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## China's Automation Tsunami

### Pinpointing Opportunities

By Franc Kaiser, Jan Borgonjon, and James Tang | March, 2015

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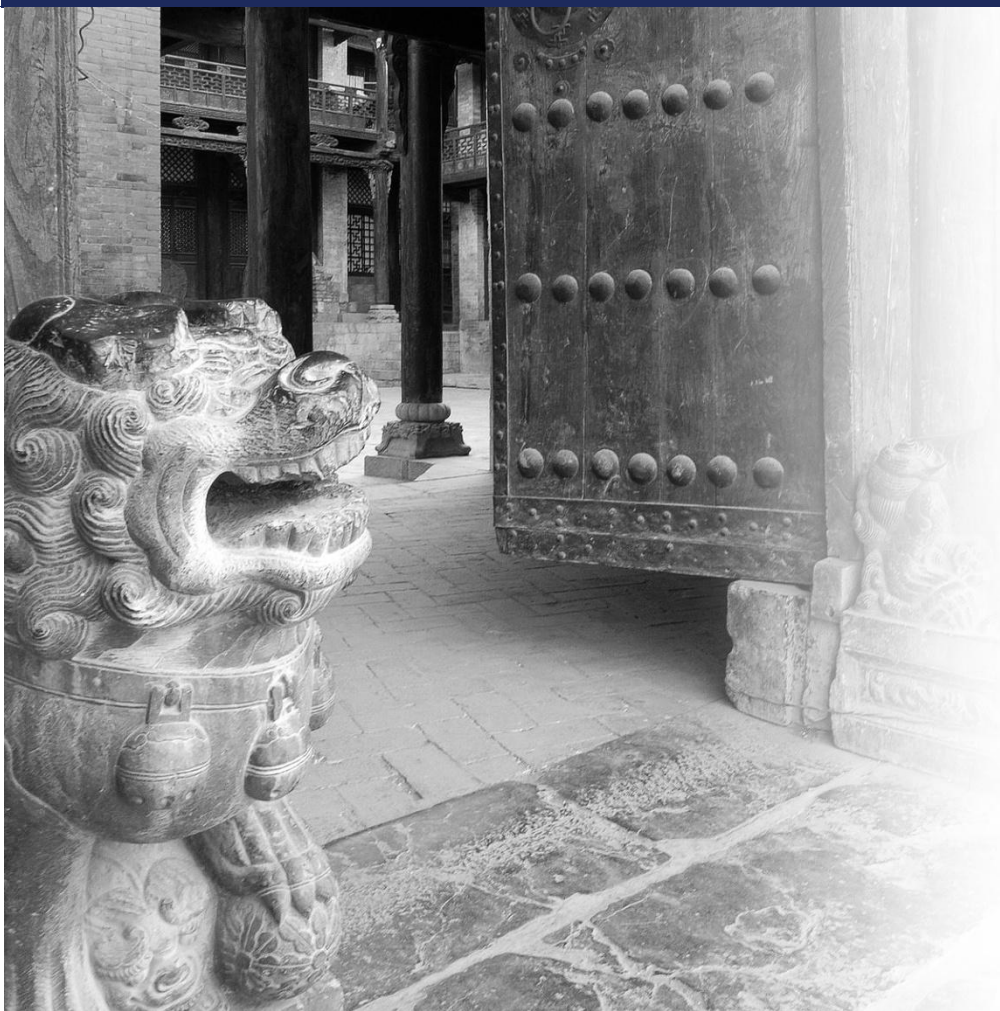
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## Summary

Cost increases and rapidly increasing quality requirements are provoking a huge shift towards automation in China. Factories are no longer about producing acceptable quality goods as cheaply as possible using cheap labor, but rather about producing medium quality products on a large scale while adhering to increasingly strict regulations and hedging against rising labor and other costs. This new reality is causing an automation demand tsunami – a movement that began with the Automotive and Consumer Electronics industries, but is quickly spreading to others.

According to our interviews and studies, China's factory automation market will more than double in size in the next 3 to 4 years, making China the clear global no. 1 market for factory automation solutions. This prediction is not only based on the opinions of experts and automation vendors, but also on governmental objectives and policies.

We estimate that factories in China will spend a total of RMB 900 bn (USD 147 bn) between 2014 and 2018 on discrete automation solutions, with the annual spending of 2018 estimated to be RMB 230 to 240 bn - around half of this spending will go to system and automation products, while the other half will go to integration vendors, robot makers, and management software vendors.

Whereas China's current spending on factory automation is driven by the automotive and ITC sector, we expect mid-sized textile factories, paper / print / packaging companies, food & beverage makers, pharmaceutical plants, and general engineering companies will be responsible for 70% of future automation spending in China. While these sectors will offer considerable business opportunities for automation solution vendors, they will also pose challenges such as a fragmented customer landscape, uneducated buying behavior, and price-sensitivity. On top of these challenges and opportunities comes fiercer competition from domestic Chinese players.

