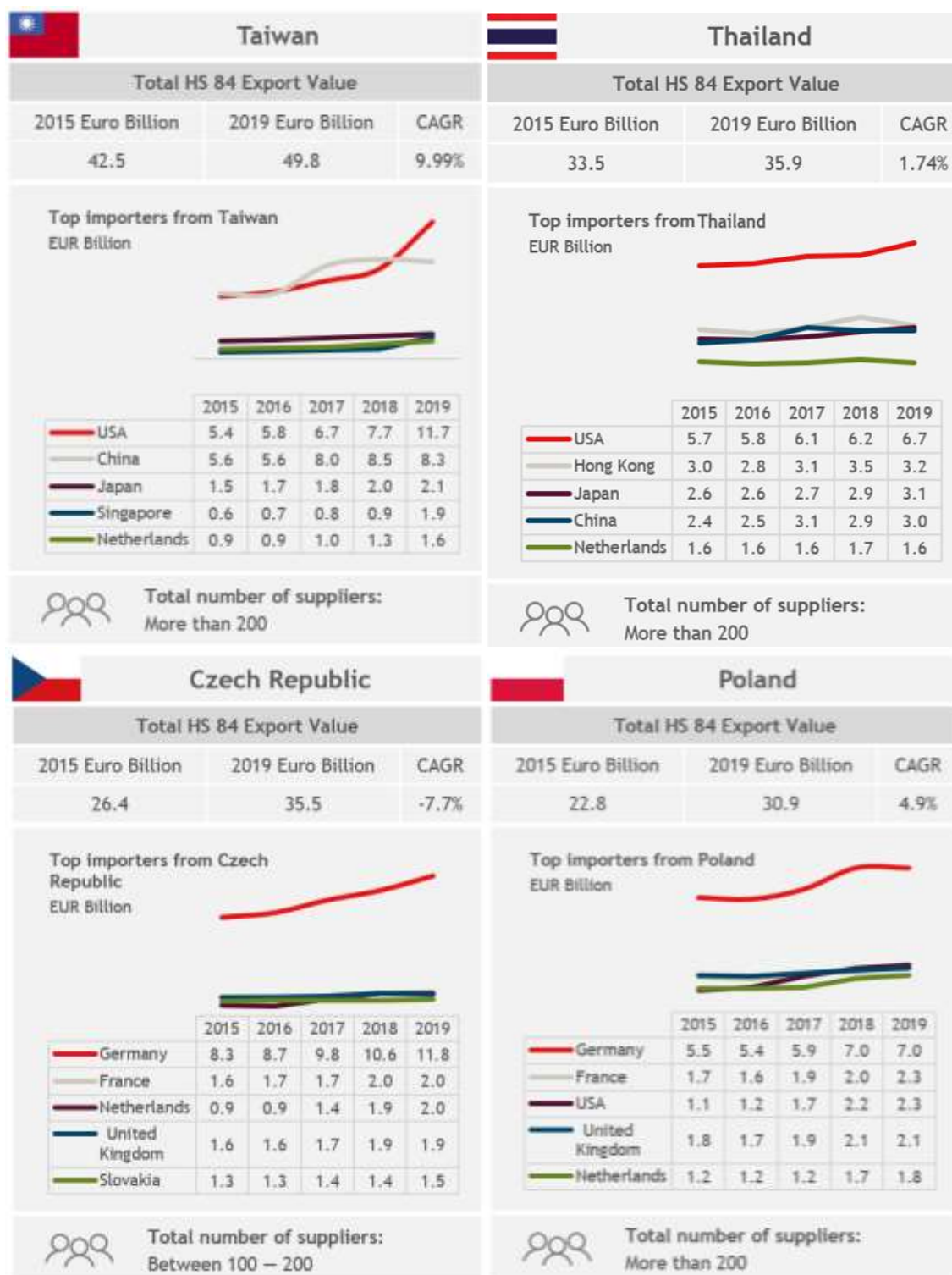
The major growth fields in the sector include the production and upgrade of industrial robotics, advanced machine tools, and agricultural machinery. It is estimated that for the next five years, China's machinery production will grow at a compound annual growth rate (CAGR) of 7.5 %.

Key Suppliers in China are:

Guangzhou Keshenglong Carton Packing Machine, Ruian Honetop Machinery, Shenzhen Xinquanli Machinery, Zhejiang Changjiang Machinery, Dongguan Hengsheng Machinery, Jiangsu Yawei Machine Tool, Luoyang Shiyong Machinery Production, Xuzhou Construction Machinery Group, Shaoxing Jinhao Machinery, Twothousand Machinery.

4.3.4 Potential Alternative Sourcing Markets for the Industrial Machinery Category

The following graphs give an overview for selected alternative sourcing markets and provide information about their export performance and growth rates, main markets being served and a rough estimation for the size of the supplier base:



Source: MANGGEI CONSULTING

Manufacturers in Potential Alternative Countries for the Industrial Machinery Category

This is a list of a selected few manufacturers, which serve international markets:

Taiwan	Thailand	Czech Republic	Poland
Ya Kun Co Ltd	Tib Group	Marting Sro	Pronar
Goodtek Machinery	Ashdan International	KTR CR	Rafako
Noveltek Industrial Machinery	DanThai Machinery	Bednar	FN Glob
Liwin Mechantronic Tech Co	DMG Mori	Kranimex	Dozamech
Victor Taichung machinery Works	Amada Orii Co Ltd	Atelier Paganini	Rolmako

Source: MANGGEI CONSULTING

Recommendation

Apart from China, other potential markets which should be considered for sourcing include Taiwan, Thailand, Czech Republic and Poland.

Also other (smaller) Eastern European countries can be very attractive sourcing markets, depending on the individual need, quality level, yearly volume and the mix of parts/components.

4.4 Iron & Steel Products (HS 72 and 73)

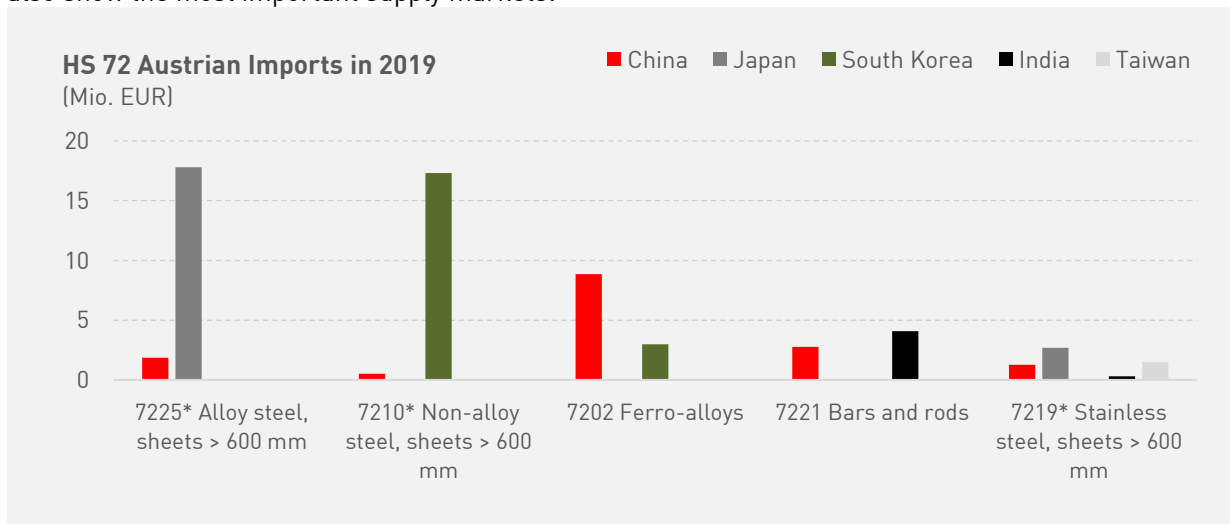
4.4.1 Austrian Sourcing

This category includes two main sub-categories, firstly raw materials (HS72) and secondly fabricated parts (HS73).

While for the raw materials the price is mainly driven by global iron and steel price, the price of the fabricated parts depends a lot on the local processing costs. In the HS 7318 category Taiwan is the main market with the biggest supply base. After a complaint from the European Industrial Fasteners Institute, the European Union opened anti-dumping investigations into Chinese exporters to assess whether iron and steel screws, bolts and washers are being sold to the EU at excessively low prices. It pays off to have an eye on potential penalty duties when importing from China.

It is common practice in the automotive industry to set up two completely separate supply chains for critical components in also different regions. Many Austrian companies, however, only rely on one source for the supply of fabricated iron and steel products for their automotive, machine and automation equipment manufacturing.

The following charts describe the major HS 72 and 73 product categories Austria imports from Asia and they also show the most important supply markets:

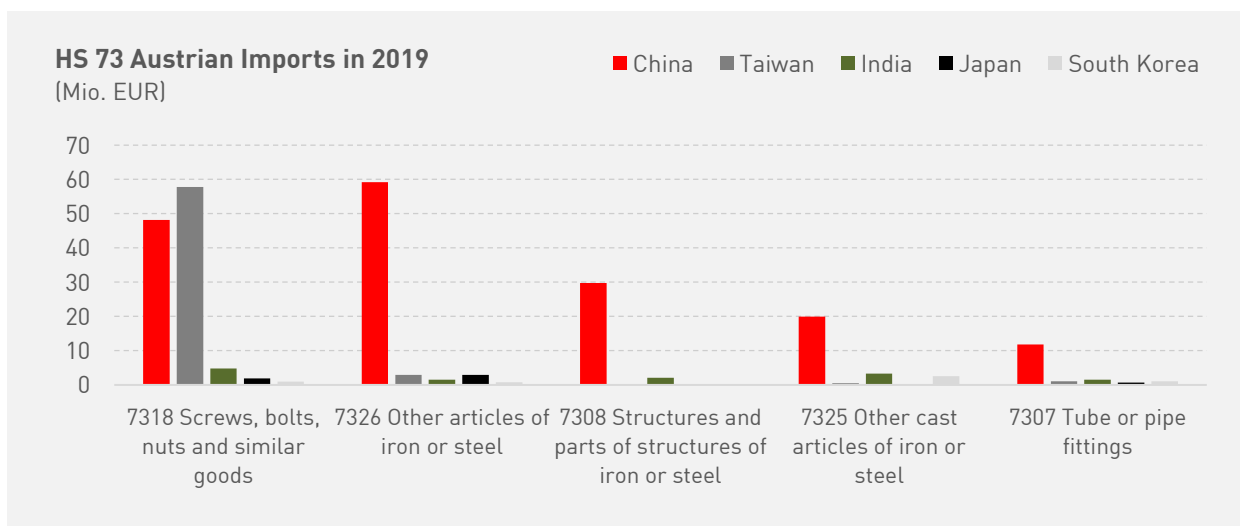


* 7225 Flat-rolled products of other alloy steel, of a width of 600 mm or more

* 7210 Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, clad, plated or coated

* 7219 Flat-rolled products of stainless steel, of a width of 600 mm or more

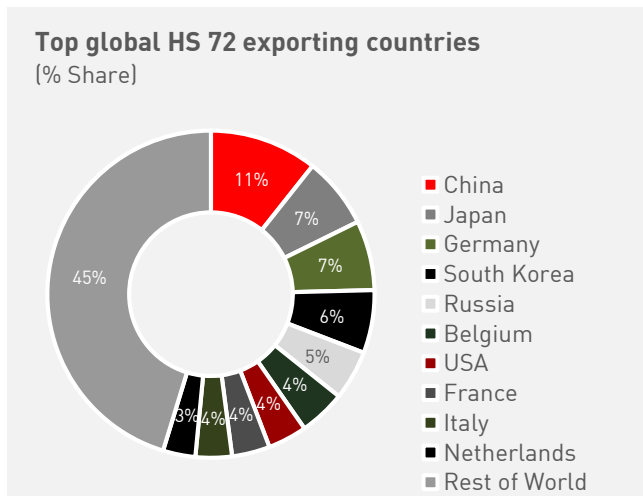
Source: Statistics Austria



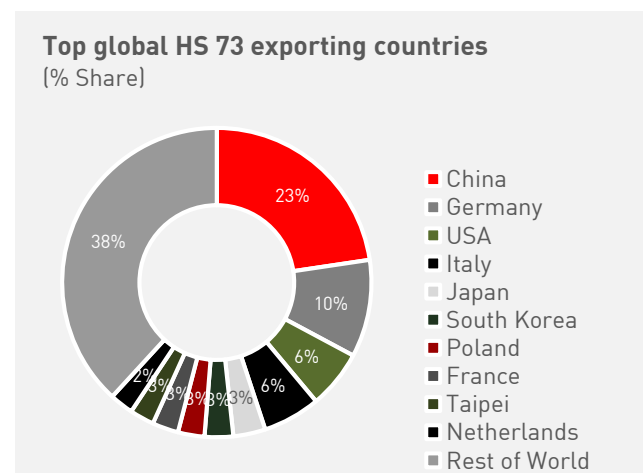
Source: Statistics Austria

4.4.2 Global Snapshot

The world's most important suppliers for Iron & Steel Products (HS 72) are China, Japan, Germany, South Korea and Russia. China is the top exporter of this category with a market share of 11%.



The world's most important suppliers for Articles of Iron & Steel Products (HS 73) are China, Germany, the United States, Italy and Japan. China is the top exporter of this category with a market share of 23%.



The following tables show the countries and regions with leading exports worldwide for the selected HS 72 and 73 product categories, which are most relevant for Austria:

<i>HS 7202 - Ferro-alloys</i>		<i>HS 7221 - Bars and rods, hot-rolled, in irregularly wound coils, of stainless steel</i>		<i>HS 7318 - Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers (incl. spring washers)</i>	
Exporters	Exports 2019 in 1,000 USD	Exporters	Exports 2019 in 1,000 USD	Exporters	Exports 2019 in 1,000 USD
South Africa	3,255,854	Taiwan	299,591	Germany	6,547,183
Brazil	3,202,150	Italy	239,874	China	6,443,172
Indonesia	2,600,652	Japan	237,336	USA	4,396,938
Kazakhstan	1,883,722	China	225,534	Taiwan	4,320,809
India	1,844,408	France	188,948	Japan	2,769,079
Russian Federation	1,225,434	Spain	137,218	Italy	1,912,633
China	1,149,341	South Korea	133,364	France	1,580,009
Ukraine	910,037	Sweden	119,702	UK	918,146
New Caledonia	909,836	India	72,174	South Korea	880,053
Malaysia	886,593	UK	43,110	Switzerland	867,409

<i>HS 7326 - Other articles of iron or steel</i>		<i>HS 7308 - Structures and parts of structures (bridges and bridge-sections, lock-gates, towers, roofs, etc.) of iron or steel</i>		<i>HS 7325 - Other cast articles of iron or steel</i>	
Exporters	Exports 2019 in 1,000 USD	Exporters	Exports 2019 in 1,000 USD	Exporters	Exports 2019 in 1,000 USD
China	9,330,491	China	13,373,224	India	1,117,442
Germany	5,163,350	Germany	4,667,043	China	779,195
USA	4,576,950	Poland	2,939,314	Germany	634,373
Italy	3,698,200	Spain	1,910,238	Spain	440,218
France	2,213,396	Netherlands	1,730,711	Czech Republic	422,911
South Korea	1,838,698	Belgium	1,651,971	Poland	398,400
Poland	1,837,912	Italy	1,596,737	Italy	299,903
Czech Republic	1,811,220	South Korea	1,536,655	Turkey	283,099
Netherlands	1,480,617	Czech Republic	1,328,044	USA	268,674
Thailand	1,385,708	Turkey	1,326,842		

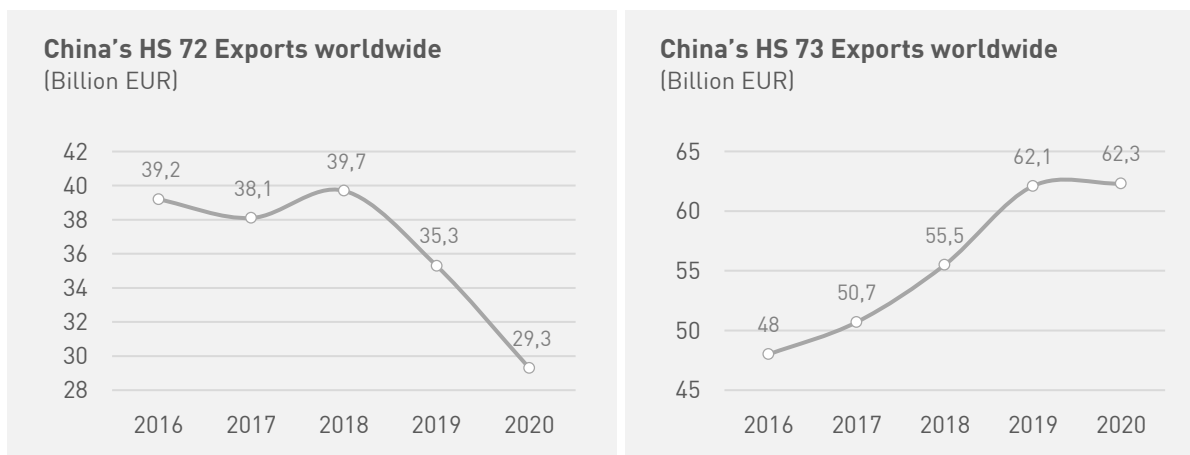
*HS 7307 - Tube or pipe fittings
(for example, couplings,
elbows, sleeves), of iron or
steel*

Exporters	Exports 2019 in 1,000 USD
China	4,766,735
Italy	1,766,779
Germany	1,710,323
USA	1,647,799
South Korea	927,521
India	676,196
UK	548,881
Netherlands	531,621
Poland	495,571

Source: Trade Map

4.4.3 China Snapshot

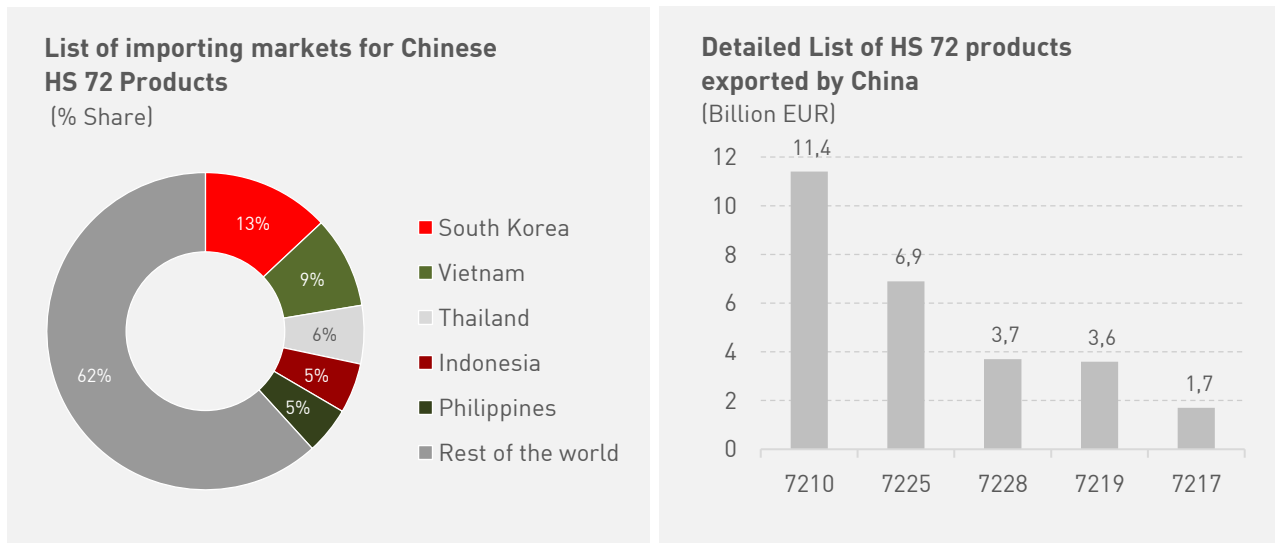
The following shows China's exports of HS 72 and HS 73 products worldwide:



Source: UN Comtrade

Chinese exports to East- and South-eastern Asian countries have dropped significantly over the past years due to an increased domestic production in these countries and a generally lower demand.

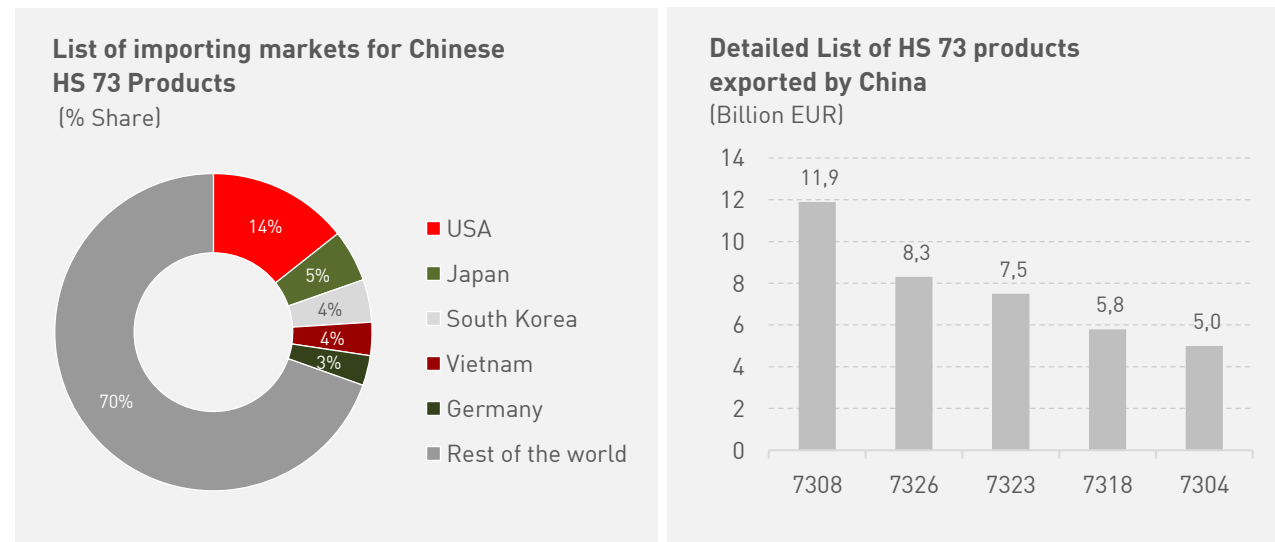
The following charts show the major importing markets for products made-in-China and which sub-categories are most relevant:



* 7228 Other bars and rods of alloy steel other than stainless, angles, shapes and sections of alloy steel other than stainless, n.e.s.; hollow drill bars and rods, of alloy or non-alloy steel

* 7217 Wire of iron or non-alloy steel, in coils (excluding bars and rods)

Source: UN Comtrade



* 7323 Table, kitchen or other household articles, and parts thereof, of iron or steel; iron or steel wool; pot scourers and scouring or polishing pads, gloves and the like, of iron or steel (excluding cans, boxes and similar containers of heading 7310; waste baskets; shovels, corkscrews and other articles of the nature of a work implement; articles of cutlery, spoons, ladles, forks etc. of heading 8211 to 8215; ornamental articles; sanitary ware)

* 7304 Tubes, pipes and hollow profiles, seamless, of iron or steel (excluding products of cast iron)

Source: UN Comtrade

Iron or Steel Clusters Map

The main sourcing clusters include Liaoning and Hebei:



Source: MANGGEI CONSULTING

Production Hub:

Chinese steel output locations are located at the North Eastern seacoast of China and most of the output comes from a large number of small-scale producers concentrated in cities like Anshan (Liaoning province).

Key Suppliers in China are:

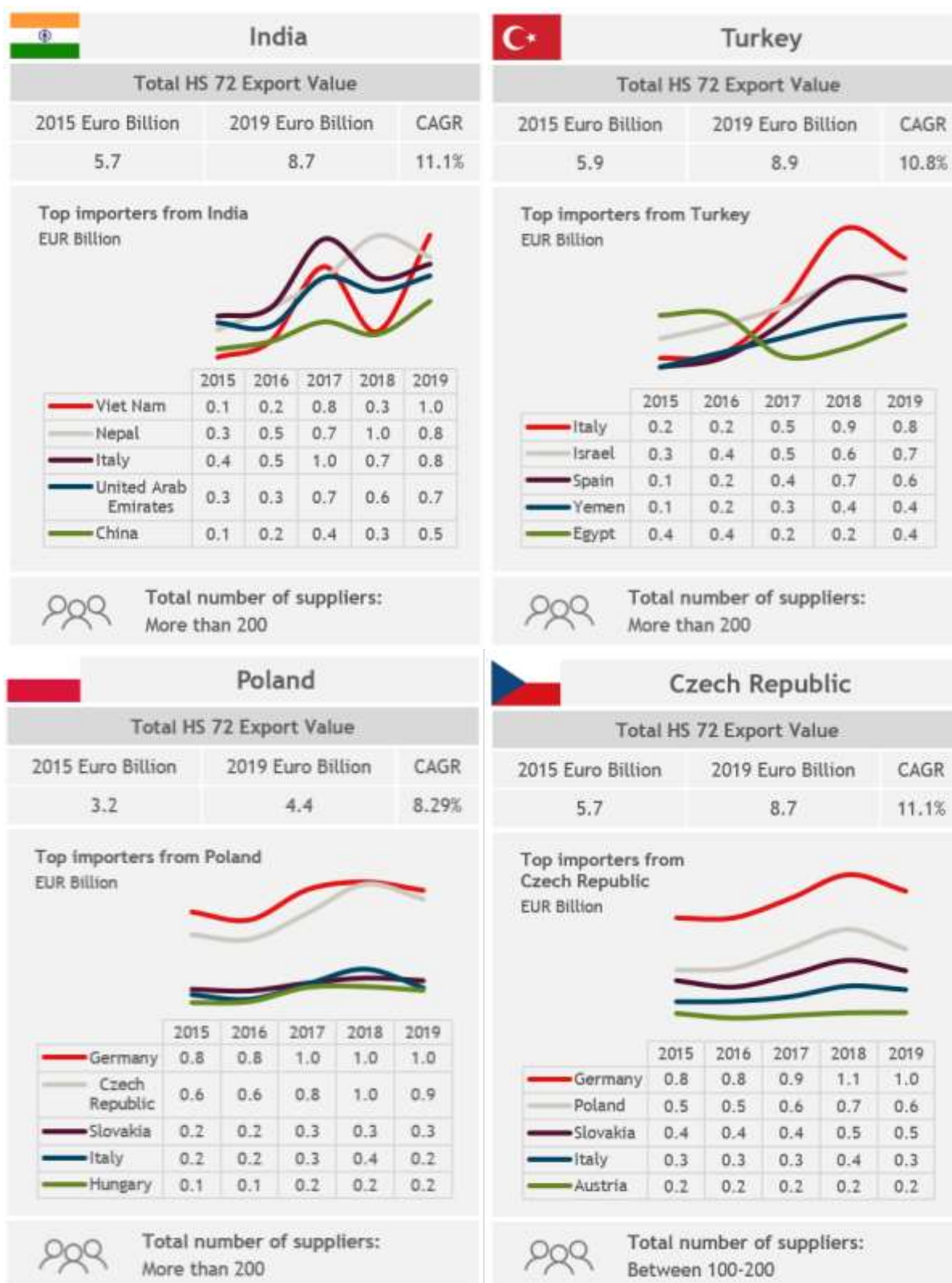
RGL Group, CNBM International, Tewoo Group, China Minmetals, H&C S Holdings, Wanbao, Henghou Group, Citic Metal, BM Holding, Shanghai Ico Minerals, Rizhao Zhongrui, Source Profit, Zhejiang Materials Industry Group.

Coating

Stricter environmental regulations and better enforcement have forced many non-compliant Chinese suppliers to shut down their operations. Fewer suppliers and more regulations brought along higher prices. In addition, the overall quality level for coating in China still lacks behind Western standards. Austrian companies looking for a supplier of reliable top-quality coating in China might therefore only have a small range of potential partners with relatively high prices.

4.4.4 Potential Alternative Sourcing Markets for the Iron and Steel Products Category

The following graphs give an overview for selected alternative sourcing markets and provide information about their export performance and growth rates, main markets being served and a rough estimation for the size of the supplier base:





Source: MANGGEI CONSULTING

In addition, imports from China have recently been replaced to an extent from countries and regions such as Vietnam, Malaysia, Japan, Indonesia, Thailand, Taiwan, South Korea, UAE, Oman, Iran, Bahrain, Pakistan, South Africa and Brazil.

Potential Manufacturers in Alternative Countries for the Iron and Steel Products Category

This is a list of a selected few manufacturers, which serve international markets:

India	Turkey	Poland	Czech	Russia
Sail	MMK Metallurgy	Ovako	Trinec Iron & Steel Works	Severstal
Tata Steel	Kardemir	Mostostal	Brembo	Evrax
Essar	Isdemir	Zlomrex	Vitkovice Steel	Mechel
Sanmar Group	Erdemir	Huta Stalowa Wola	Zdas	Beloretsk Steel Works
Ispat Industries	ICDAS	MTM Stal	Liberty Engineering Products	Magnitogorsk Iron & Steel Works

Source: MANGGEI CONSULTING

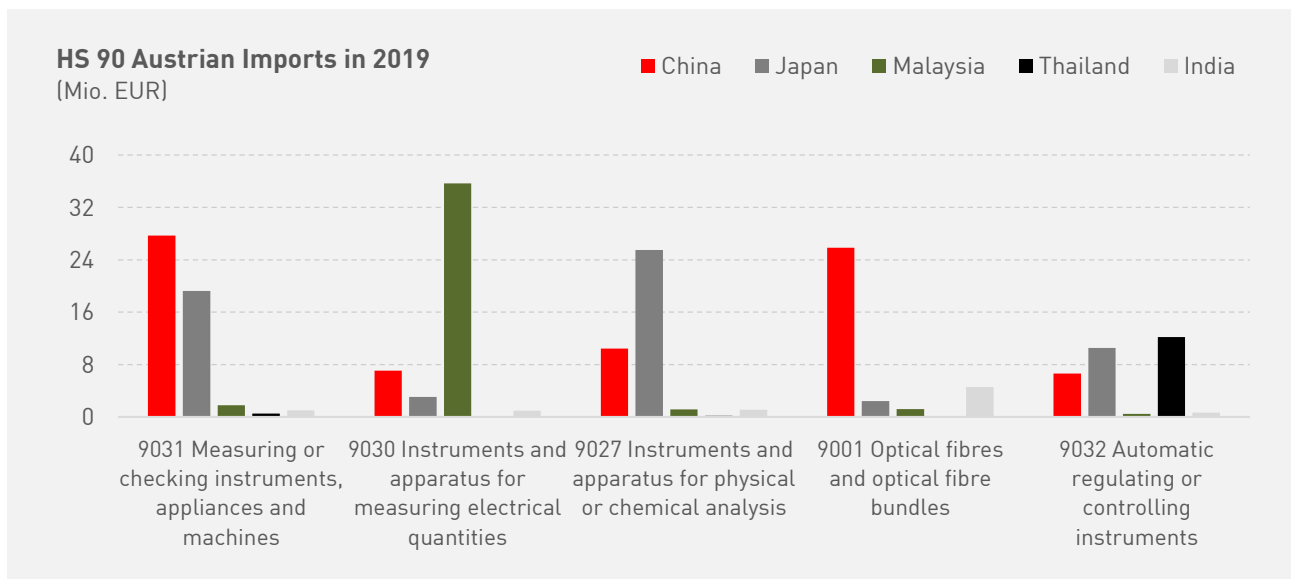
4.5 Optical Devices (parts of HS 90)

4.5.1 Austrian Sourcing

The category of Optical Devices is strongly in Asian hands. China dominates the Austrian imports in HS9031 (Measuring or Checking Instruments) and HS9001 (Optical fibres and bundles) products.

In 2020, the European Commission started an investigation into imports of optical fibre cables from China for which the EU manufacturers believed that they were sold in Europe at artificially low prices.

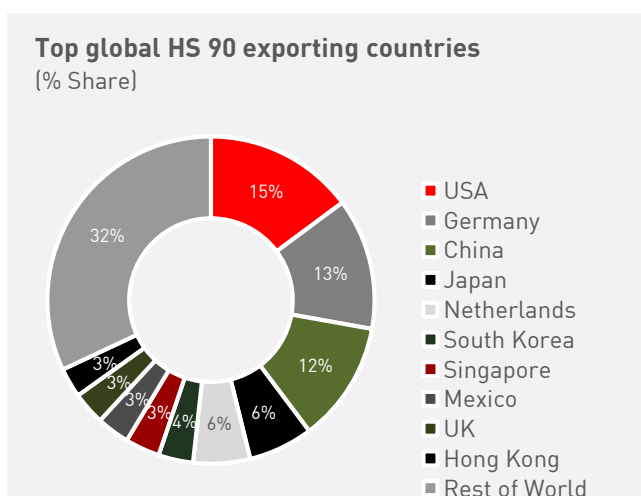
The following chart describes the major HS 90 product categories Austria imports from Asia and shows the most important supply markets:



Source: Statistics Austria

4.5.2 Global Snapshot

The world's most important suppliers for Optical Devices (HS 90) are the United States, Germany, China, Japan and the Netherlands. China is the top exporter of HS 90 category with a market share of 15%.



Source: UN Comtrade

The following tables show the countries and regions with leading exports worldwide for the selected HS 90 product categories, which are most relevant for Austria:

<i>HS 9031 - Measuring or checking instruments, appliances and machines</i>		<i>HS 9001 - Optical fibres and optical fibre bundles</i>	
Exporters	Exports 2019 in 1,000 USD	Exporters	Exports 2019 in 1,000 USD
Germany	9,272,007	Japan	4,380,197
USA	5,627,709	China	4,241,823
Japan	4,571,618	South Korea	3,883,934
China	4,331,960	USA	3,469,554
South Korea	2,863,927	Germany	1,976,439
Singapore	2,231,118	Taiwan	1,813,390
UK	1,537,792	Hong Kong	1,614,546
Hong Kong	1,423,397	Ireland	1,462,566
Italy	1,408,109	Singapore	1,430,815
Israel	1,194,134	UK	1,197,965

Source: Trade Map

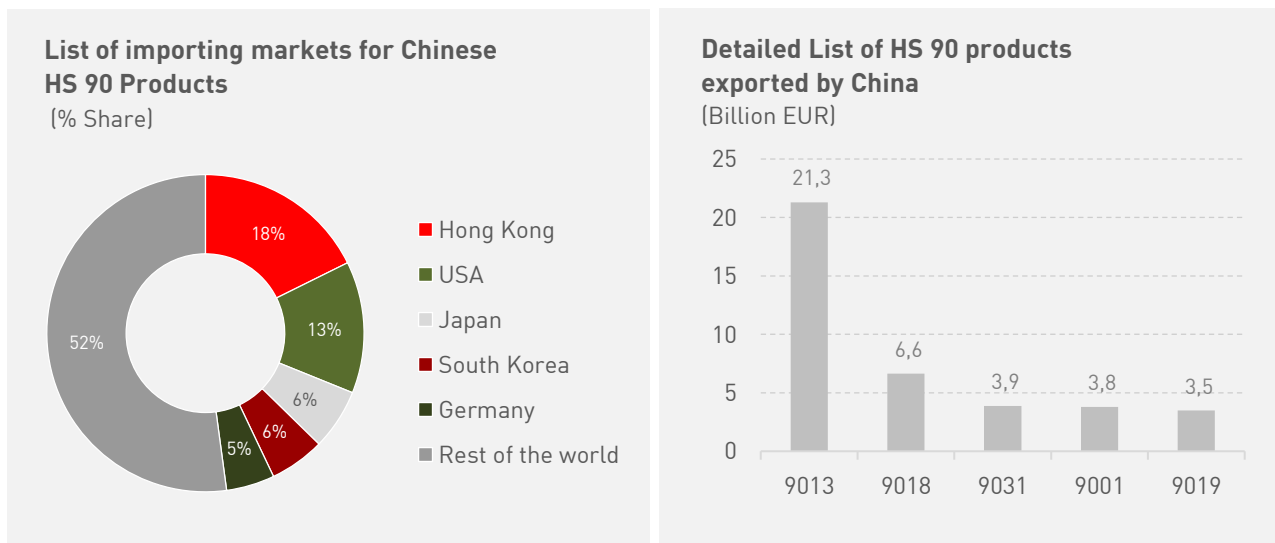
4.5.3 China Snapshot

The following shows China's exports of HS 90 products worldwide:



Source: UN Comtrade

The following charts show the major importing markets for products made-in-China and which sub-categories are most relevant:



* 9013 Liquid crystal devices not constituting articles provided for more specifically in other heading; lasers (excluding laser diodes); other optical appliances and instruments not elsewhere specified in chapter 90

* 9018 Instruments and appliances used in medical, surgical, dental or veterinary sciences, incl. scintigraphic apparatus, other electro-medical apparatus and sight-testing instruments, n.e.s.

* 9019 Mechano-therapy appliances; massage apparatus; psychological aptitude-testing apparatus; ozone therapy, oxygen therapy, aerosol therapy, artificial respiration or other therapeutic respiration apparatus

Source: UN Comtrade

Optical Devices Clusters Map



Source: MANGGEI CONSULTING

China is the largest exporter of Optical devices, appliances and instruments in the world. This product category is also among the most exported product categories of China. Wuhan in Hubei province is the leading manufacturing hub of optical devices in China.

The main importers of Optical devices from China are Hong Kong, Mexico, South Korea, Vietnam, and Poland. In 2017 and 2018, Hong Kong, Poland and Mexico were the fastest growing export destinations for China.

However, China is also ranked number one in importing optical devices, appliances and instruments in the world from destinations such as South Korea, Chinese Taipei, Japan, Vietnam and Hong Kong.

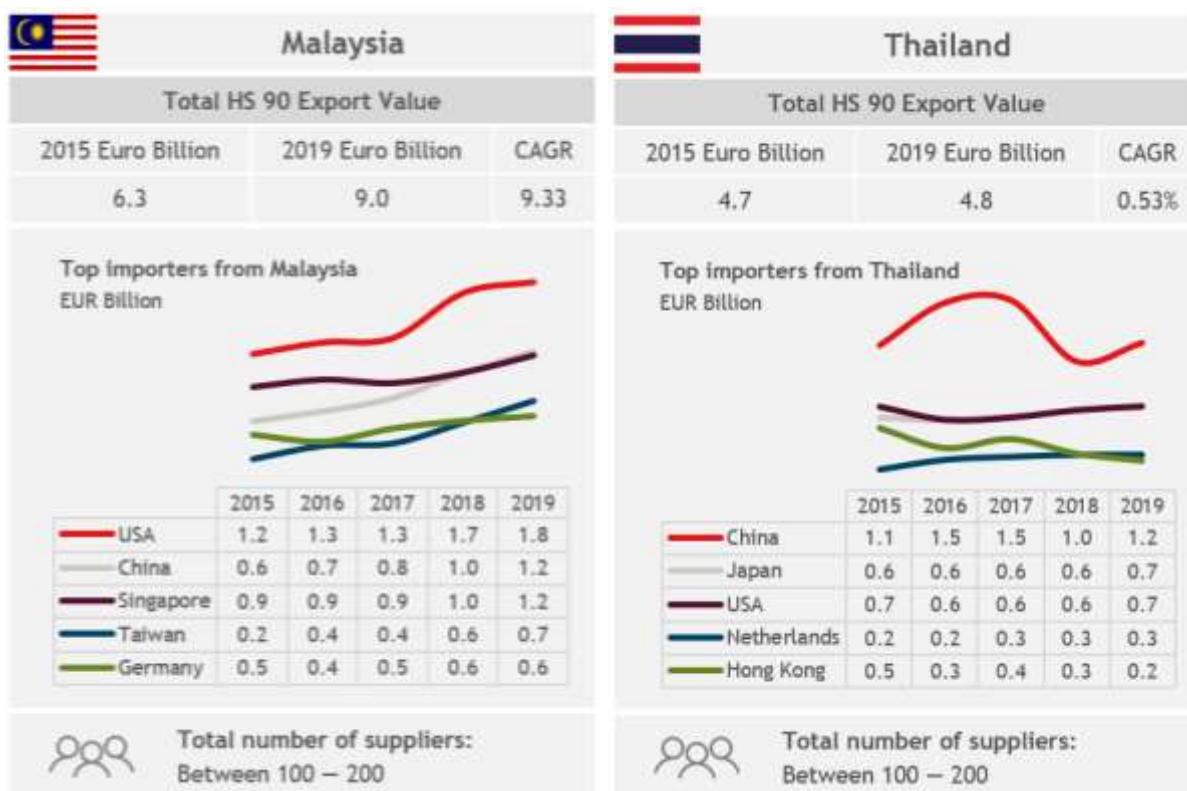
Key Suppliers in China are:

Hengtong Group, Yangtze Optical Fibre, FiberHome Telecommunication, Jiangsu Zhongtian Technologies, Futong Group, Shenzhen SDG.