## Definitions

For the purposes of this article, "automation" covers factory automation, or discrete automation, where a work step or process which has previously been executed manually is converted into a non-manual step. This excludes any reference to or solutions for process automation.

We define and calculate factory automation based on 4 categories of products and services:

- Enterprise management software (e.g. ERP, MES, PLM)
- Integration (automation solutions)
- System and automation products (e.g. PLC, HMI, low-voltage inverters, machine vision)
- Robots / robotics.

In our calculations and market estimates we exclude product categories such as machine tools, converting machinery, conveyor belts, and other production machinery, but overall drivers, customer perspectives, and conclusions of this study are relevant for makers of such products, too.

## Warm up: The case of automation in China's white goods sector

China produces 85% of the world's domestic appliances and exports more than 40% of its total production mainly to the US, Japan, Germany, UK, Russia, Brazil, France, Australia, Canada, etc. Several Chinese companies occupy leading positions globally, with Haier as the global leader with total white good sales of over USD 10 bn.

Because of its exposure to international markets, and because of its very labor intensive production model, the white goods industry in China has been one of the first sectors to feel the cost pressure as margins and profits decreased. Generally speaking, the industry was not prepared for the sudden loss of competitiveness, and the impact of the change has been brutal. Midea, a leading global force in air conditioners and the 2<sup>nd</sup> global producer of microwave ovens, plans to lay off 25,000 people by 2015, 50% of its total work force in 2011. Haier is laying off 26,000 people in 2013 and 2014 - nearly one third of its 86,000-strong work force - mainly from its white goods division. To balance these drastic changes, these companies have embarked on very aggressive automation programs.

The pressure to change is tremendous and not solely related to pure salary cost increases. As a senior manager in one of the above companies put it to us informally: *"Although we are in a 3<sup>rd</sup> tier city, our labor cost is exploding and is now over 4,000 RMB per month for low skilled entry level workers. In addition, we have trouble finding these workers, and when we do find them, they turn out to be very difficult to manage and retain as many are not really committed to their job. Automation, therefore, has multiple advantages and is extremely urgent in order to regain our competitive advantage."* He cited the company's production line for washing machines, which was reduced from 45 people to zero by bringing in a fully automated line, as an example of their efforts.

The changes implemented by Haier have also had immediate effect. Haier increased profits in 2013 by 20%, to USD 1.5 bn, and worker productivity by 35% in one year. The labor reduction seems to have been done with minimal social impact, mainly relying on voluntary resignations and transfers to newly created independent sales and service companies.

Galanx, the global leader in microwave ovens faced similar challenges. Its 20-year old model of continuous and aggressive price reductions and labor intensive manufacturing collapsed around 2011, and since then company has tried to stay competitive by adding value to products, increasing productivity, and extending product lines. In early 2014, Galanz's CEO announced that his company will change its product image from "low price, good quality" (物美价廉) to "high tech and fashionable" (科技时尚).

In 2014, Galanz opened a new highly automated factory in Guangdong, with a total investment of RMB 3 bn. This factory has increased productivity by 62% over its traditional labor intensive production lines. According to the company, the automated production line also guarantees product quality and avoids losses caused by human errors. The average profitability of the microwave sector (90% dominated by Galanz and Midea) is now up to around 6%, up from close to zero, or possibly negative (no reliable figures are available as Galanz is a private company) a few years ago.

## Key drivers of the automation boom

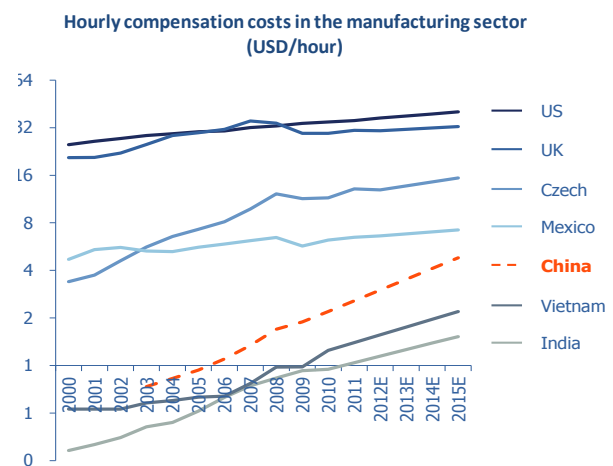
The basic underlying causes for the automation boom are well known. As China's old investment-driven model, fuelled by cheap financing, cheap labor, exports and large government projects runs out of steam, the Chinese government has committed to restructuring and upgrading its economic model in order to improve investment efficiency and productivity and to spur on consumption and household income growth. Government policies that focus on efficiency, consumption, and innovation are being put in place. Moreover, China's demographic dividend has come to an end as the number of new entrants to the labor pool has started to decrease. From about 2020 onwards, we can expect a net decrease in the active labor population.