4.5.4 Potential Alternative Sourcing Markets for the Optical Devices Category

The most popular alternative destinations for the HS 90 Category are Taiwan, Vietnam, Malaysia and Thailand. The following graphs give an overview for selected alternative sourcing markets and provide information about their export performance and growth rates, main markets being served and a rough estimation for the size of the supplier base:





Source: MANGGEI CONSULTING

Manufacturers in Potential Alternative Countries for the Optical Devices Category

This is a list of a selected few manufacturers, which serve international markets:

Taiwan	Malaysia	Thailand	Vietnam
New Vision	Abio Ortho	TSF Bosaeng	Traphaco
Bionime	Granulab	Nineneo	Omron
Novapex	Braun Medical Industries	Infus	Terumo BCT
Ndcos	Teleflex Medical	ENC Medical Group	DST Vina
Janman Precision	Haemonitics Malaysia	Naleen	Segyung Vina

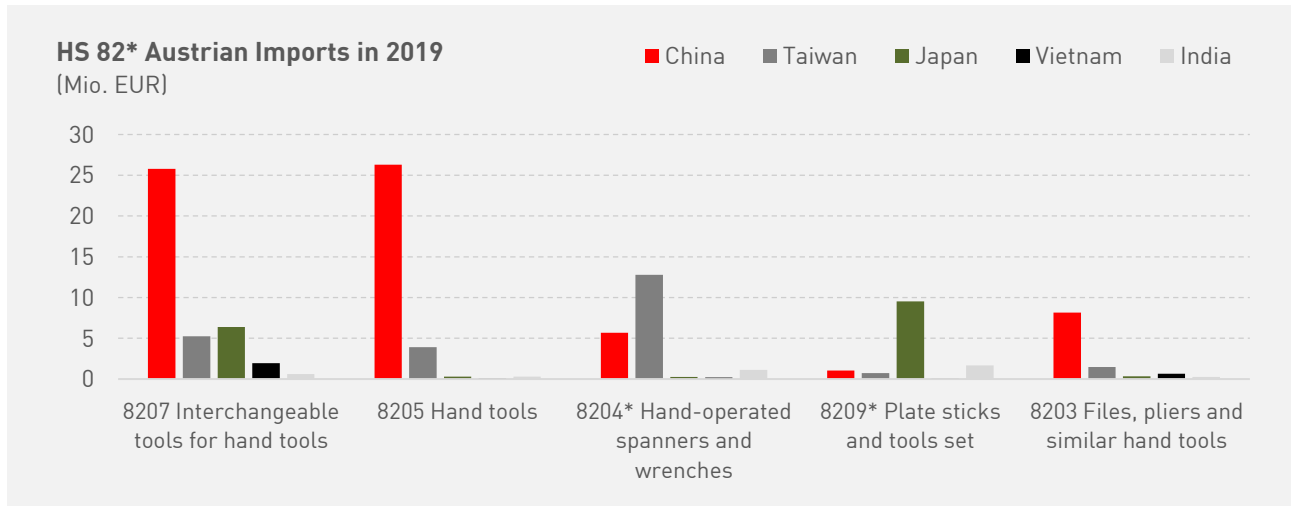
Source: MANGGEI CONSULTING

4.6 Tools (parts of HS 82 relevant for Industry)

4.6.1 Austrian Sourcing

This category offers various alternative sourcing options outside of China, although China has the biggest supply base. Taiwan, Poland and Mexico have an export volume of more than 1 Billion EUR.

The following chart describes the major HS 82 product categories Austria imports from Asia and shows the most important supply markets:



* HS 82 Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal

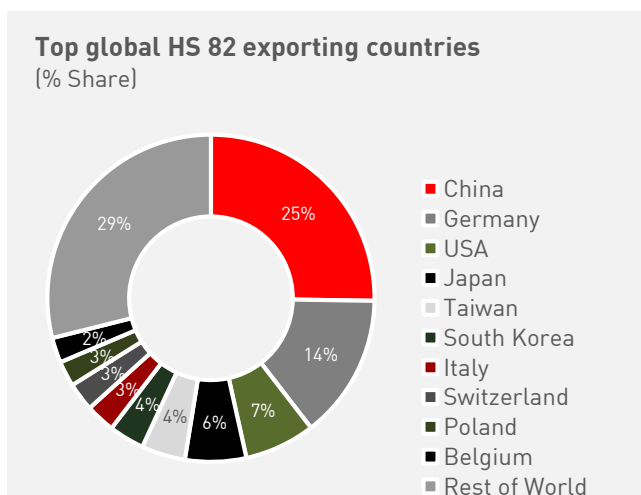
* 8204 Hand-operated spanners and wrenches; interchangeable spanner sockets, with or without handles

* 8209 Plates, sticks, tips and the like for tools, unmounted, of cermet

Source: Statistics Austria

4.6.2 Global Snapshot

The world's most important suppliers for Tools (HS 82) are China, Germany, the United States, Japan and Taiwan. China is the top exporter of HS 82 category with a market share of 25%. It is important to note that the HS 82 chapter includes also many products for consumers.



Source: UN Comtrade

The following tables show the countries and regions with leading exports worldwide for the selected HS 82 product categories, which are most relevant for Austria:

<i>HS 8207 - Interchangeable tools for hand tools, whether or not power-operated, or for machine tools</i>		<i>HS 8205 - Hand tools (incl. glaziers' diamonds), not elsewhere specified or included; blowlamps; vices, clamps and the like</i>		<i>HS 8203 - Files, rasps, pliers (incl. cutting pliers), pincers, tweezers, metal-cutting shears, and similar hand tools</i>	
Exporters	Exports 2019 in 1,000 USD	Exporters	Exports 2019 in 1,000 USD	Exporters	Exports 2019 in 1,000 USD
Germany	4,158,223	China	2,886,759	China	796,560
China	3,597,601	Taiwan	966,375	Germany	385,161
Japan	2,324,220	Germany	762,913	USA	159,424
USA	1,993,854	USA	614,581	Taiwan	127,118
South Korea	1,547,518	France	274,142	Netherlands	77,648
Italy	1,035,138	UK	207,773	Switzerland	69,003
Switzerland	733,032	Netherlands	187,538	Belgium	60,575
Spain	531,496	Italy	164,479	India	58,921
France	493,301	Belgium	139,490	France	53,094
Taiwan	481,524	Poland	137,844	Japan	51,680

Source: Trade Map

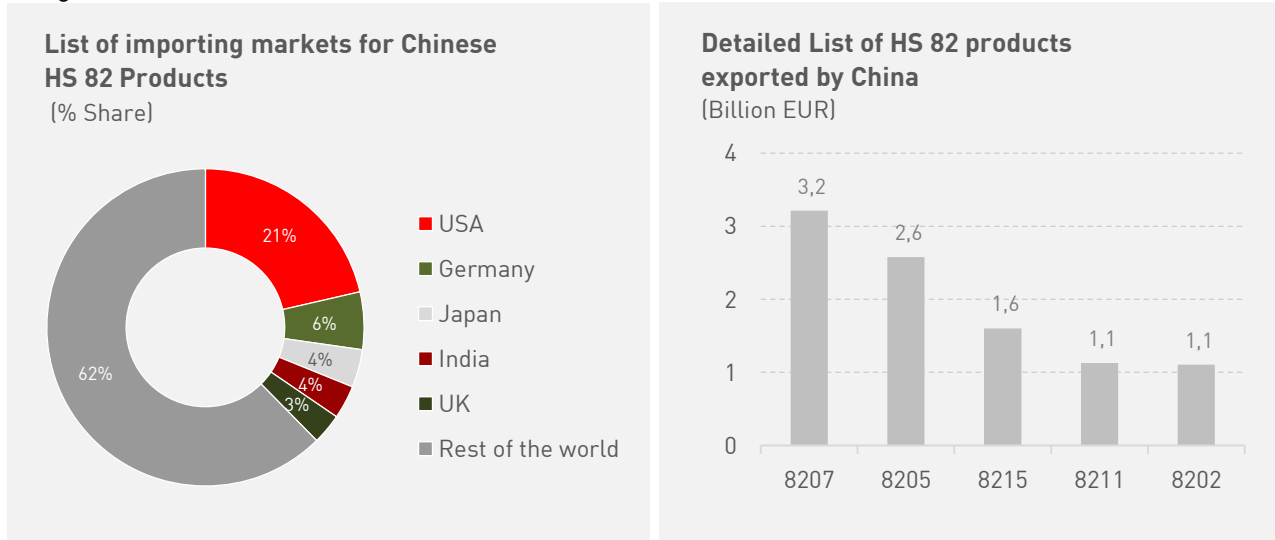
4.6.3 China Snapshot

The following shows China's exports of HS 82 products worldwide:



Source: UN Comtrade

The following charts show the major importing markets for products made-in-China and which sub-categories are most relevant:



* 8215 Spoons, forks, ladles, skimmers, cake-servers, fish-knives, butter-knives, sugar tongs and similar kitchen or tableware of base metal (excluding lobster cutters and poultry shears of heading 8201 and 8213)

* 8211 Knives with cutting blades, serrated or not, incl. pruning knives, and blades therefor, of base metal (excluding straw knives, machetes, knives and cutting blades for machines or mechanical appliances, fish knives, butter knives, razors and razor blades and knives of heading 8214)

* 8202 Handsaws, with working parts of base metal (excluding power-operated saws); blades for saws of all kinds, incl. slitting, slotting or toothless saw blades, of base metal

Source: UN Comtrade

Tools Clusters Map

The main sourcing clusters in China are Jilin, Hebei, Anhui, Hubei, Hunan and Guangdong.

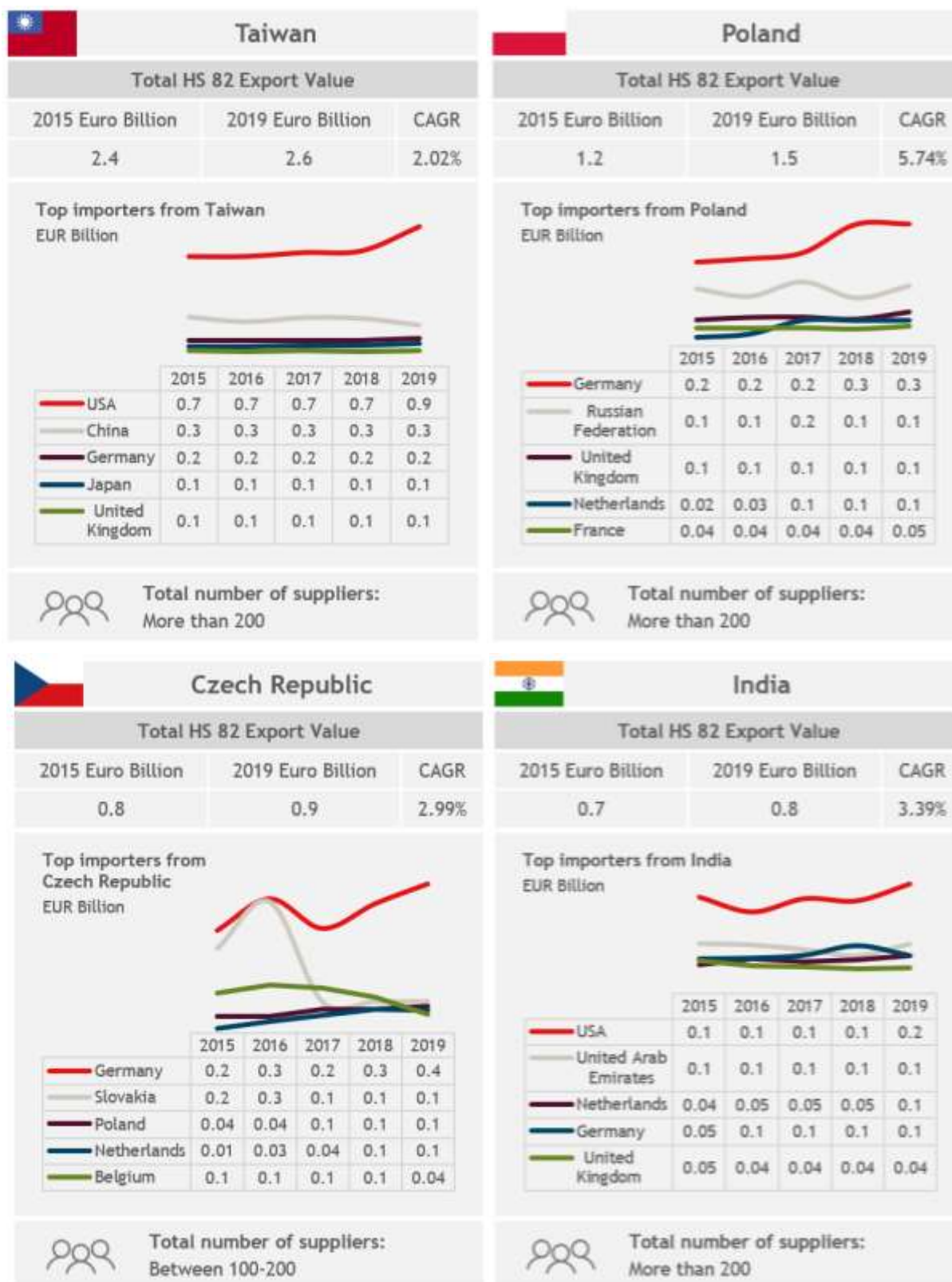


Source: MANGGEI CONSULTING

Risks for sourcing from China in this category come from the potential imposing of anti-dumping duties on deliveries from certain suppliers.

4.6.4 Potential Alternative Sourcing Markets for the Tools Category

The following graphs give an overview for selected alternative sourcing markets and provide information about their export performance and growth rates, main markets being served and a rough estimation for the size of the supplier base:



Source: MANGGEI CONSULTING

Manufacturers in Potential Alternative Countries for the Tools Category

This is a list of a selected few manufacturers, which serve international markets:

Taiwan	Poland	Czech	India
AOK Industrial	Iscar Tools	Kasik Tools	Ajay Industries
HaurYueh Tools	Seco Poland	DSN sro	Sterling Hand Tools
Action Tools	Koszalinska Fabryka	Martin sro	Magadh Tools
Aidox Technology Corp	Bemex	Dartech	JF Tools
First Tools Ind	El Serw Jacek Klimaszewski	Habilis spol	Venus India

Source: MANGGEI CONSULTING

4.7 Plastics/Rubber Products (HS 39)

4.7.1 Austrian Sourcing

Plastic parts and components are mostly imported from countries within Europe. However, the Austrian imports from emerging countries outside of Europe are on the rise.

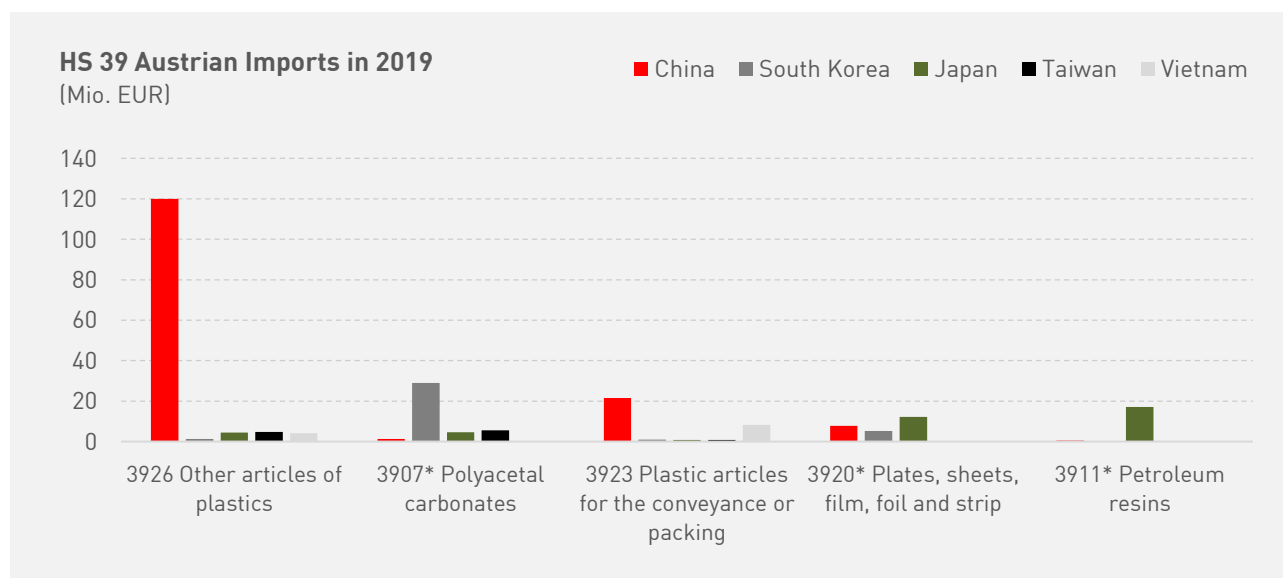
After China, Europe is the largest producer of plastic materials (especially Germany and France). The imports of plastic parts and components from within Europe are expected to continue growing with a rate of 8% per year.

A 6.5% duty is levied on European imports from countries outside of Europe, including China. Several countries such as Turkey and South Africa benefit from a preferential 0% tariff under the Generalised System of Preferences (GSP).

The huge demand for personal protective equipment and single-use plastics has also increased the demand for recycling services under this category. This has opened up an opportunity for operators in the Waste Collection, Treatment and Disposal. Plastic recycling. The production of plastics from environmentally friendly materials is becoming more important and popular.

For plastic injection molded parts capabilities in mold making at different suppliers are an important issue to address as they usually vary a lot, especially within China and Asia.

The following chart describes the major HS 39 product categories Austria imports from Asia and shows the most important supply markets:



* 3907 Polyacetals, other polyethers and epoxide resins, in primary forms

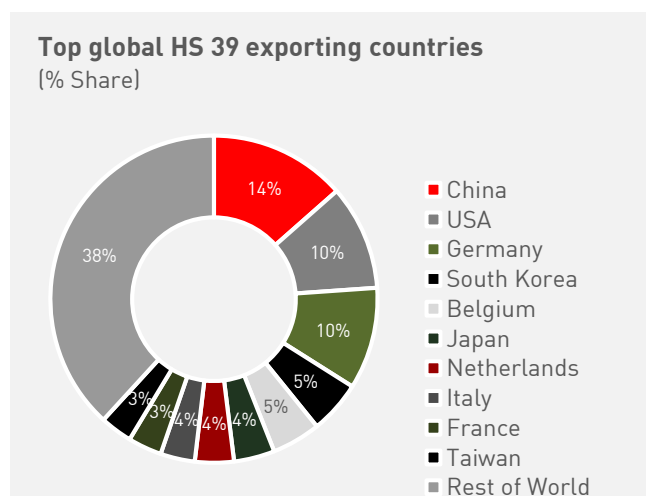
* 3920 Plastics; plates, sheets, film, foil and strip (not self-adhesive)

* 3911 Petroleum resins, coumarone-indene resins, polyterpenes, polysulphides, polysulphones, etc

Source: Statistics Austria

4.7.2 Global Snapshot

The world's most important suppliers for Plastics/Rubber Products (HS 39) are China, the United States, Germany, South Korea and Belgium. China is the top exporter of HS 39 category with a market share of 14%.



The following tables show the countries and regions with leading exports worldwide for the selected HS 39 product categories, which are most relevant for Austria:

HS 3926 - Articles of plastics and articles of other materials of heading no. 3901 to 3914

Exporters	Exports 2019 in 1,000 USD
China	21,439,700
Germany	9,693,665
USA	6,913,056
Italy	3,218,628
France	2,930,455
Poland	2,309,641
Netherlands	2,158,637
Japan	2,153,724
Mexico	1,966,908
Czech Republic	1,929,529

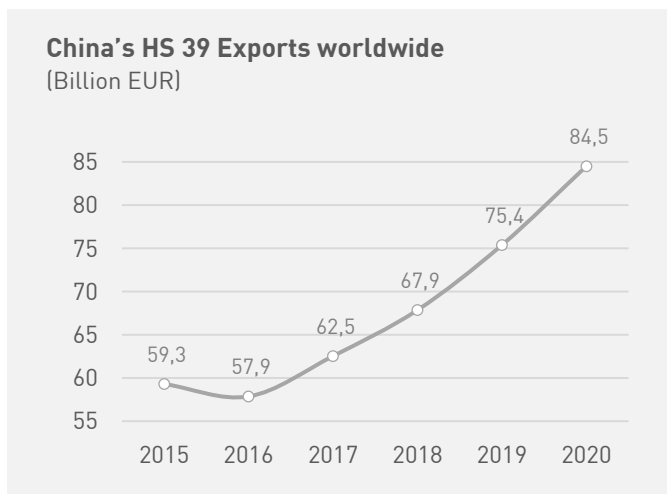
HS 3923 - Plastic articles for the conveyance or packing of goods; stoppers, lids, caps and other closures of plastics

Exporters	Exports 2019 in 1,000 USD
China	9,829,905
USA	5,486,184
Germany	5,017,024
France	2,495,271
Mexico	2,165,236
Netherlands	1,991,503
Italy	1,905,430
Canada	1,845,711
South Korea	1,559,338
UK	1,377,417

Source: Trade Map

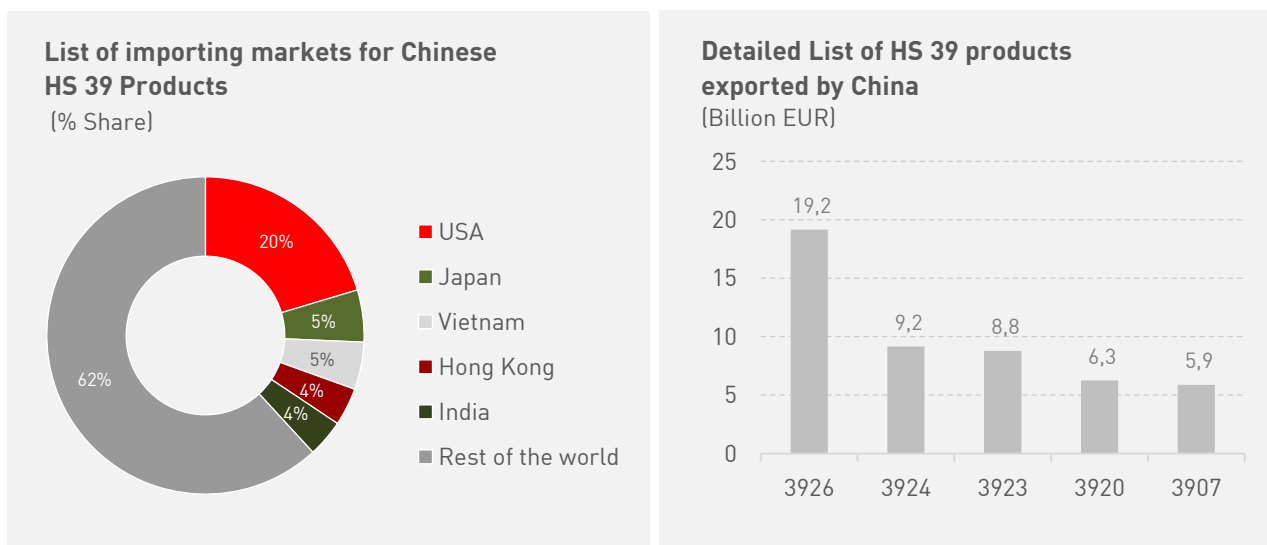
4.7.3 China Snapshot

The following shows China's exports of HS 39 products worldwide:



Source: UN Comtrade

The following charts show the major importing markets for products made-in-China and which sub-categories are most relevant:



* 3924 Tableware, kitchenware, other household articles and toilet articles, of plastics (excluding baths, shower-baths, washbasins, bidets, lavatory pans, seats and covers, flushing cisterns and similar sanitary ware)

* 3907 Polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms

Source: UN Comtrade

Plastics/Rubber Products Clusters Map

The main sourcing clusters are Shanghai, Hubei, Zhejiang and Guangdong:



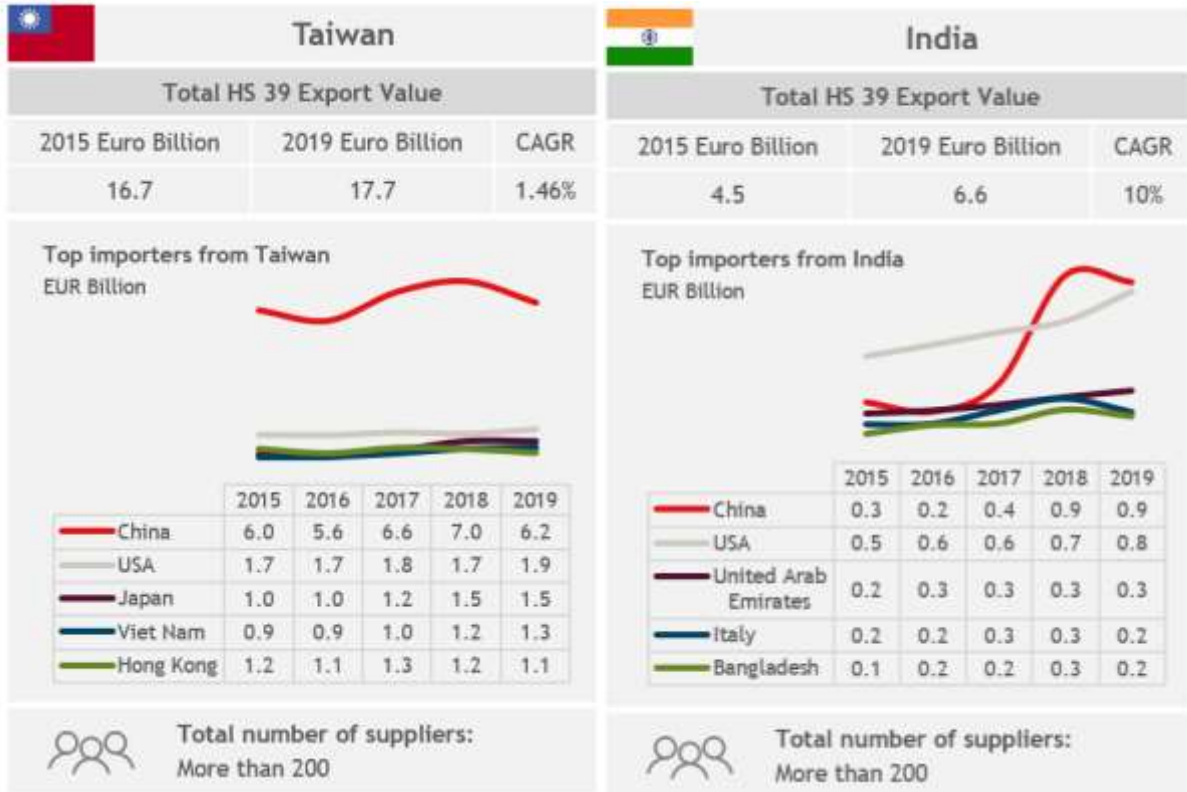
Source: MANGGEI CONSULTING

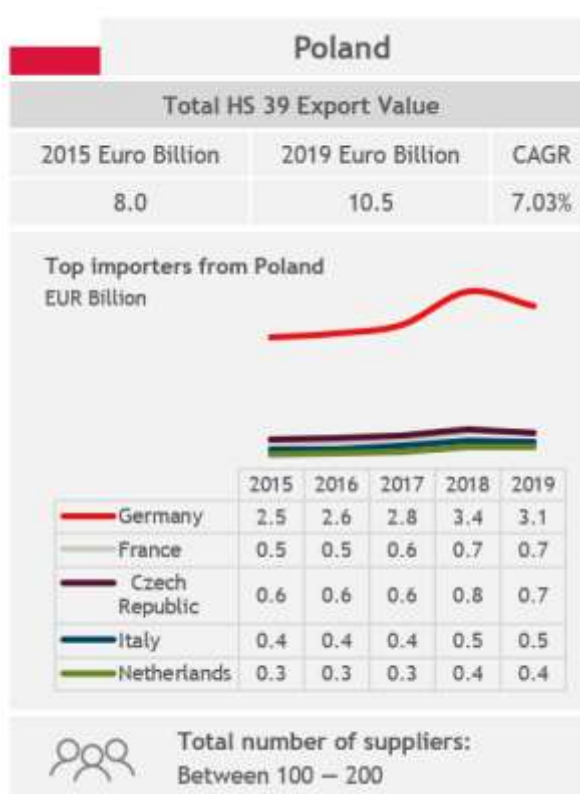
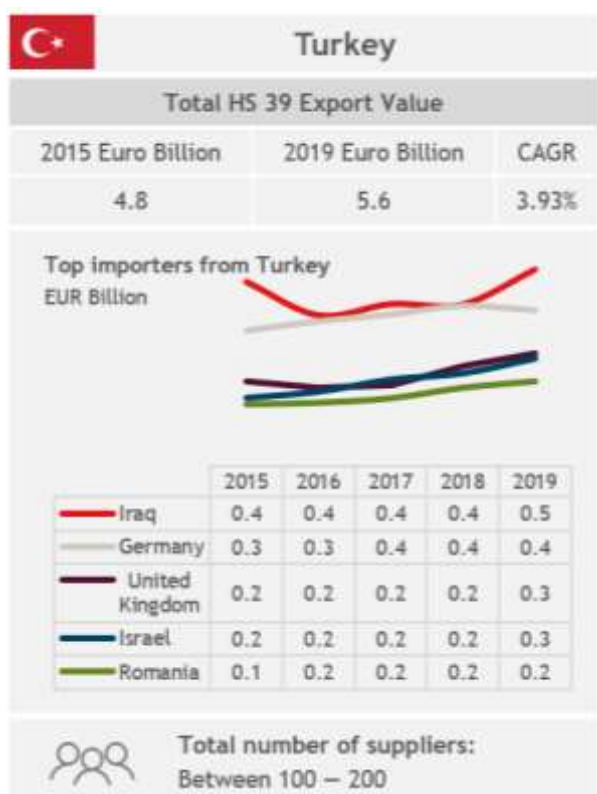
Key Suppliers in China are:

Suzhou Victory Precision Manufacture, Shandong Linglong Tire, Sailun Group, Anhui Zhongding Sealing Parts, Zhuzhou Times New Material Technology.

4.7.4 Potential Alternative Sourcing Markets for the Plastics/Rubber Products Category

Alternative potential sourcing destinations include Taiwan, India, Turkey, Poland and Malaysia. The following graphs give an overview for selected alternative sourcing markets and provide information about their export performance and growth rates, main markets being served and a rough estimation for the size of the supplier base:





Source: MANGGEI CONSULTING

Potential Manufacturers in Alternative Countries for the Plastics/Rubber Products Category

This is a list of a selected few manufacturers, which serve international markets:

Taiwan	India	Turkey	Poland	Malaysia
Matila Industrial	Nilkamal	Elifplas Plastic	Krafplast	New Plastics Industries
Enjoing Go Company	Plastiblends India Ltd	Sudnur Plastik	Telco	Cosmal Manufacturing
Teraplastics	Supreme Industries	Goreme Melamin Ltd	Plastjan	Brightway Holdings
Taiwan Hwang Yi Precision	Mahindta EPC	SH Plast Metal Plastik	PPH Evko	Goodway Integrated Lte
Yong Hau Enterprise	Prima Plastics	Policap	Nosta	Triplast Plastic

Source: MANGGEI CONSULTING

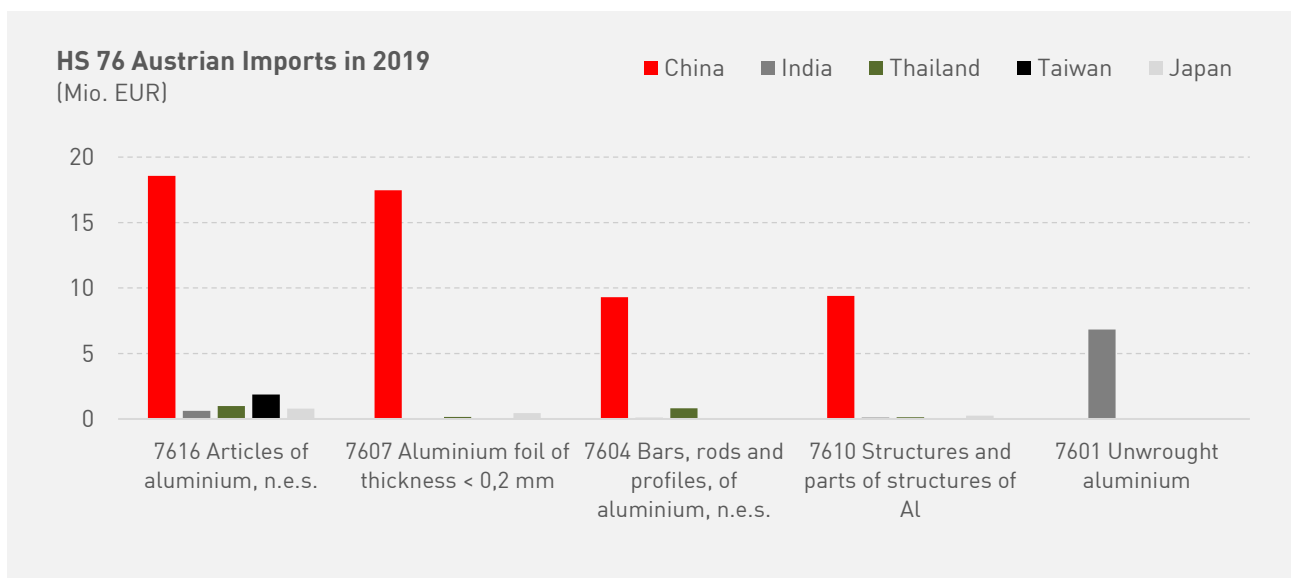
4.8 Aluminum Products (HS 76)

4.8.1 Austrian Sourcing

The category of Aluminum Products is divided into raw material and fabricated parts. Aluminum as raw material is a global commodity and buyers have to secure their needs by an annual framework agreement on the global market. It is important to keep dominating factors in mind that determine the pricing, namely local energy cost, raw material prices, currency exchange rates and potential penalty duties.

For fabricated parts made from aluminum, especially in cast, Chinese suppliers offer aggressive pricing regarding mold and tool costs. The manufacturing competence and quality varies widely and buyers must be very cautious about the capability of suppliers. It should be checked if they are capable of handling the size of potential client orders and also if they are interested in smaller client orders in the long-term.

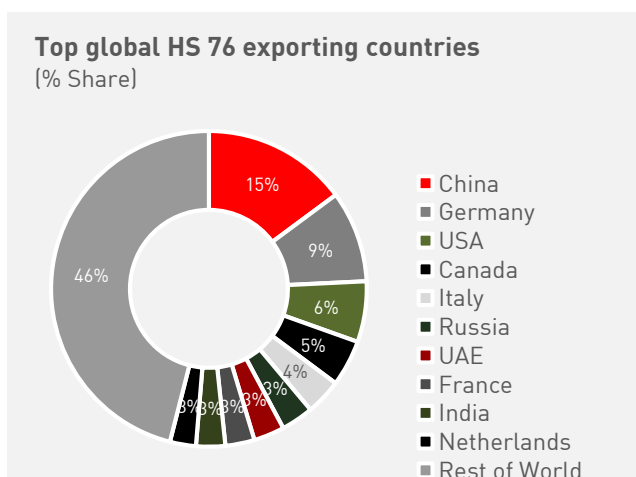
The following chart describes the major HS 76 product categories Austria imports from Asia and shows the most important supply markets:



Source: Statistics Austria

4.8.2 Global Snapshot

The world's most important suppliers for Aluminium Products (HS 76) are China, Germany, the United States, Canada and Italy. China is the top exporter of HS 76 category with a market share of 15%.



Source: UN Comtrade

The following tables show the countries and regions with leading exports worldwide for the selected HS 76 product categories, which are most relevant for Austria:

<i>HS 7616 - Articles of aluminum, n.e.s.</i>	
Exporters	Exports 2019 in 1,000 USD
China	3,325,859
Germany	1,800,612
Italy	1,595,284
USA	1,290,699
Poland	860,194
Malaysia	786,753
France	774,645
Austria	745,469
Czech Republic	563,111
Taiwan	554,139

<i>HS 7607 - Aluminium foil of a thickness (excluding any backing) of = 0,2 mm</i>	
Exporters	Exports 2019 in 1,000 USD
China	4,018,354
Germany	1,595,720
Japan	562,197
Italy	550,670
USA	536,661
Turkey	391,852
South Korea	365,087
Greece	361,367
France	325,738
Netherlands	205,633

<i>HS 7604 - Bars, rods and profiles, of aluminum, n.e.s.</i>	
Exporters	Exports 2019 in 1,000 USD
China	2,975,864
Germany	1,842,258
Spain	1,139,481
Italy	929,440
USA	920,221
Turkey	883,551
Austria	586,390
Belgium	510,650
Poland	480,298
Netherlands	427,071

<i>HS 7610 - Structures and parts of structures of aluminium; plates, rods, profiles, tubes and the like</i>	
Exporters	Exports 2019 in 1,000 USD
China	3,918,731
Germany	1,739,337
Poland	753,846
Canada	633,712
Italy	630,995
Austria	482,841
USA	440,957
Thailand	415,701
Netherlands	373,097
Turkey	315,569

Source: Trade Map

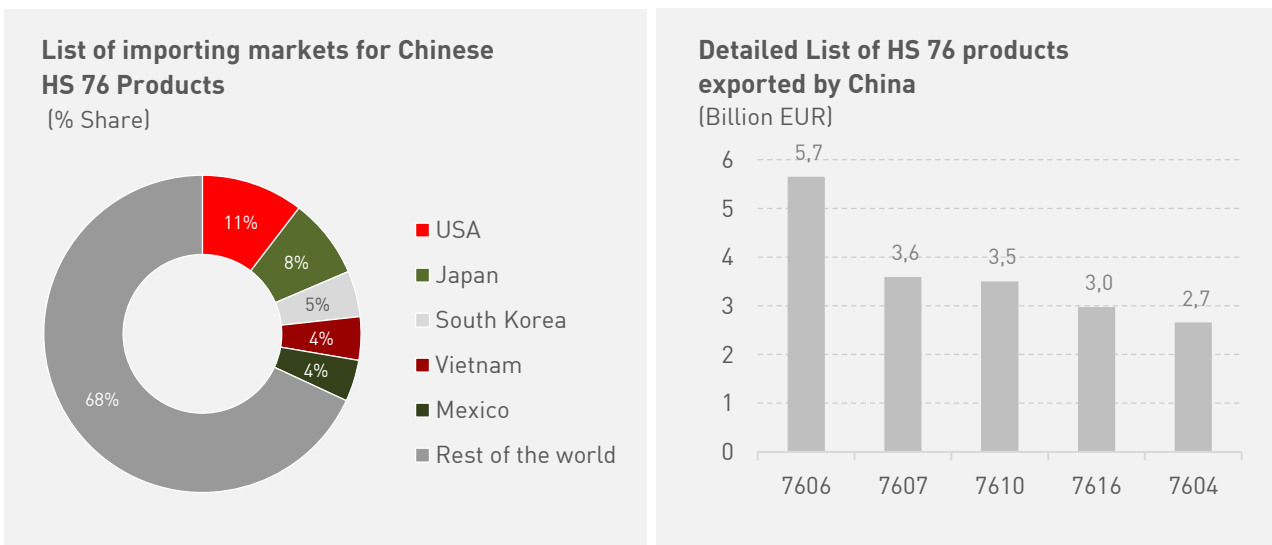
4.8.3 China Snapshot

The following shows China's exports of HS 76 products worldwide:



Source: UN Comtrade

The following charts show the major importing markets for products made-in-China and which sub-categories are most relevant:



* 7606 Plates, sheets and strip, of aluminium, of a thickness of > 0,2 mm (excluding expanded plates, sheets and strip)

Source: UN Comtrade

Aluminum Products Clusters Map

The main sourcing clusters are Inner Mongolia, Shanxi, Henan, Guizhou, Yunan and Guangxi:



Source: MANGGEI CONSULTING

Key Chinese Aluminum production hubs are in North China, Central China and Northwest China. Southwest China's Guizhou province has become the new number-one destination for aluminum producers due to friendly environmental policies and availability of raw materials such as bauxite.

In 2019, China's exports of aluminum extrusions, used in areas from construction to vehicles, stood at 1.04 million tons. Those exports only accounted for about 10 percent of total output.