Those factors are well known, but we would like to go into greater detail on what this actually means in practice and what factors are actually driving the automation transformation. It will be important to understand these drivers as they will influence how Chinese companies go about automating and how they make their automation-related purchasing decisions:

- Labor: cost; personal income tax and benefit compliance; labor availability and stability; structure and quality of the labor force; and labor safety
- Increased quality requirements
- Stricter financial discipline and less accessible financing
- Pollution and energy consumption controls
- Active government support at national and local levels for both producers and users of automation products.

## Driver: Issues revolving around labor

Since about 2005, labor costs in China have increased by ~14% annually. This reflects similar patterns from Taiwan and Korea, where labor costs tripled or quadrupled during the 70's and 80's. We expect labor costs to continue to increase over the next 5 years, and this will bring China closer to countries like Mexico or the Czech Republic, and will make it much more expensive than countries like India and Vietnam.



Source: Bureau of Labor Statistics (US), China Statistical Yearbook, the General Statistics Office of Vietnam, the Statistics of India.

In addition to cost inflation, the labor challenge is further compounded by a range of other issues:

*Personal income tax and labor benefit compliance* is getting stricter as the government becomes more supportive of workers and as workers' sentiments hold greater weight in decision making. This adds directly to the labor cost, particularly for Chinese companies that in general have been less compliant.

*Labor availability and stability.* Across the country, finding factory workers has become a real challenge. Those who are willing to work now have many options and are more likely to change jobs, which raises recruitment and training costs and may impact the quality of work done on the production line. The scarcity and instability of workers is a powerful driver of automation, as automation not only decreases the need for workers, but also makes the production process more stable and less dependent on a fickle labor force.

*Quality and structure of the labor force.* No longer can China count on a young and motivated work force willing to sacrifice their youth, working many hours without holidays, in precarious conditions, and for a minimal salary. On one hand, new entrants to the work force come almost exclusively from one-child families, have high ambitions, and are often not willing to work hard. On the other hand, in the many companies with 20 years of history or more (especially SOEs), quite a large number of employees are over 40 years old. At such an age, they are not suitable for repetitive or heavy physical work, but cannot easily be fired. Automation can offer a better solution.

*Safety considerations.* Labor safety was, until recently, a government priority only in name. However, over the last two years sentiment has changed, and labor safety issues now can not only have a direct reputational impact (e.g. the string of highly-publicized Foxconn suicides), but also an economic impact as the government and the labor arbitration courts take a more balanced approach. As is reflected in the government policies, in particular industries like mining and explosives; safety is the main concern in automating processes that are unsafe for workers.

#### **Driver: Increased quality requirements**

Quality requirements across the value chain in China are steadily rising, and maintaining high levels of quality is becoming more difficult as scales and complexity increase. Repetitive work might lead to mistakes or worse by humans, in particular with large and complex production processes, but machines do not have similar shortcomings. For some companies, like those in the automotive sector, quality level and consistency have become key requirements from clients and are strong drivers for automation. In the food sector, food safety is a major quality-related concern, and this is having a major effect on the packaging and printing industry as companies want to ensure not only the quality of the production process, but also the traceability of food products.

#### **Driver: Accessibility of financing**

Money is no longer as easily available as it was in the past. Under the new economic growth model, loans are being offered more cautiously, and projects are scrutinized for their economic feasibility. Labor-intensive projects are no longer deemed attractive for financing purposes. While this new reality exists for many industries, the automation industry will benefit from the increasing importance of long-term profitability and cash flows in companies and banks' financial decision making processes.

#### **Driver: Pollution control & energy efficiency**

As pollution control and energy consumption have become priorities for the national government, requests have increased for improvements in the production process (in particular in process industries such as paper, cement, etc.) and in many cases further automation and/or upgrading.



### Driver: Government Policy

The Chinese government strongly supports not only the development of the automation supply industry, but also the transition of client industries to more automated models. While national policies are important as they orchestrate the involvement of other actors (e.g. banks, which will be more likely to finance), local level policies in support of automation projects can be substantial and very direct, sometimes in the form of direct subsidies. The following figure shows some examples of the increasing support of the national and local governments for companies to switch to more automated production solutions.

Apart from strong support on the automation production side (development and support for a national automation industry), the Chinese government is also implementing measures to support the actual use of automation technology.

At the national level, and based on the general direction of the 12<sup>th</sup> Five Year Plan (e.g. industry upgrading, energy efficiency, sustainable growth, etc.), the ministries responsible for the various end-user industries have included automation as one of the goals in their industry 12<sup>th</sup> FYPs. Some examples include:

- Industrial Energy Saving 12<sup>th</sup> FYP (工业节能十二五规划): encourages automation/automated control/intelligent control to save energy and improve efficiency in wind turbines, pumps, compressors, production machineries for ceramics, textile and garment, printing and dyeing, steel, non-ferrous, petrochemicals, and construction materials.
- Chemical fiber industry: upgrade automated control level, flexible production equipment
- Civil explosive industry: production automation for work safety
- Coal industry: automation for work safety and efficiency
- Household appliance industry: use more automated production equipment, enable flexible production to cater to market demand for small volume - high variety.

- Paper industry: automated process control to achieve energy saving, emission reductions, quality and efficiency increases.
- Paper chemical industry: automated production line for clean and high quality production.
- Non-ferrous industry: automation for work safety, quality, energy saving and pollution reduction
- Textile industry: production automation for efficiency and quality upgrading.

These industrial FYPs set forward detailed targets, priorities, focus areas, and measures of implementation for each industry and serve as important guidelines for the government in planning investments and giving subsidies, tax incentives, R&D incentives, resources, etc. to enterprises and projects.

At local level, some governments in the most labor-affected areas of Guangdong and Zhejiang are offering subsidies/awards to enterprises upgrading or automating their production equipment. Some examples include:

Ningbo, Zhejiang (2014): encourages manufacturers in traditional labor-intensive industries to develop and apply automated production process and equipment in cooperation with equipment/machinery producers and research institutions. The government offers annual subsidies based on a certain percentage of the investments in equipment and R&D. ([Link](#))

Hangzhou Economic and Technology Development Zone (2013): gives policy support and subsidies to encourage enterprises to “replace labor with machines,” for the purposes of reducing reliance on labor and improving high precision production. ([Link](#))

Dongguan, Guangdong (2014): over the next 3 years, gives annual subsidies to labor intensive producers for technological upgrades that “replace labor with machines.” The max subsidy amount per enterprise is RMB 5 m. ([Link](#))

## China's discrete automation status quo

China is already the largest automation market in the world, and as such, most leading international players are present. The Central Government issued a series of policies during the 12<sup>th</sup> FYP that seeks to leverage automation technology to support the development of high-end equipment manufacturing.

In 2013, the industry output of automation in China reached RMB 60 bn, increasing over 30% compared with 2010. We estimate China's total spending on factory automation to be around RMB 105 bn (USD 17 bn) in 2013, which points out China's significant demand for import solutions and equipment. China is fast becoming one of the most important markets worldwide. To further emphasize this point, roughly 37,000 industrial robots were sold in China in 2013, more than 20% of the global market, surpassing Japan as the world's biggest robot consumer for the first time

### An imbalanced development

Automation progress is still imbalanced across sectors and companies in China. Among the automation sectors, automotive is by far the largest consumer of automated solutions and alone uses 90% of China's robot base. Drawing comparisons between China and developed countries, where only 70% of robots are used for automotive-related purposes, shows that China's automation industry still has significant room to mature. Even within the automotive sector, the degree of automation is not that high, as many processes are still performed manually.

The shocking explosion in August 2014 at Kunshan Zhongrong, the tier-2 wheel hub supplier of General Motors, that resulted in over 100 casualties, is one example of the presence of labor intensive manufacturing processes in the industry. The harmful and dangerous polishing process of aluminum wheels still heavily relies on hundreds of workers, rather than robots or machines.

According to automation sales trends, large private companies and foreign-invested companies (including JVs) are the most likely to employ automation solutions. SOEs, though often large, exhibit a slower pace of adoption. Small and medium enterprises, particularly those in Guangdong, Zhejiang and Jiangsu, are primed to offer the next big boost to automation demand. This will present specific challenges as these companies are more dispersed and often use different decision making parameters than the large companies.

### Looming challenges

Automation is not a panacea for all manufacturing companies. The quality of inputs and operators is a key concern. Foxconn, for instance, announced very aggressive automation plans 2 years ago, but had to slow down because of concerns related to the quality and consistency of product inputs.

There is a shortage of laborers qualified to manage and operate automation machinery. Again, this highlights the increasingly important educator role automation suppliers fill for potential clients. In some cases, purchased automation machinery is operated by unqualified technicians who hinder production rates or worse. In such cases, the customers are likely to be dissuaded from additional automation purchases in the future.

To combat this issue, many automation suppliers are cooperating with technical schools to train potential technical workers. In one case, Headman, a domestic machine tool maker in Zhejiang province, provides scholarships and internships to students of a local technical school in order to increase the number of qualified operators Headman's clients can employ. Without this reinvestment on Headman's part, the company's clients would realize subpar returns on their automation investments and Headman would lose the opportunity to provide successful case studies to potential clients.

## How special is the Chinese market?

As in so many other sectors and industries, Chinese customers are a bit different compared to Western markets. In our discussions with several international vendors, it was obvious that the biggest difference remains in the mindset of decision makers. Most local customers expect short payback periods (five years or less) in their investment horizon – if they calculate the ROI at all – which makes it difficult to discuss automation's long-term benefits.