Chinese aluminum exporters have faced anti-dumping duties from the U.S., Canada, Australia and Vietnam. The 27-nation EU constitutes about 13% of China's aluminum extrusion exports in 2019, which is slightly higher than the 12 % share held by Vietnam.

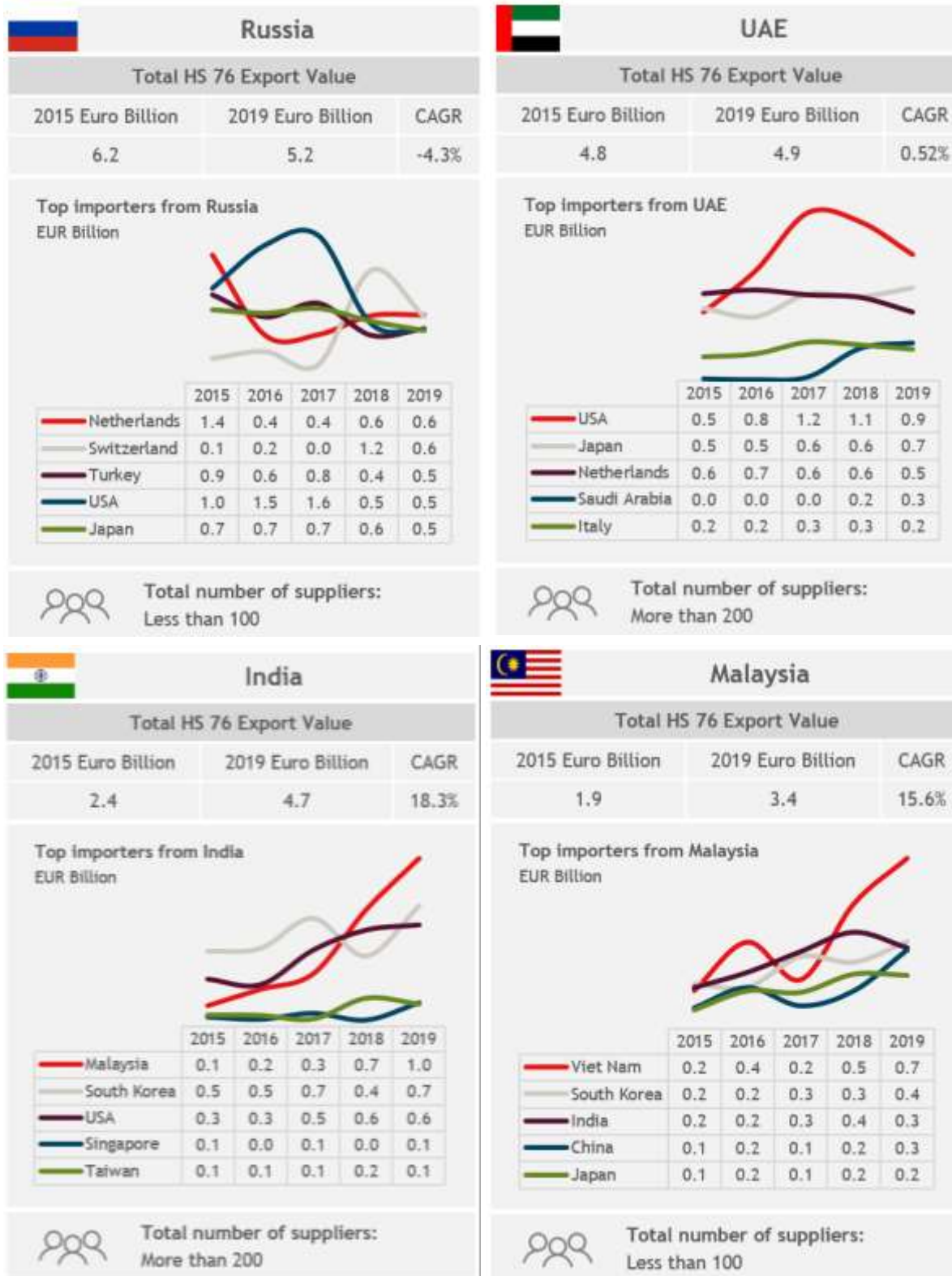
According to the industry body European Aluminum, Chinese aluminum exports to the EU in 2019 have doubled compared to 2016. At the end of 2020, the EU imposed anti-dumping duties of up to 48 percent on Chinese aluminum extrusion products.

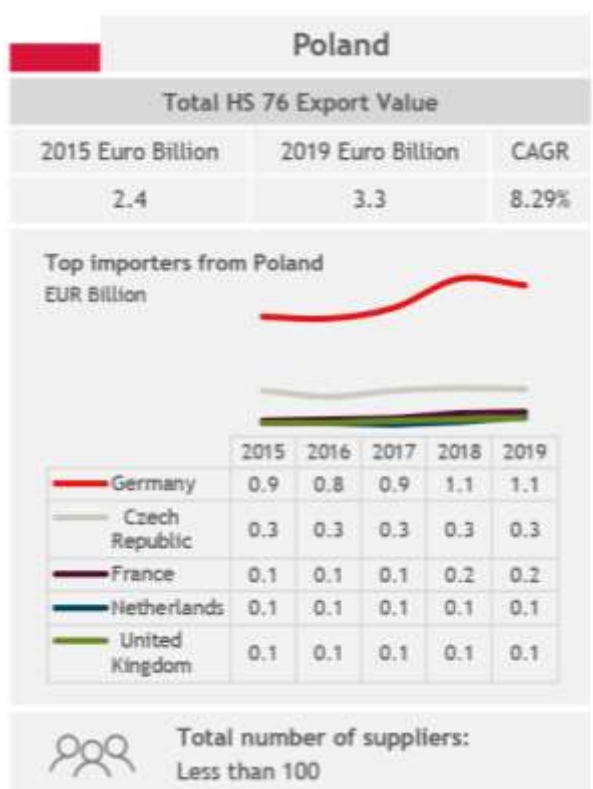
Key Suppliers in China are:

Aluminum Corporation of China, Luneng Jinbei – Yuanping Alumina Refinery, Shandong Xinfu Aluminium Group, Shandong Weiqiao Aluminum and Power, Jinjiang Group.

4.8.4 Potential Alternative Sourcing Markets for the Aluminium Products Category

Alternative potential sourcing destinations include Russia, the UAE, India, Malaysia and Poland. The following graphs give an overview for selected alternative sourcing markets and provide information about their export performance and growth rates, main markets being served and a rough estimation for the size of the supplier base:





Source: MANGGEI CONSULTING

Potential Manufacturers in Alternative Countries for the Aluminum Products Category

This is a list of a selected few manufacturers, which serve international markets:

Russia	UAE	India	Malaysia	Poland
Rusal	Emirates Global Aluminum	Nalco	Aluminium Company of Malaysia	Hydro Aluminium Rolled Products
Altek	Sohar	Hind Aluminium	Hydro Aluminium	Aliplast
Primetorg	Al Falak Aluminium	Manaksia Alumin	Kosa Aluminium Extrusion	P U Jabo Jan Wierzchowski
Vtorsplav	Alucop	Vedanta Resources	Kamco	Albatross Aluminium
Tatprof	Dubai Aluminium PJSC	Bharat Aluminium Company	TT Engineering	Aluteam

Source: MANGGEI CONSULTING

4.9 Organic Chemicals (HS 29)

4.9.1 Austrian Sourcing

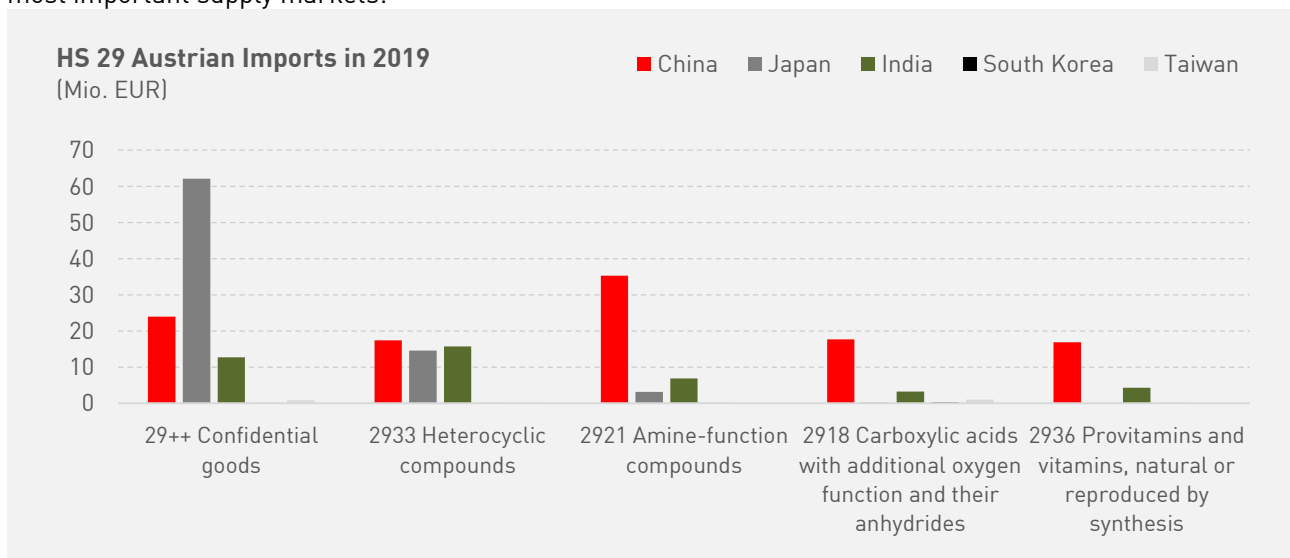
The import and export structure of China's chemical products is relatively stable with a high concentration - Shandong and Shanghai are the most important sourcing clusters.

China's chemical industry is undergoing a rapid transition, Chinese import of organic chemical has increased significantly due to inefficient factories and obsolete technologies.

In 2019, the U.S., UK and Switzerland were the three largest partners of the EU for exports and imports of chemicals.

One Austrian Chief procurement officer surveyed for this study mentioned that Chinese players will strengthen their footprint in the Organic Chemical category also in Europe.

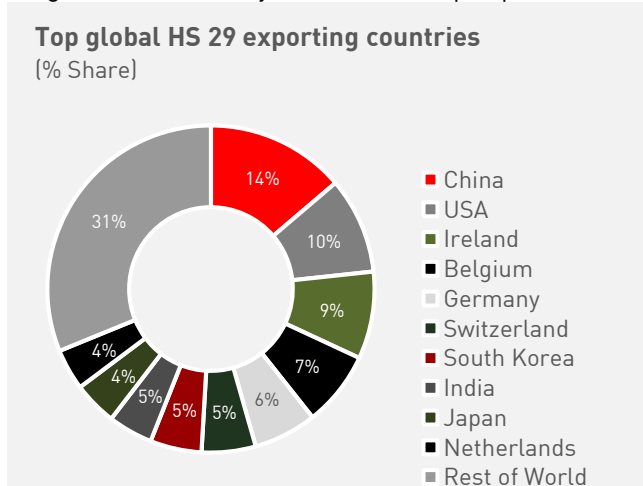
The following chart describes the major HS 29 product categories Austria imports from Asia and shows the most important supply markets:



Source: *Statistics Austria*

4.9.2 Global Snapshot

The world's most important suppliers for Organic Chemicals (HS 29) are China, the United States, Ireland, Belgium and Germany. China is the top exporter of HS 29 category with a market share of 14%.



Source: *UN Comtrade*

The following tables show the countries and regions with leading exports worldwide for the selected HS 29 product categories, which are most relevant for Austria:

<i>HS 2933 - Heterocyclic compounds with nitrogen hetero-atom(s) only</i>	
Exporters	Exports 2019 in 1,000 USD
Ireland	22,347,080
Switzerland	10,315,329
Belgium	9,267,806
China	8,535,584
UK	4,073,276
Germany	3,756,489
Israel	3,391,512
India	2,758,998
USA	2,130,263
Netherlands	193,593

<i>HS 2921 - Amine-function compounds</i>	
Exporters	Exports 2019 in 1,000 USD
China	2,092,535
USA	1,228,954
Belgium	1,154,296
Germany	920,863
India	570,543
Japan	366,183
UK	346,201
Netherlands	310,422
Czech Republic	174,916
South Korea	164,892

<i>HS 2918 - Carboxylic acids with additional oxygen function and their anhydrides, halides, peroxides and peroxyacids</i>	
Exporters	Exports 2019 in 1,000 USD
China	2,452,688
Germany	562,161
India	401,603
USA	400,078
Italy	367,512
Belgium	327,090
Japan	271,935
South Korea	225,036
Switzerland	215,889
Netherlands	427,071

<i>HS 2936 - Provitamins and vitamins, natural or reproduced by synthesis, incl. natural concentrates, derivatives thereof</i>	
Exporters	Exports 2019 in 1,000 USD
China	2,717,703
USA	823,065
Australia	534,468
Germany	425,474
Singapore	290,569
France	287,898
India	232,110
Netherlands	215,622
Belgium	178,110
Japan	128,086

Source: Trade Map

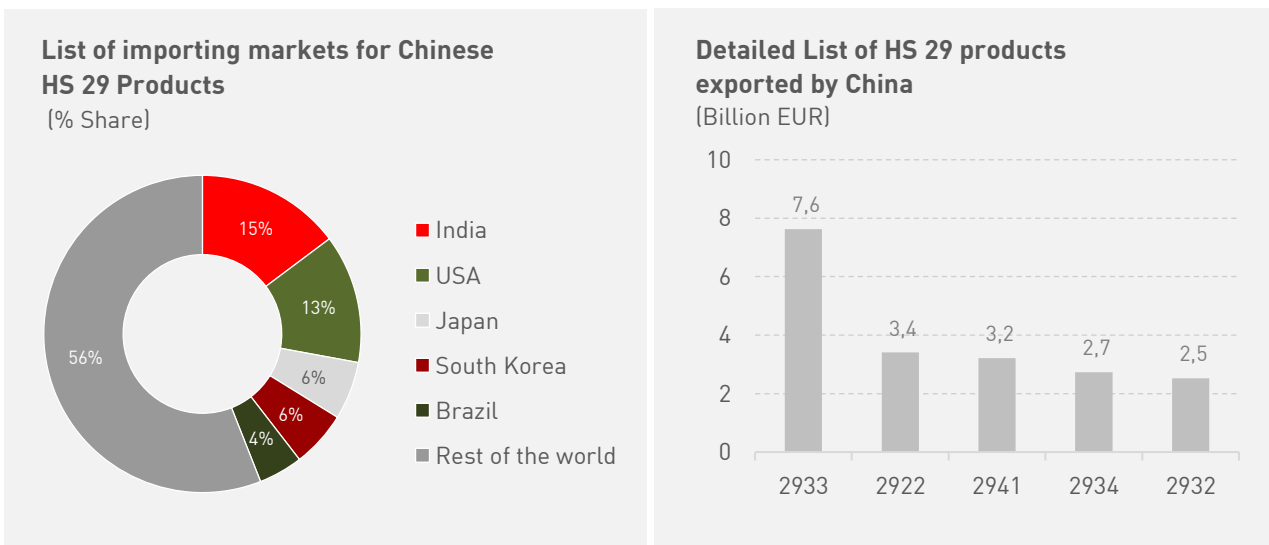
4.9.3 China Snapshot

The following shows China's exports of HS 29 products worldwide:



Source: UN Comtrade

The following charts show the major importing markets for products made-in-China and which sub-categories are most relevant:



* 2922 Oxygen-function amino-compounds

* 2941 Antibiotics

* 2934 Nucleic acids and their salts, whether or not chemically defined; heterocyclic compounds (excluding with oxygen only or with nitrogen hetero-atom[s] only)

* 2932 Heterocyclic compounds with oxygen hetero-atom[s] only

Source: UN Comtrade

Organic Chemicals Clusters Map



Source: MANGGEI CONSULTING

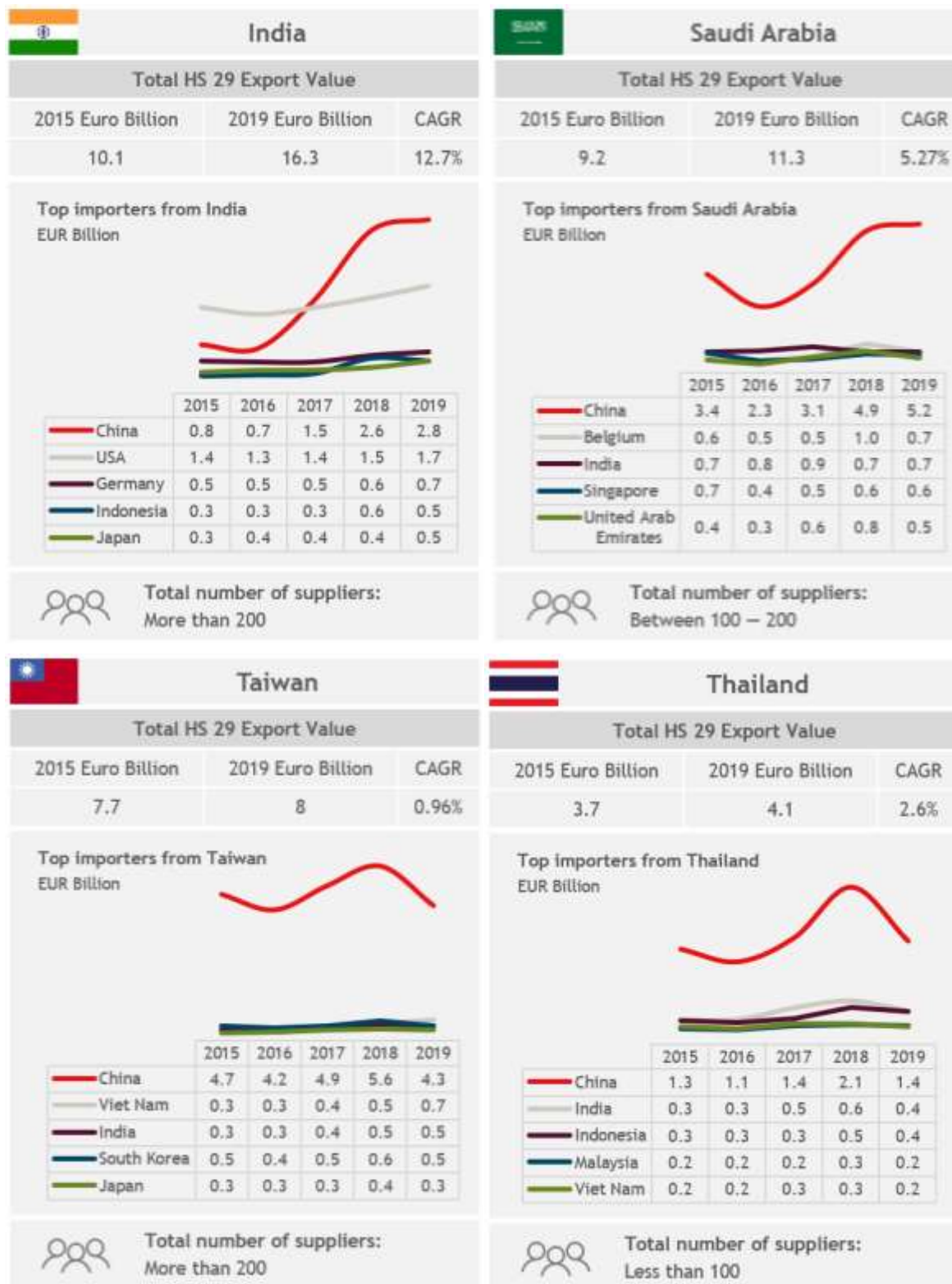
China's chemical industry (around \$1.5 trillion of sales in 2017) has been the largest in the world in view of revenue since 2011. China's chemicals export volume accounts for just about 10% of the sector's output. Chemical plants are still often located in mixed urban areas next to residential buildings. There are over 20,000 producers all over China. Politics aims to set up specialized chemical production zones in which several producers can make use of centralized infrastructure like for the treatment of wastewater and hazardous waste.