While China's total demand for automation is certainly large and growing, at the company level, especially for mid-sized companies, the key barrier to adoption remains the budget the company is willing to invest into automating its manufacturing operation. The price matters to the degree that many companies still prefer to bet on manual labor. In our research for this article, we talked to representative mid-sized Chinese manufacturers in different sectors and "price / cost of the automation solution" was on the top of their list when engaging and selecting an automation vendor. In addition, the current level of integration of potential accounts for automation vendors is lower than in the West, and requires extensive education and discussions before basic decisions can be made. Unfortunately, many accounts are ready to take risks on output quality by choosing cheaper automation solutions.

The key challenge for any automation vendor remains overcoming cost and price barriers. In our research, we found that customers were much more sensitive to pricing in their decision making process than they were to "productivity." Despite the clear priorities of the customers, we also found foreign vendors' sales pitches often over emphasized enhanced "productivity" for the customer while neglecting their financial concerns. This discrepancy between expectation and offering presents vendors with a chance to improve their sales effectiveness by refocusing on potential customers' most important considerations in the decision making process.

## What place do foreign vendors have?

In our discussions with numerous companies in different sectors, we found that automation customers know, understand, and admit that foreign solutions are superior to local offerings, especially as they suspect and fear that local solutions are much less reliable. As such, a certain percentage of local customers are willing to pay a premium for a vendors' promise to deliver a reliable and high quality solution under a brand name. The disconnect starts when the foreign vendor offers a lower-price solution, as the local customer knows that he will receive lower quality. This, in turn, begins a viscous cycle as the customer continues to put the price squeeze on to get an even better deal. As such, larger foreign vendors cancel out of such accounts often later than earlier, and create a window of opportunity for either smaller or local – but certainly cheaper – vendors in the process.

Thus, a strategic approach to customer segmentation is absolutely key for foreign vendors, as they have to focus their efforts on the right account types from the start. We found that this is especially difficult for small-to-mid-sized foreign vendors, as they are eager to react to project opportunities regardless of the type and background of the account. This eagerness leaves the vendor with troublesome and unprofitable projects that do not generate great reference cases and makes it difficult to scale their business in China.

Furthermore, foreign vendors need to be able to assure their future accounts of their system's reliability and after-sales support. For larger foreign vendors this means having a local team of engineers, independent of HQ and overseas team, that can drive both sales and the execution processes according to the pace the local account requires.

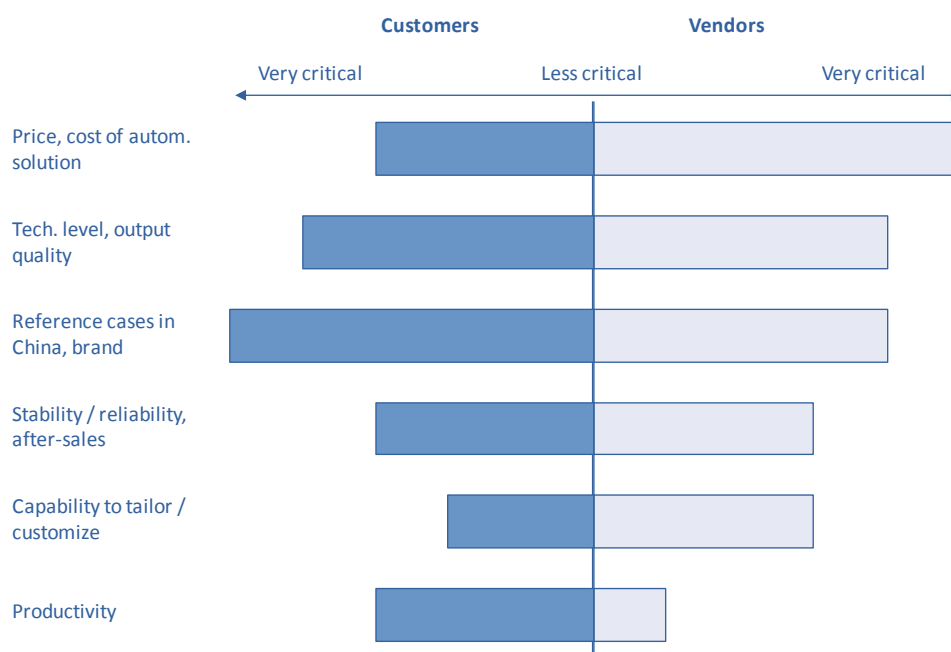


### Key differences China - RoW



Indicative representation, based on interviews with 10 foreign vendors.

### Differing opinions exist between customers and vendors



Indicative representation. Based on 10 vendor interviews, 20 customer interviews across 6 sectors)

## Market development until 2018

Although China's automation industry differs by sector, region, and type of customer, there is no doubt that the automation industry will continue to grow over the coming years.