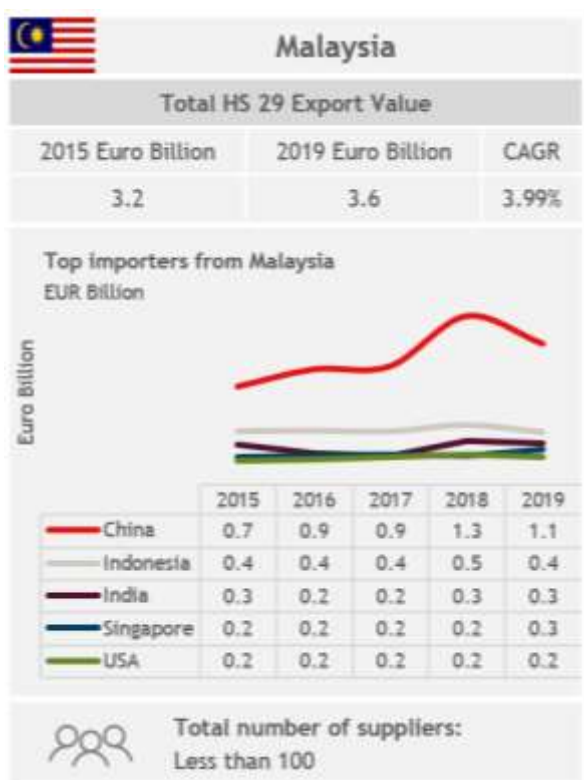
Key Suppliers in China are:

Wuxi Cooperation International, Shanghai Yung Zip Pharmaceutical, Shanxi Solid Industrial, Zhejiang Tengyu New Material.

4.9.4 Potential Alternative Sourcing Markets for the Organic Chemicals Category

Alternative potential sourcing destinations include India, Saudi Arabia, Taiwan, Thailand and Malaysia. The following graphs give an overview for selected alternative sourcing markets and provide information about their export performance and growth rates, main markets being served and a rough estimation for the size of the supplier base:





Source: MANGGEI CONSULTING

Manufacturers in Potential Alternative Countries for the Organic Chemicals Category

This is a list of a selected few manufacturers, which serve international markets:

India	Saudi Arabia	Taiwan	Thailand	Malaysia
Tata Chemicals	Modern Petrochemicals	Chemsphere Technology	Thai Ambica Chemicals	Petronas Malaysia
Hindustan Organic Chemicals Ltd	Saudi Specialty Chemicals	Hopax Fine Chemical	Sumitomo	Acme Chemicals Malaysia
Indo Amines	Sabic	Zimi Chemicals	Siam Sorbitol	Nanocarb Technology
Gujarat Fluorochemicals Ltd	Alujain	Jen Tong Chemical Industry	Toa Paint Thailand	Finn Chemicals
National Fertilizers	Tasnee	Taiwan Xinqiang Chemicals	Viv Interchem	Hexza Corp

Source: MANGGEI CONSULTING

4.10 Raw Materials, Rare Earth and Dependency on China

The European economy ensures its success on global markets through technology exports but is also dependent on raw material imports to do so. In addition to global economic growth, technological change, in particular, can have significant impacts on the demand for specific mineral raw materials. Rare earths have a strategic importance for China's global economic hegemony and Europe is heavily dependent on China's monopoly on rare earths.

Numerous research papers dealing with the criticality of raw materials have studied how important it is to have measures in place that ensure supplies of individual raw materials. In the 2016 Study "Raw materials for Emerging Technologies" („Rohstoffe für Zukunftstechnologien“), Fraunhofer IZM, Berlin on behalf of Deutsche Rohstoffagentur researched the relevance of raw materials for emerging technologies. When developing new technologies, existing options to ensure the supply of raw materials should be an integral part of the basic planning considerations. The study is currently updated.

In general, the study suggests that following measures may be considered to ensure the supply of raw materials to industry:

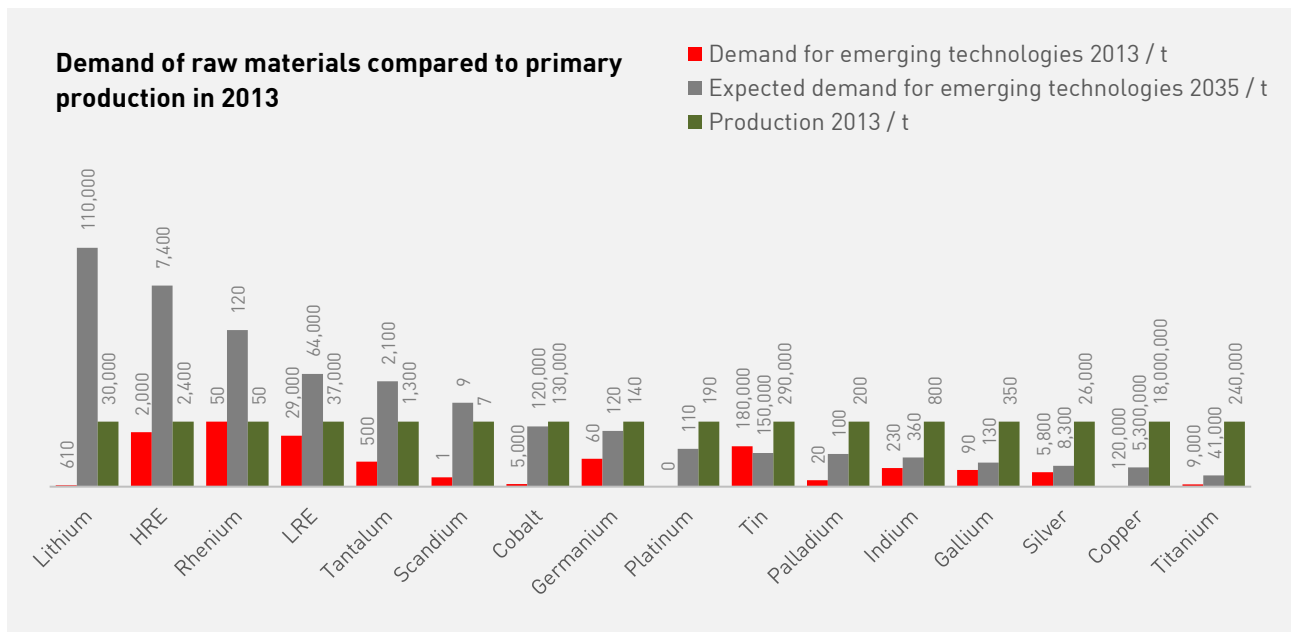
- expansion and improved efficiency of ore mining or metal extraction,
- substitutions at the level of materials and technologies
- resource efficiency in production and use,
- recycling, ensured by recyclable designs, recirculation strategies and efficient recycling technologies.

The following table shows how relevant different raw materials are for emerging technologies. Without an increased production for some metals, the demand coming from emerging technologies will not be able to be met. E.g. for lithium used in batteries and for lightweight airframes, the expected demand will be 3.9 time higher than 2013 production levels.

Ratio: Demand in the year 2013 and expected demand in the year 2035 Compared with the Worldwide Production in the year 2035:

Metal	Demand 20xx/ Production 2013		Emerging technologies
	2013	2035	
Lithium	0	3.9	Lithium-ion batteries, lightweight airframe
HREE (Dy/Tb)	0.9	3.1	Magnets, e-cars, wind power
Rhenium	1	2.5	Super alloys
LRE (Nd/Pr)	0.8	1.7	Magnets, e-cars, wind power
Tantalum	0.4	1.6	Micro-capacitors, medical technology
Scandium	0.2	1.4	SOFC fuel cells
Cobalt	0	0.9	Lithium-ion batteries, XTL.
Germanium	0.4	0.8	Fibre optic, IR technology
Platinum	0	0.6	Fuel cells, catalysts
Tin	0.6	0.5	Transparent electrodes, lead-free solders
Palladium	0.1	0.5	Catalysts, seawater desalination
Indium	0.3	0.5	Displays, thin layer photovoltaics
Gallium	0.3	0.4	Thin layer photovoltaics, IC, WLED
Silver	0.2	0.3	RFID
Copper	0	0.3	Electric motors, RFID
Titanium	0	0.2	Seawater desalination, implants

The following graph shows the demand for various raw materials for the use in selected emerging technologies (demand 2013 and expected demand in 2035) compared to primary production of the respective commodity in 2013:



The length of each bar for the raw materials is normalized to the respective production in 2013.

Source: Fraunhofer IZM

5 PRACTICAL ADVICE AND BEST PRACTICES

5.1 General Considerations for the Implementation of Supplier Risk Management

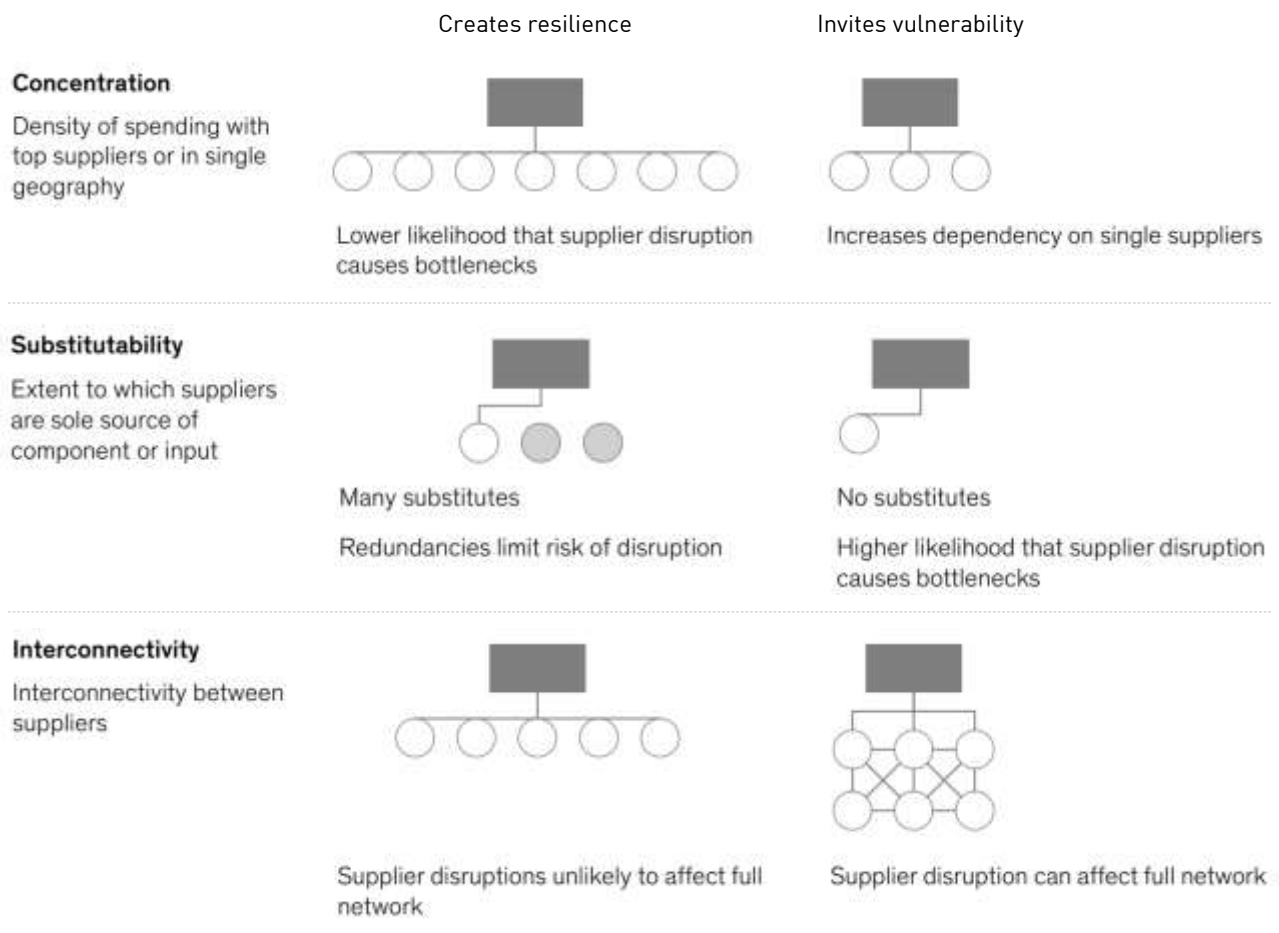
Companies have to evaluate their risks in five critical areas:

1. Demand planning and inventory management
2. Supplier network structure
3. Transportation and logistics networks
4. Financial fragility
5. Product and portfolio complexity

And could take the following actions to create resilient supply chains:

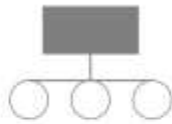
1. Map your value chain in detail.
2. Leverage the full digital potential to monitor, connect and collaborate across the supply chain
3. Diversify your supplier network and geographic footprint
4. Strengthen critical suppliers or bring production of key components in-house
5. Build alternatives in transportation and logistics
6. Move to modular product design with standardized inputs
7. Harden physical assets to withstand natural disasters
8. Increase inventory levels and safety stock
9. Flexibility across suppliers, manufacturing sites and customer channels
10. Create cash flow and balance sheet buffers – Including for suppliers

The structure of supply chain networks can create or reduce vulnerability (McKinsey)

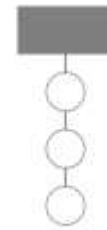


Depth

Layers of subtier suppliers



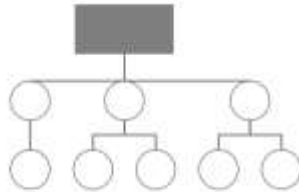
Increases ability to spot risk in subtiers



Lowers visibility into subtiers

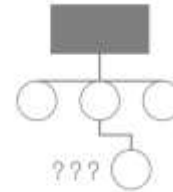
Visibility

Extent to which customer can trace spending at subtier level



Many subtiers known

Transparency



Few subtiers known

Lack of transparency

Dependence

Sub-tier suppliers that are highly dependent on one customer or are SMEs



Decreases likelihood subtier is vulnerable to financial shocks



Higher subtier vulnerability to financial shocks

Source: McKinsey

Minimize exposure to shocks

Targeted measures taken before an event occurs can mitigate the impact of a shock or speed time to recovery. One of the most important steps is building more redundancy into supplier networks. Relying on a single source for critical components or raw materials can be a vulnerability. In fact, even if a company relies on multiple suppliers, they may be concentrated in the same place. Taking the time to identify, prequalify, and onboard backup vendors comes at a cost but it can provide much-needed capacity if a crisis strikes. Auditing and diversifying the supply chain can have added benefit such as reducing carbon intensity and raising environmental and labor standards.

One way to achieve supply chain resilience is to design products with common components, cutting down on the use of custom parts in different product offerings. Auto manufacturers are perhaps the most advanced in this regard, having implemented modular manufacturing platforms that share components across product lines and production sites.

When a shock does hit, companies need the ability to respond quickly

The shift to just-in-time and lean production systems has helped companies improve efficiency and reduce their need for working capital. The time might have come to strike a different balance between “just-in-time” and “just in case.” Having sufficient backup inventory of key parts and safety stock is a critical buffer that can minimize the financial impact of disrupted supplies. It can also position companies to meet sudden spikes in demand.

The ability to reroute components and flex production dynamically across sites can keep production going in the wake of a shock. This requires robust digital systems as well as the analytics muscle to run scenarios based on different responses.

5.2 Practical Advice, Tools, Check Lists

5.2.1 Pricing Guidelines, Volumes, Tooling Costs, Off-the-shelf vs. New-Developed Parts

Overview of local cost factors

The competitiveness of sourcing countries or regions are mainly depending on following cost factors:



Source: MANGGEI CONSULTING

These cost factors and their trends can also be seen as major risk factors and should be monitored and analyzed by purchasing executives permanently.

The 100k rule

Many Austrian sourcing departments and also the authors come up with the rule of thumb that it might only make sense in B2B sourcing from Asian markets for a sourcing volume of at least 100,000 EUR and also then only if the bundle of products for such a purchase with one supplier is not too diverse. For smaller orders, the efforts to work with and the risk to cooperate with suppliers closer to home are usually lower and compensate potential cost savings.

Off-the-shelf versus new development of parts

When screening new suppliers, an important question regarding risk and cost is: Can we buy an “off-the-shelf part” or do we have to work with a supplier to come up with a new part? This question is fundamental regarding cost and risk as new developments often come with the necessity of new tools and R&D overhead. Standardization and the use off-the-shelf products or components help to minimize risk and cost and bundled together within a company could increase purchasing volumes.

5.2.2 Main Questions and Steps for Supply Market Analysis and Supplier Screening

The following graph describes the different steps of the supply market analysis and supplier screening, It shows some questions that should be answered to determine the major categories and the main sourcing countries which should further be screened for new suppliers.

Steps and Output:

Spend & Risk Analysis

- Which are the major direct spend categories?
- Which are the major direct spend categories with the biggest risk of supply constraints?
- Which categories have caused the main problems in the past/lately?
- Which categories are more complex/need skilled suppliers (for instance in R&D, etc.)?
- In which categories do we have a lot of single source supply?
- In which categories do we have a lot of suppliers?
- In which categories do we have raw material risk?
- In which category do we have suppliers in one region/country?
- In which category do we have a process that can be a bottleneck? (like coating, or disinfection, etc.)
- In which category do we have risk of transport, customs, tax issues?



Output 1
**Focus
Categories**

Category Potential for the HS Codes in Scope

- HS Code Analysis of the major countries/regions (major supply countries)
- Experience of Experts & Buyers in this field
- Databases for suppliers in the specific categories
- Web Research
- Catalogues of Fairs, Congresses, Trade Shows, etc.
- Country Reports and tailor-made market research by AUSSENWIRTSCHAFT AUSTRIA



Output 2
**Focus
Countries**

Supplier Criteria

- Which bundles of parts / which volume can/should be placed at a supplier?
- What is the major manufacturing and QC processes needed at the supplier?
- What are "Must Have" criteria?
- What are "Nice to Have" criteria?
- Which certifications are needed?
- Which volume fits to a supplier (high mix-low volume, low mix-high volume)?
- Which material / components are the ones the supplier needs to have experience with?
- Which customer or industry reference does the supplier have to have?
- Use of AI Tools



Output 3
**Longlist of
Suppliers**

Fast Track RFI (Request for Information) and RFQ (Request for Quotation)

- Small RFI with most relevant information needed (Must Have Criteria and general information)
- RFQ with cost breakdown that can be compared to existing suppliers' cost split, mentioning the order volume (per year) that could be placed at the supplier
- Measurement of which suppliers are very cooperative in this step



Output 4
Shortlist of Suppliers

Sampling of existing parts (if feasible)

- Order comparable parts or off-the-shelf parts to check quality and get a look and feel from 5-15 suppliers per category



Output 5
Suppliers for First Visit

First Visit to Suppliers

- Major criteria for visits to be specified up-front the visit: manufacturing steps/machines, stock, QC infrastructure, certificates, reference parts, etc.
- Can be done through live video if internet connection allows it to participate remotely



Output 6
Suppliers for First Order or Samples
or
Audit

Source: MANGGEI CONSULTING

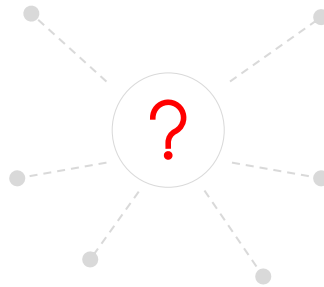
5.2.3 Identifying Problems

This graph shows major steps on how to identify and reduce potential problems in advance to minimize your own risk by determining supplier risk as soon and quickly as possible:

Implement a supplier risk manager function who deals with the topic in general and evaluates information about suppliers. Regular query of financial risk data in a structured manner via financial key figures and evaluation accordingly with an internal traffic light system. If a risk arises, discussions are held directly with the supplier

Increase communication with high-risk suppliers and get information of the surrounding business of the supplier (value chain partners, other customers, etc.). It is crucial to maintain close contact with the most important suppliers to identify problems quickly and to watch out for alarm signals/ indicators such as frequent changes in contact persons, company form or auditors

Implementation of clear risk categorization of sourcing categories and suppliers



Supplier monitoring tools such as sustainability platforms that combine supplier assessment and social media monitoring

Social media monitoring can be very crucial to see if suppliers are connected with certain terms that contain a risk. Works very quickly, giving an edge on information and response

Partly with regular questionnaires to get a picture of e.g. suppliers' manufacturing capacity or to check suppliers' financial data

Source: MANGGEI CONSULTING

5.3 Risk Analysis of Categories and Suppliers vs. Global Supply Options

The following shows an example of a medium sized company in the window hardware sector which screened its main sourcing categories and identified for each the possible need for consolidation of the number of suppliers, the screening of existing and potentially new suppliers and/or the need for conducting benchmarking (comparing with industry peers, price benchmarking).