### Automotive continues as a key driver

The automotive and automotive components sectors are growing at incredible rates, and they are expected to maintain this growth for the next 5-8 years. While the automotive industry adopted automated solutions early on, there are still niches in need of automation. For example, the mould and die subsector will need to adopt automated solutions to keep up with shorter car model launch cycles, each of which requires over 1,000 sets of mold and die. Currently, most mould and die for high-end passenger vehicles are imported, but this will change as automated solutions become more popular.

## Most future spending will come from other sectors

Until now, most foreign automation vendors have focused their efforts on developing accounts in the automotive (OEMs, T1 /T2 component makers) and ITC / 3C / Electronics sectors. Given their early adoption, the automotive and ITC sectors are much further along the adoption curve compared to less obvious and less prominent sectors like textile manufacturing, food & beverage makers, paper / print / packaging makers, pharmaceutical maker, and general engineering plants.

Whereas automotive component producers are increasingly asking for turnkey equipment and sophisticated automation solutions, the key need of up-and-coming sector companies will be to automate the peripherals to their existing production machinery. Companies in those sectors face a larger variety of product manufacturing demands and need greater flexibility in their production layouts, but the main source of their production headache comes from labor- (ergo, cost-) intensive steps at either end of the production process. These processes have gone largely unchanged over the last 10-20 years and rely heavily on the manual labor of relatively cheap operators and assembly line workers. This is especially evident

### Two distinct automation sectors in China

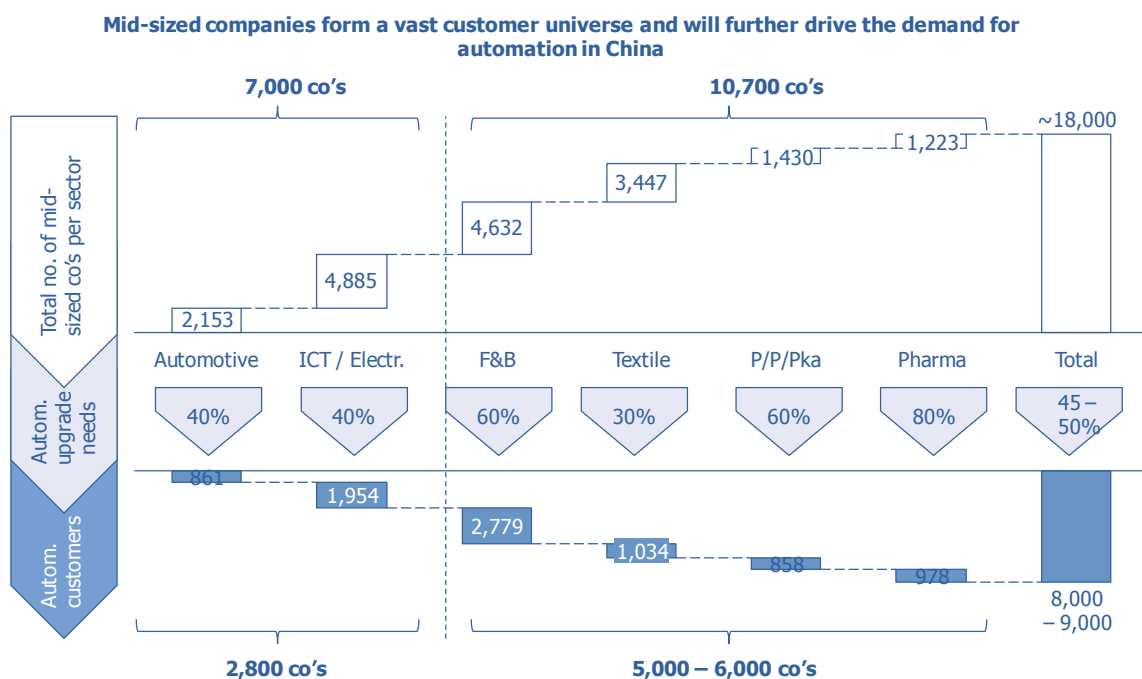
Relatively advanced	Up-and-coming
Automotive, ITC	Textile, F&B, Paper / Print / Packaging, Pharma
<ul style="list-style-type: none"> <li>• Already mature, automated</li> <li>• No "upgrade needs" per se</li> <li>• Quality key concern</li> <li>• Large accounts</li> <li>• Own standards, strong bargaining power against vendor</li> <li>• Limited after-sales opportunities</li> </ul>	<ul style="list-style-type: none"> <li>• Large customer universe</li> <li>• More immature, upgrade needs</li> <li>• Possibility to engage early in the process</li> <li>• Lower bargaining power</li> <li>• Maintenance, spare part sales potential</li> <li>• Foreign vendors preferred</li> </ul>

in the packaging, pharmaceutical, and food & beverage sectors, where large quantities of the same product or items are being manufactured, but less so in the general engineering sector (i.e. turbine tower flange manufactures, railway components, etc.), where the work pieces are fewer and larger. In the general engineering sector, companies are looking to update their machinery from semi-automated to fully-automated or better performing equipment.

There are additional merits for vendors when targeting sectors beyond the automotive and ITC realms. For example, many automotive OEMs leave the vendor little choice but to accept the customers' standards – but this is not so in the up-and-coming sectors, where the accounts are smaller and have much less bargaining power with the vendor. For the emerging sectors, there is a much greater chance to engage with the customer early on in the factory planning process and play a more crucial strategic role.

What's more, car OEMs often have their own teams caring for the production line, leaving little room for the original machinery or automation vendor to provide after-sales services. This is again in contrast to the up-and-coming sector accounts that rely on the vendors' after-sales support and promise future revenue streams from spare parts and services. As these accounts are more immature, they tend to return to the vendor for support instead of attempting to maintain the process and equipment themselves or risking the help from 3<sup>rd</sup> party services vendors.

Despite their promise, accounts in these sectors will not take a direct leap from manual to fully-automated plants. Instead, we expect them to upgrade and implement their automation levels step-by-step, and keep investment requirements to a controllable minimum. Hence they will need strong, protracted guidance and support from their vendors to make their production processes a success.



### TCO (Total Cost of Ownership) is more accepted, and leads to increased service demands.

Automation solutions are always linked to a high TCO advantage over manual labor. Values for the *investment into servicing the equipment* are slowly being added to the old formula of *output – initial machinery equipment investment = profits* previously engrained in the brains of decision makers which focused on short-term profits. One key driver for this trend is customer reliance on bank loans for financing and the higher expectations banks have for protecting their investments within an environment of increasing costs. In a time where future expected growth is no longer sky-high, companies are eager to re-invest in existing assets, and hence free more budgets for higher quality services.

As a result, the need for maintenance, repair, and upgrade services is quickly becoming apparent to factory owners in China and will provide automation players with steady future revenue streams. Customers are realizing that maintenance is helpful in ensuring continuous operation, and more and more customers are willing to pay for the services that enable this. Many automation suppliers are already offering innovative solutions and services that bring extra value to customers by improving performance, productivity, and reliability.

### “Energy saving” emerges as an automation factor.

As total costs are increasingly being considered, energy consumption is one of the factors increasingly taken into account. For example, China is already the largest textile machinery manufacturer in the world, but foreign textile machines are more competitive and higher priced because of their energy saving and environmental protection advantages. Domestic textile machines take 80% of the China market sales volume, but less than 50% of sales values as more and more textile machine customers seek automated solutions to cut energy costs.

### Quality concerns & risk control ask for automation.

Customers are now pressuring manufacturers to break the “made in China” stigma of poor quality, but the combination of high quality goods in large volumes is difficult to achieve using manual labor. Manufacturers have no choice but to automate in order to meet the quality standards expected by customers. When the manufacturing process also includes potentially dangerous or hazardous steps, the automation solution becomes doubly attractive in mitigating risk and maintaining quality. Given the increasing focus on and new policies protecting worker welfare, removing manual labor from dangerous processes is often the soundest strategy.

## Case studies – textile companies in China

#### Shaoxing Chenyu

- Dyeing / printing process done manually
- Mechanic machines but not automated
- Revenue per production line: RMB 10 m.
- Each machine needs 4 – 8 operators
- Each line needs 50 workers per shift

#### Jiangsu Yulun

- Doffing process done manually
- 50 dedicated workers per shift
- Occasional production stop (bottleneck)
- Occasional contaminations
- Aims to reduce labor by 50%.

#### Zhangjiagang Yangzi

- Winding done manually
- 3–4 workers for a 100-spindle machine
- 1 robot arm for RMB 500,000: Too costly

Source: Annual Report of companies; InterChina's Interviews and Analysis

### Robots will enable a second wave of automation.

In 2013, automation products sold in the Chinese market were valued around RMB 105 bn. We estimate that China's automation market will reach RMB 238 billion by 2018. Several special segments, such as robot manufacturing, will develop faster than others. In 2013, China became the No.1 robot market worldwide. Leading robot makers have been achieving good sales record in China in past decade. For example, ABB has achieved a 30% compound annual growth rate on robot revenue since 2009 when it opened its Shanghai plant. Regardless of development speeds, there will be many opportunities for not only automation product companies, but also solution providers, service companies, and many other players in the value chain.

The demand for automated production solutions is having a major and direct impact on the use of robots in China. Depending on which comparison benchmark is used, China's robot density is currently about 1/3 of the density in developed countries. This leaves huge room for growth even though the industry is already booming – China became the largest robot market in the world by volume in 2013. There were 37,000 robotic units sold in China in 2013, significantly more than the 26,000 units sold in the second largest market, and previous global leader, Japan.