Category	Observations	Initial Hypothesis	Consolidation	Supplier Screening	Benchmark
Fabrications	High number of suppliers (83 suppliers), handling 6,922 SKUs, parts not matched to best suppliers, no hard negotiations, a lot of assembly in HCC, not too complex parts	Consolidate existing supply base, explore Supply Markets in Eastern Europe and Asia, get clarity of cost drivers, do €/kg benchmarks, frame contracts with core suppliers, implement penalties for delayed deliveries / Quality Problems, get feedback from Suppliers on Design/Manufacturability improvements, install Capacity Planning	●	◐	●
Machined Parts	High number of suppliers (92 suppliers), handling 3,527 SKUs, no matching and grouping of parts with the capable suppliers in terms of machining capabilities, no cost breakdown (material, machining, etc.)	Fabrications only - move to a default €/kg pricing model to buy capacity & forward planning	●	◐	●
Standard Electrical Parts	More than 1,825 Electrical Standard SKUs are handled with more than 3,397 POs; no catalogue buying in place	C-parts management, install catalogue buying, reduce PO numbers for low value parts	●	○	◐
Standard Mechanical Parts	More than 3,948 SKUs are handled with more than 3,277 POs, no catalogue buying in place		●	○	◐



For important procurement groups the following analysis was done in regards to the existing supplying country, number of suppliers, number of articles being sourced, the risk assessment (1= lowest, 5=highest), purchasing volume, if an analysis of trade statistics based on HS code was done and alternative sourcing countries were identified:

Product group	WG designation	Country	No. of suppliers	Qty articles	Risk assessment	EKV je WG/country	HS Code Analysis	Alternative Sourcing Countries
010	Laser processing					€503.631,50	✓ done	Eastern Europe, Turkey
011.02	Steel profiles					€828.311,21	✓ done	China, India
015	Turned parts					€2.900.500,43	✓ done	Eastern Europe, China, Taiwan
015	Turned parts	China	1	3	3	€8.441,53		
015	Turned parts	Poland	2	2	3	€941,37		
016	Springs					€1.178.261,66	✓ done	China, Taiwan, Eastern Europe
017	Stamped parts					€4.678.730,37	✓ done	Eastern Europe, China, Taiwan, Vietnam
017	Stamped parts	Poland	4	56	2	€985.170,33		
018	Cold formed parts					€10.775.326,81	✓ done	Eastern Europe, China, Taiwan
018	Cold formed parts	China	1	9	4	€195.313,28		
018	Cold formed parts	Poland	3	8	3	€24.171,00		
018	Cold formed parts	Slovenia	1	27	4	€482.764,30		
019	Forged parts					€1.737.716,97	✓ done	Eastern Europe, China, Taiwan
019	Forged parts	China	1		3	€28.700,94		

Source: MANGGEI CONSULTING

5.4 Customized Score Card Analysis for Supply Risk Reduction

The following shows an example of a scorecard used to analyze suppliers for an Austrian medium sized intralogistics company based on different criteria and the weight and scoring model used for these different criteria:

Criteria	Weight	Scoring	Max Score per criteria
Overall Business			
Year Founded	7%	1 = After 2015 2 = Between 2010 to 2015 3 = Between 2000 to 2010 4 = Before 2000	4
Number of employees	8%	1 = less than 20 2 = between 21 to 50 3 = between 51 to 100 4 = more than 100	4
Export experience	10%	1 = Less than 5 years 2 = Between 5 to 10 3 = More than 10	3
Turnover in 2018 (Million EUR)	12%	0 = less than 3M 1 = between 3 to 10M 3 = between 10 to 30M 5 = more than 30M	5
Turnover trends	10%	0 = Decreasing more than 5% or no info given 1 = basically stable 2 = Increasing > 10% 3 = Increasing > 20%	3
% of export projects to Germany-Austria-Switzerland (DACH) vs. all projects (from revenue perspective)	10%	1 = less than 5% 2 = between 5% to 25% 3 = between 25% to 50% 4 = more than 50%	4
Is supplier a competent R&D partner / can supplier support improvement of parts & manufacturing?	13%	0 = No / Rather not 1 = Yes partly, or have partner to do it 3 = Yes, inhouse	3
Company Type	10%	1 = Engineering service provider only with sub tooling and sub manufacturing 2 = Tool or parts manufacturer only 3 = Both engineering service provider and tool/part manufacturer in house	3
Cooperation/communication during RFI/RFQ and speed of communication	10%	0 = Not satisfied 1 = Just ok 3 = Satisfied 5 = Excellent	5
Completeness of RFI & has supplier fully understood our inquiry?	10%	0 = Not willing to fill RFI 1 = <60% 3 = 60%-80% 5 = >80%	5
Project related capability			
Percentage of turn over coming from automotive/automation/aviation/etc. industry	16%	1 = < 20% 3 = 20% ~ 50% 5 = > 50%	5

Have good quality control equipments (TBD what exactly is must have)	17%	1 = Lack more than 3 expected equipments 3 = Less 1~2 equipments 5 = Have all	5
Lead time for tools/molds	16%	0 = More than 20 weeks 3 = between 10 and 20 weeks 5 = less than 10 weeks	5
Lead time for serial parts	17%	0 = More than 20 weeks 3 = between 10 and 20 weeks 5 = less than 10 weeks	5
Flexibility in changing parts without high cost?	18%	1 = N/A or high cost (approx. > 5k € per change) 3 = Can change without high cost (approx. < 5k € per change) 5 = Have nearly no cost for changes	5
Supplier can manufacture all parts?	16%	0 = only 1 part 1 = between 2 and 4 parts 3 = Yes, all 5 parts	3
Certificate Compliance			
ISO 9001	20%	0 = No; 3 = Yes	3
ISO 14001	20%	0 = No; 3 = Yes	3
IATF16949	25%	0 = No; 3 = Yes	3
Other international certs like IRIS, etc.	15%	0 = No; 3 = Yes	3
Initial Quotation & Support Performance			
Have submitted initially improvements (like combined tools, material or dimensions change, etc.) or DFM analysis	25%	0= No 3= Yes	3
Completeness of RFQ	25%	1= Rough 3= Acceptable 5= Satisfying	5
Competitiveness of quote (average cost = pc prices + tool cost per 6000 pcs)	25%	1= Not competitive (> 50% of average cost) 3= Average (-50 to 50% of average) 5= Competitive (< -50% of average)	5

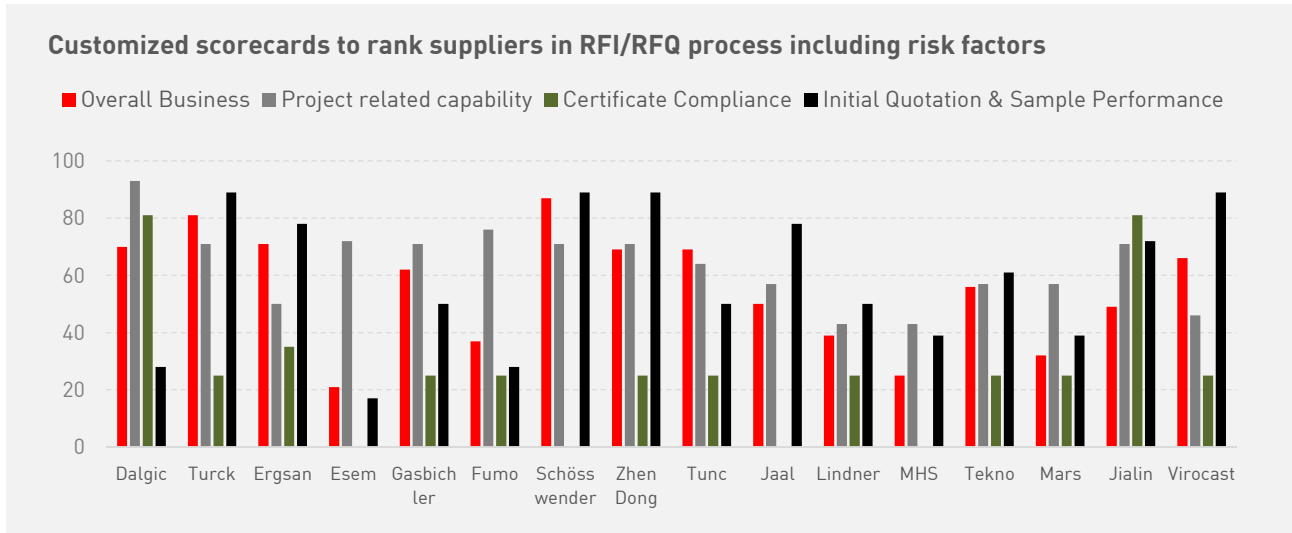
Source: MANGGEI CONSULTING

Total weights by criteria:

Criteria	Overall Business	Project related risk capability	Certificate Compliance	Initial Quotation & Sample Performance
Weight	20%	35%	20%	25%

Source: MANGGEI CONSULTING

The following shows a graph comparing different suppliers in a scorecard model:

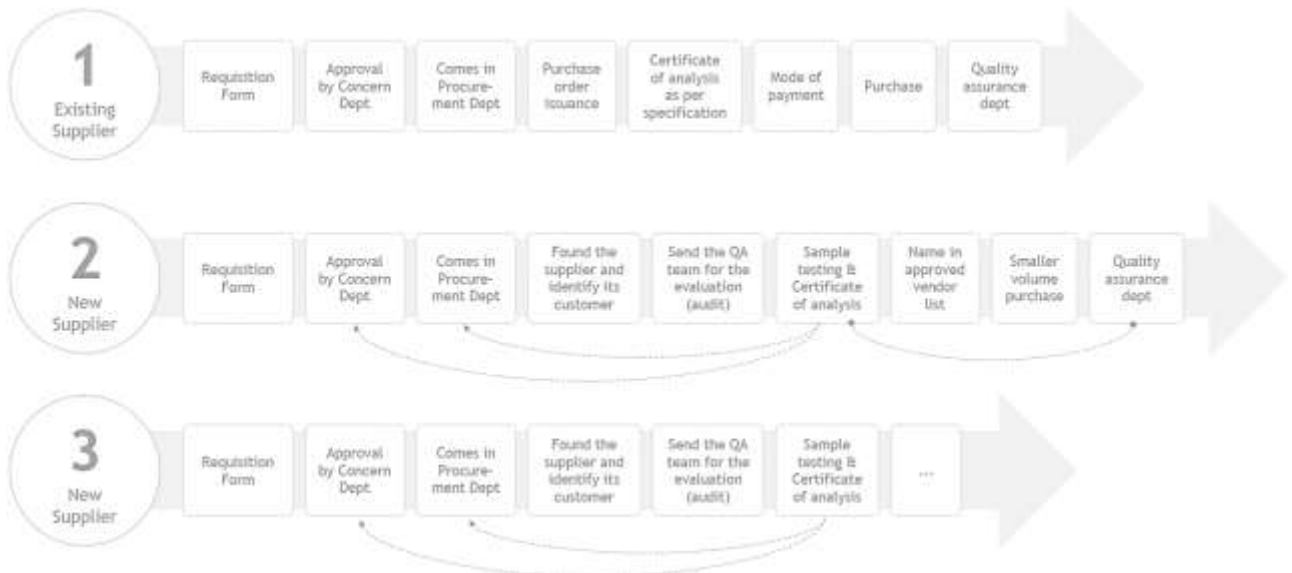


Source: MANGGEI CONSULTING

5.5 Sampling Strategy

Sampling at a very early stage in the supplier screening process can help to save time and cost in the qualification of potential suppliers. The first samples could be parts similar to the actual parts to be sourced in order to check capabilities of a supplier and to get an indication for the quality level. Sampling at an early stage can save time and also cost. Samples which are comparable to the needed specifications are also easy and fast to get if the buyer is ready to cover the cost. Keep in mind that in person visits and audits will bear much higher efforts and costs, and a lot of questions can be clarified very early when samples (or similar parts to the required specs) are checked by the responsible Quality Control departments.

Examples for different Steps in a Supplier Selection Process



Source: MANGGEI CONSULTING

5.6 Quality Inspection



Source: MANGGEI CONSULTING

5.7 Databases for Import Statistics

There is a number of databases available to analyze trade data:

Trade Map

<https://www.trademap.org/Index.aspx>

Trade Map is an useful free-to-use tool to analyze trade statistics and major supplying countries provided by the UN's International Trade Center. Trade Map provides - in the form of tables, graphs and maps - indicators on export performance, international demand, alternative markets and competitive markets, as well as a directory of importing and exporting companies. Trade Map covers 220 countries and territories and 5300 products of the Harmonized System. The monthly, quarterly and yearly trade flows are available from the most aggregated level to the tariff line level.

Access2Markets

<https://trade.ec.europa.eu/access-to-markets/en/home>

Access2Markets is the EU Commission DG Trade's free database for European exporters and importers to find detailed information on tariffs, rules of origin, taxes and additional duties, import procedures and formalities, product requirements, trade barriers and trade flow statistics.

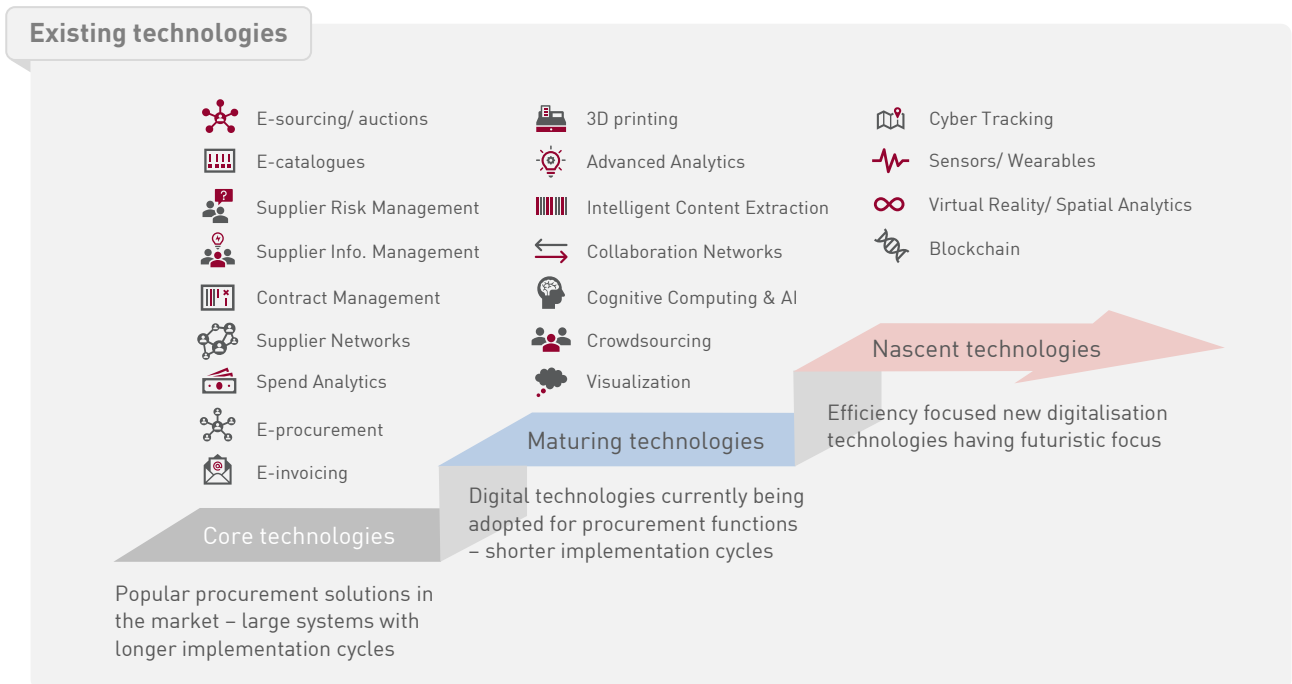
6 DIGITALIZATION IN THE PROCUREMENT PROCESS

6.1 Transparency on Procurement Digitalization

Digitalization in the procurement process offers solutions to relieve procurement departments, create more transparency, provide reliable planning and to analyze risks.

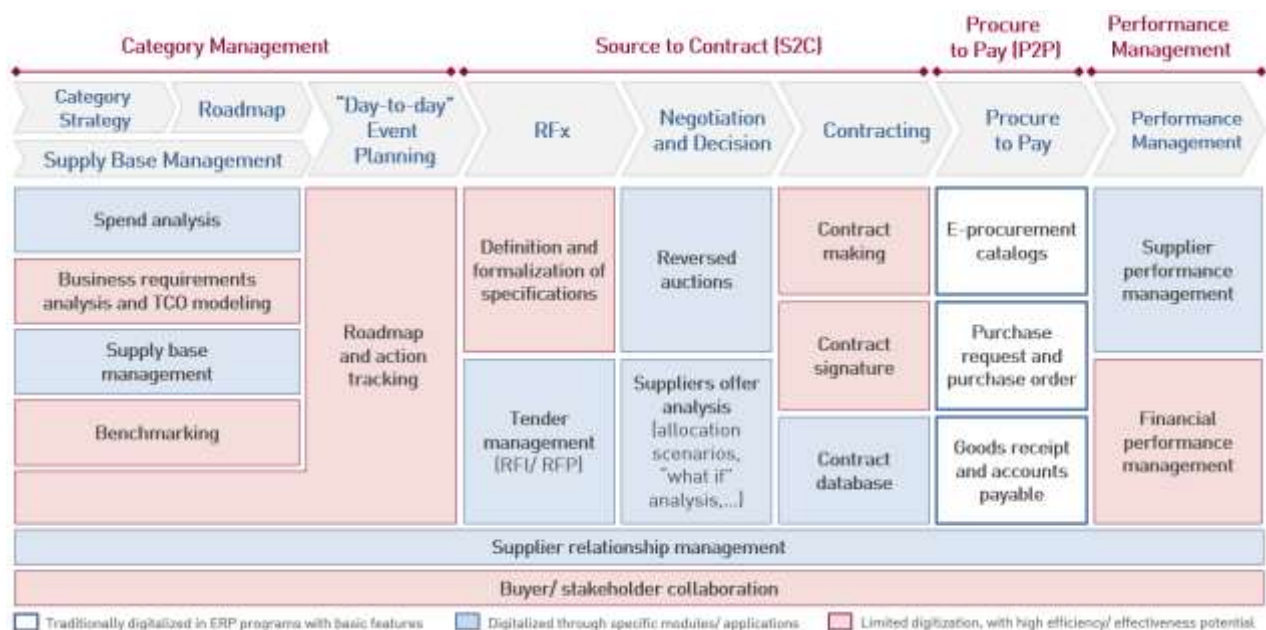
Especially, solutions in crowdsourcing, demand-supply planning, supplier relationship management, supply risk analysis, audit tools and logistics can help to build resilient supply chains.

The following content should give a short glimpse of different options:



Source: EAC, MANGGEI CONSULTING

Digitalization that achieves penetration across all process stages in the procurement process is bound to improve overall process efficiency and effectiveness.



Source: EAC, MANGGEI CONSULTING

Digital procurement solutions that are present in the market offer applications across process width and depth, providing options to organizations for selection of a complete package or a dedicated module.

One could classify solution providers as following:

1. Leaders: Solutions covering several Source to Pay elements with extensive functionality.
2. Masters: Offer comprehensive range of functionality within the limited scope e.g. extensive contract manufacturing functionality.
3. Generalists: Solutions offering many of the Source to Pay elements but with basic functionality.
4. Amateurs: Solutions for organizations that are looking for basic functionality within a limited scope.

Solution Providers Landscape



Source: EAC, MANGGEI CONSULTING

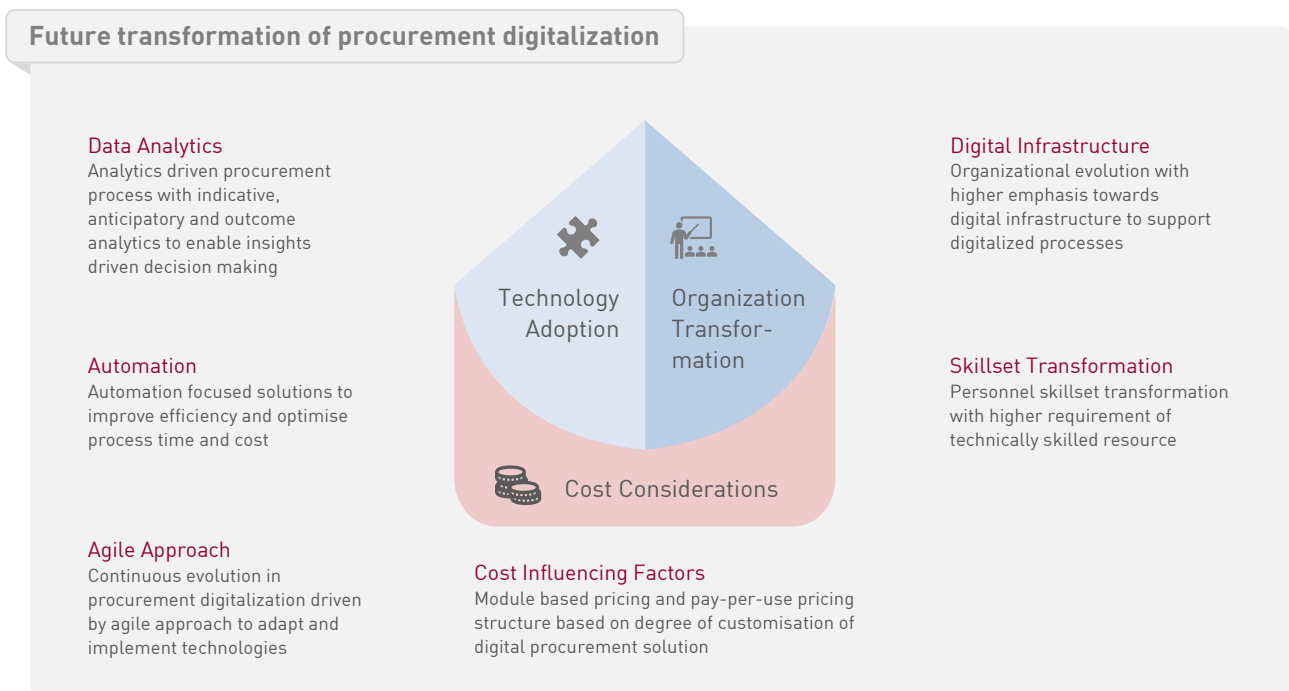
Nowadays, data availability, data integration, system implementation and availability of people with the desired skillset are the key implementation challenges for procurement digitalization.



Source: EAC, MANGGEL CONSULTING

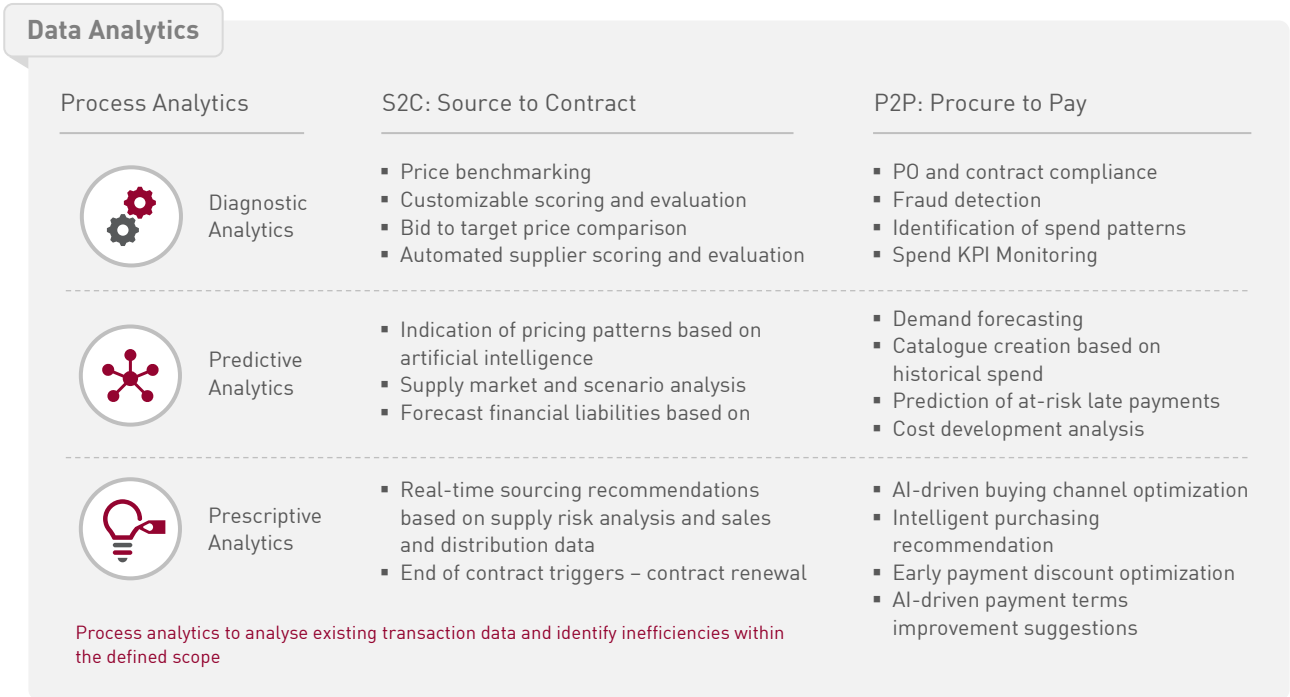
6.2 Future Transformation and Way Ahead

The future of procurement digitalization most likely will experience an increased adoption of technology in data analytics and process automation as well as a consequential transformation in organizational setup.



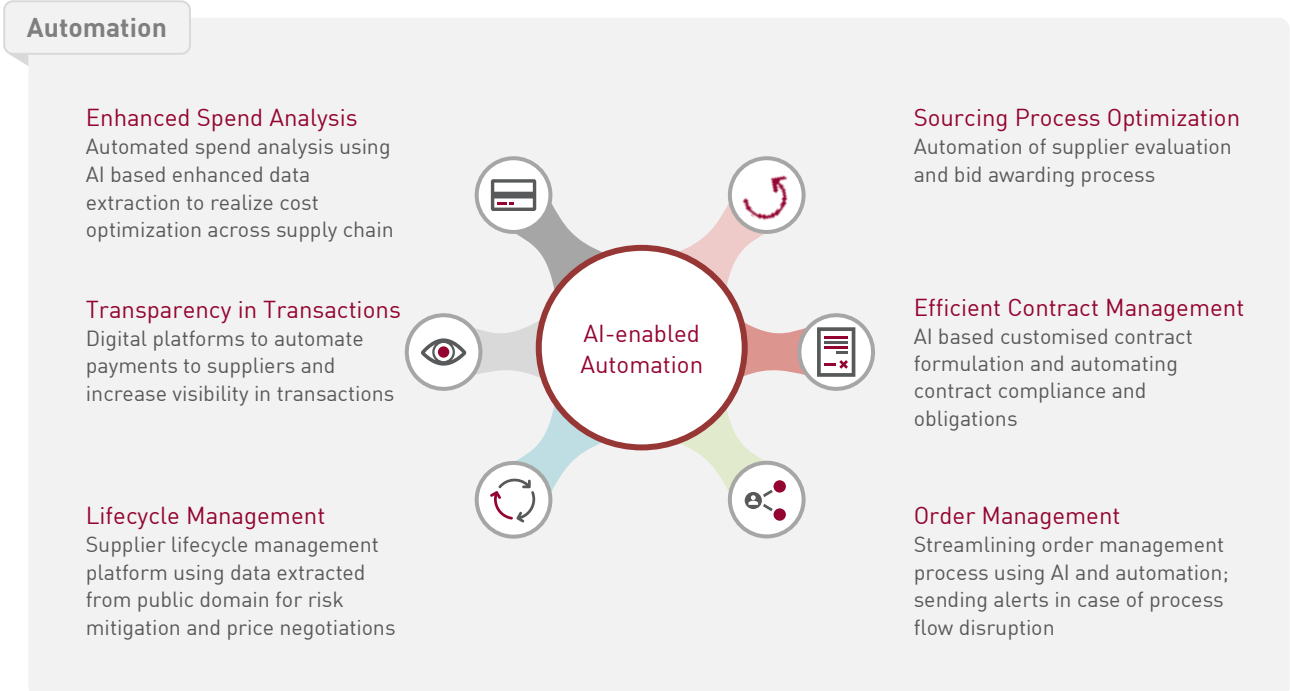
Source: EAC, MANGGEL CONSULTING

Diagnostic, predictive and prescriptive focused data analytics systems can help to identify and eliminate inefficiencies, drive improved decision making and an overall process optimization.



Source: EAC, MANGGEI CONSULTING

Automation technologies can be used to drive cost optimization and increase process efficiency by facilitating process optimization and risk mitigation across procurement process. Procurement automation is based primarily on data extracted using AI. It is aimed at optimising total cost, improving process efficiency, wherein de-bottlenecking in sub-processes and increasing visibility are the key focus areas.

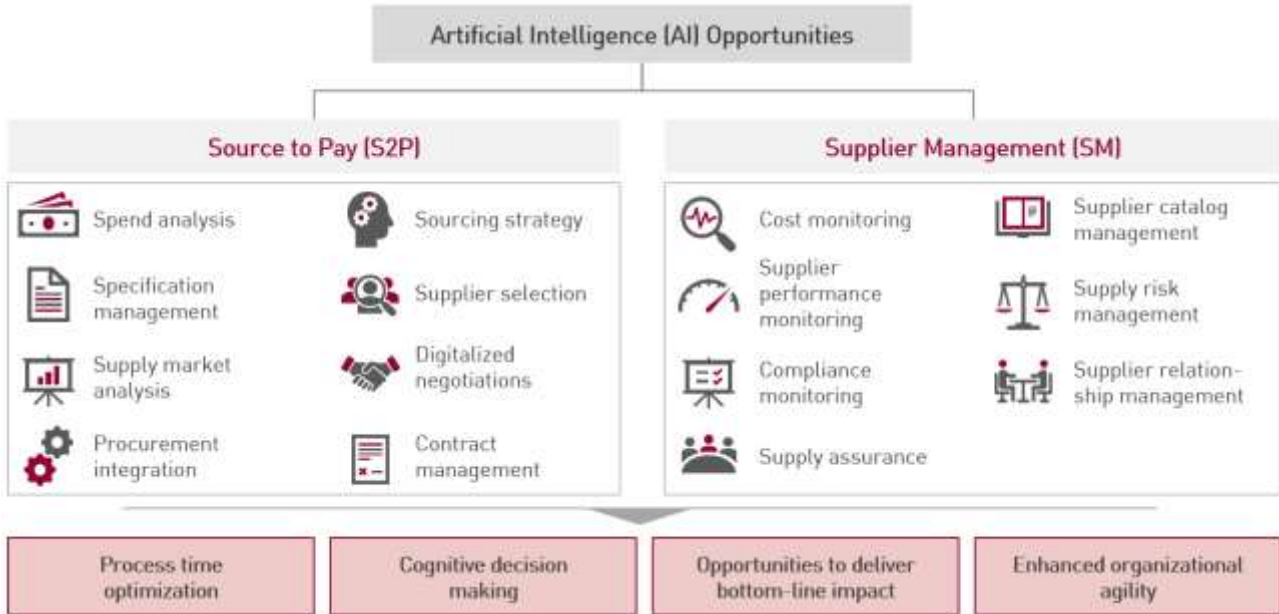


Source: EAC, MANGGEI CONSULTING

6.3 Procurement Digitalization Examples

Artificial intelligence

Artificial intelligence (AI) offers many opportunities across the procurement process stages of Source to Pay (S2P) and Supplier Management (SM). It enables process time and cost reduction, improves decision making capabilities and enhances the organizational agility.



Source: EAC, MANGGEI CONSULTING

Blockchain

Blockchain connectivity and information flow features present opportunities in supply chain management (SCM) leading to process optimization and reduction in costs through a transparent digital platform which is accessible to stakeholders. The following graphs show blockchain benefits in supply chain management (SCM):

Blockchain in SCM – Key Benefits



Blockchain Network – Supplier Info Management



Source: EAC, MANGGEI CONSULTING

Built on a blockchain platform, IBM has offered digitalization solutions across industries such as travel and transport, energy and industrial, consumer goods and financial services.



Source: EAC, MANGGEI CONSULTING

Supplier relationship management solutions

Large and specialized software providers also offer supplier relationship management (SRM) solutions to increase transparency in supplier performance and risk assessment.

SRM solutions

Supplier Management Solution

- Supplier management ranges from supplier qualification to supplier performance and risk management
- Performance evaluation should avoid too much standardization
- One-size-fits-all approach for supplier performance management is not ideal; Certain KPIs can be used to evaluate all suppliers, but there should always be room for category- or supplier specific KPIs

Key benefits

- Increased transparency
- Fact-based benefit calculation
- Scoring determined beforehand
- Automatic processing of responses
- Possibility to automatically disqualify suppliers
- Auto-archiving of all communication and documents

KEELVAR >

- Sourcing optimization platform
- Offers supplier qualification and risk management capabilities
- Reporting and analytics functionalities
- SAP Application Extension Partner

ivalua

- Specialist in spend & supplier management
- Strong within the other modules
- SAP Application Extension Partner

Source: EAC, MANGGEI CONSULTING

Orpheus

Orpheus has developed Bots for different functions in supporting data analysis that uses Push instead of Pull of information. It leads to automatization of routine tasks.

Bot Options – Event Analysis

Multiple Bot options available supporting:

- Independent event analysis
- Continuous analysis

Pricing
Bulk prices

Compliance
Order Splitting

Terms & Conditions
Payment Term vs. Contracted Term

Optimization
Identification of Tail Spend

Bot Options – Selection for Processing in System

Source: EAC, MANGGEI CONSULTING

Audit Solutions

Supplier audit solutions help organizations to plan, conduct, report, score and assess risks of suppliers in terms of compliance and to resolve such issues. Austrian companies that offer digital audit solutions include Intact GmbH and Gutwinski Management GmbH.

Audit solutions

Supplier Audit Solution

- For companies such as L&R present in pharma and healthcare industry, **periodic audits of internal operations and suppliers for compliances is important to conform with regulations** set by the authorities
- To enable organizations conduct supplier audits in a fast and effective way, software companies offer **digital audit solutions enabling early risk detection and resolution** of any compliance issues
- Solutions offer online/ offline ability, **mobile device compatibility** for access on the go, **dashboard creation** and **collaboration with suppliers** on a **centralized, configurable, cloud enabled system**

Key Features

Planning and Scheduling
Plan audits and align auditor and supplier calendars

Conducting Audits
Checklist preparation, take notes, document findings, image record - all on the go

Audit Report Generation
Report template preparation, process information and generate report

Data Analysis and Scoring
Data assessment for supplier performance, trend analysis, reporting and scorecard

Risk Assessment
Supplier process compliance, risk profile creation, highlight risks and review

Auditee Response
Share audit results and risks with auditee for review and providing relevant responses

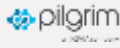
Source: EAC, MANGGEI CONSULTING

Pilgrim

Pilgrim SmartSolve offers audit management software solutions for internal and external supplier audits for organizations in the medical device, pharma, life sciences and healthcare industry. The key advantage of their tool is the focus on audit solutions for medical devices and the healthcare industry that assist to manage and mitigate supplier risks and achieve regulatory compliance success.

Pilgrim

Brief Profile



- Founded in 1993, Pilgrim Solutions is headquartered in Florida, USA and part of IQVIA Inc. with global presence
- Pilgrim offers **software solution for highly regulated industries** including medical devices, pharma, life sciences and healthcare
- Offers quality management, compliance management, risk-based quality management, supplier quality management, audit management software solutions

SmartSolve Audit Management

- Supports **compliance and risk control** with end-to-end process management of internal and external audits
- Supports audit planning, checklist import, criteria creation, conduct audits, attach evidence, capture data from images and notes, process data and generate scorecards, Integrate audit findings into QMS, identify high-risk trends, make action plan and reduce risk of non-compliance
- Has **SmartSolve Mobile Audit**, a mobile device application for online/offline audits at remote locations with limited network connection to conduct audits



Source: EAC, MANGGEI CONSULTING

Certificate management solutions

Certificate management platforms provide centralized storage, access and status of manufacturer and supplier certifications, which brings transparency in complex supply chains and enables compliance adherence.

Certificate management solutions

Certificate Management Solutions – Key Features

- Digital solutions offering management of certifications of the enterprise and suppliers on cloud based platform
- While few solutions are readily available, many software companies offer customized development of solutions on requirement



Central Storage Platform

- Provide centralized platform for organization and supplier certificates to be stored and tracked to ensure compliance
- Support storage of quality certificates, environmental standards or sustainability proofs



Status Tracking and Update

- Allows setting up of supplier network and linkage of their certificates
- Provide dashboard view of current status of all certificates – for organization and suppliers
- Constant status check
- Provide timely alerts prior to certificate expiry and risk of non-compliance



Source: EAC, MANGGEI CONSULTING

Xtanio

Xtanio by DCCS in Graz, Austria, offers cloud-based certificate management solutions with upload, track and dashboard features to manage certificates and ensure compliance.

Brief Profile

- Offered by DCCS IT Business Solutions, setup in 1989 with presence across Europe
- Offers certificate management as a service on cloud based platform

SOLUTION OFFERINGS

Xtanio Certificate Lifecycle Management

- Provides cloud based central platform for upload and access of certificates - quality, environmental standards, etc.
- Supports onboarding of supplier network and certifications
- Interactive dashboard to provide overview of your current compliance status, risks and recertification requirements on time
- Access to the latest certificates and ensure compliance

Company registration

Supplier onboarding

Certificate upload

Tracking and compliance status

Source: EAC, MANGGEI CONSULTING

Risk management solution

Supplier Risk management solutions use data analytics and AI tools to provide real-time and predictive risk alerts across suppliers enabling effective supply chain management for companies.

Digital cloud-based software tools are serving as a centralized platform for tracking suppliers across the complex supply chain network. These tools improve individual supplier relationships and the assessment of risks and potential vulnerabilities occurring due to financial, environmental, political and legal incidents or accidents.

Key Features

- Centralized Platform** for assessment of risk across suppliers
- Event monitoring** through feeds from news, social media and other streams across the globe for any critical risks
- Data Analytics and AI engines** for tracking of incidents and real-time reporting and predictions
- Customized interactive dashboards** and supplier risk assessment-based scorecards

Advantages

- Gaining **supplier visibility and risk scores** enabling companies to manage risks, plan and optimize supply chain
- Getting **real-time and predictive risk alerts** enabling companies to correct and achieve immediate supply chain continuity

Supplier Risk Management Solution Examples

Source: EAC, MANGGEI CONSULTING

prewave

The Austrian company prewave identifies and analyses supplier-related news for Audi, Porsche and Volkswagen from publicly available media and social networks in more than 50 languages and over 150 countries. If there is any indication of a sustainability risk in the supply chain, the brands are notified. Then, the procurement team assesses the situation and considers initiating countermeasures. In this way, AI provides an early proactive warning system for breaches of the Volkswagen Group's sustainability requirements. In this way, it supplements traditional reactive complaint channels such as mailboxes and ombudspersons.

A key advantage about this approach is that it provides supply chain visibility through central monitoring of supplier risks along with predictive assessments for companies to initiate mitigation measures, thereby avoiding delays.

Microsoft Dynamics 365

Microsoft Dynamics 365 offers digital procurement solutions as part of the SCM package with S2P functionalities along with a new SRM power app to support supplier onboarding and relationship health tracking. Dynamics 365 is an ERP and CRM application having extensive modules for sales, production, finance, HR, marketing, service, project management and supply chain functionalities. It offers procurement and sourcing solutions as part of Supply Chain Management (SCM) package and has new Supplier Relationship Management (SRM) power app under manufacturing accelerator.

Dynamics 365 has structured portal windows for each functionality in procurement and SRM providing interactive platform for suppliers and enterprise.

Microsoft Dynamics 365

Procurement & Sourcing (part of SCM package)

- Procurement and sourcing solutions offer S2P functionalities integrated with finance, warehouse management and production modules
- Key solution functionalities include:



Catalog procurement: Has catalog creation, update and procurement function



RFQ creation: Create purchase requisition and Requests for Quotation (RFQ)



Bidding: Can receive and register bids on RFQs from invited vendors with bid scoring and comparison **feature for selection and PO award**



PO creation: Creation, approval and release of PO with delivery schedules



Product receipt and Invoicing: Product receipt, quantity check and matching of vendor invoice for further processing with accounts payable

Procurement & Sourcing (part of SCM package)

- Launched under manufacturing accelerator power app, SRM offers comprehensive supplier management app that works seamlessly with SCM package



New supplier registration

Supports inviting new supplier, review request forms and approve/reject and helping in onboarding



Supplier Qualifications

Enables uploading of additional supplier information (viz. account details, certifications, products, services etc.)



Supplier relationship health tracking

Enables tracking of supplier order performance by month, any order/delivery/quality issues

Source: EAC, MANGGEI CONSULTING

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