Many international robotics manufacturers like Kuka and Comau are reacting to this demand by relocating production, and in the case of ABB their entire global robotics headquarters, to China. One key driver for this change is the increasing competitiveness of Chinese robot makers. In 2013, Chinese companies were responsible for the sales of 9,000 of the 37,000 units sold. While many of the local producers are focused on the entry-level segment of the market – i.e. relatively simple products – the robotics boom will undoubtedly give rise to several sophisticated and competent local companies.

Robotic solutions are being added to already automated production lines to further reduce labor dependence. Shanghai GM, for instance, installed four robots to manage 48 machine tools in their engine components production line. Previously, one worker managed two machine tools, meaning Shanghai GM has replaced *twenty four* manual laborers with just *four* robots. Robots, their manufacturers, and integrators will be able to target semi-automated factories in order to sell additional labor-reducing automated solutions.

### Case study of pharmaceutical company – Chongqing Lummy

1

**The packaging** is still done manually by operators in some plants. This requires a lot of labor, with each production line 20~30 workers for packaging.

2

Lummy is now conducting a series of **technical renovation projects** to automate packaging. The labor for packaging could be reduced to 3~4 in each production line after automation.

3

But there is still a dilemma in front of Lummy: **how to achieve both precision and stability?**

- Foreign brands: Higher precision but higher risk of downtime (poor input materials).
- Chinese brands: Higher tolerance, but lower precision.

Source: Annual Report of companies; InterChina's Interviews and Analysis



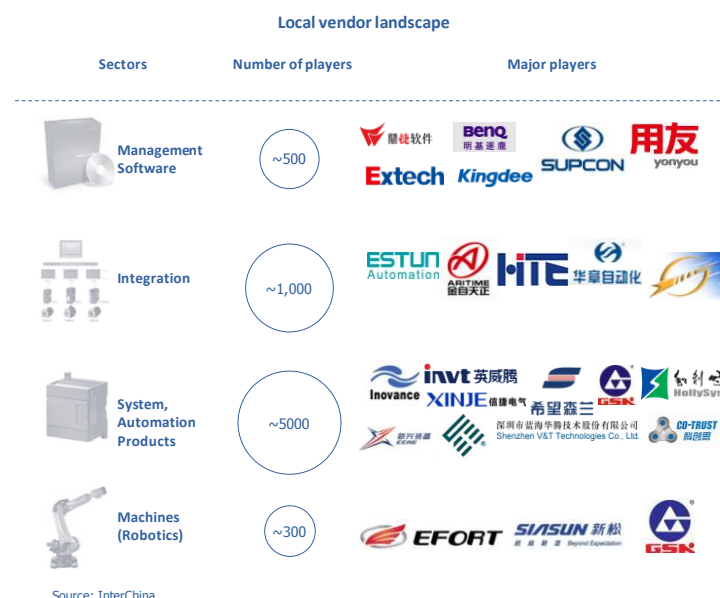
## Chinese automation vendors: fierce competitors or future partners?

The current and future boom is incubating a young, dynamic local vendor base. We believe that larger local players will profit the most from the automation tsunami because they are more dynamic, flexible to customer requests, innovative, localized, and cheaper than their international peers. Companies such as Inovance, a maker of automation products like low-voltage inverters, drivers and servo systems, and Siasun, a robot-making rival to ABB and Kuka, have already achieved market capitalization valuations of RMB 24 bn and RMB 26 bn, respectively. Projecting such players' historical average growth rate of 30% forward, local automation vendors could reach the size of USD 1 bn sales by 2018.

Companies such as Supcon, an MES vendor and system integrator, and INVT, a maker of AC drives, industrial controls, and servo and motion control systems, have already served global customers (such as Intel, Rockwell) and are also driving China's innovation engine. INVT owns over 400 patents, and Supcon was the first Chinese player to participate in the international EPA standard. GSK, a robot and automation product vendor, makes over three quarters of its sales from new product innovations, while Inovance claims to employ an R&D 'army' of over 500 engineers.

What's more, many larger Chinese players are vertically integrated, and in addition to hardware, also offer clear competences to take care of integration jobs. GSK and Estun Automation are good examples of robot and automation product makers with strong integration capacities.

Chinese vendors are very much worthy competition, and now may be the last chance for foreign vendors to approach such local players for partnerships and alliances in order to strengthen both companies' market positions. As access to new projects across China will remain an inefficient exercise for foreign vendors (especially automation product makers), and as local vendors (especially integrators) will remain interested in improving their offering to the market, partnerships could be a strategic possibility, at least for now. In a few years, local vendors' availability for partnership is likely to completely change, and it will be much more difficult for foreign players to catch their attention and interest.



## Four ideas for new engagement models

The struggle between Chinese customers' unrealistic cost expectations and pricing is a well known phenomenon for most foreign automation vendors. Apart from rigorous and selective customer segmentation and prioritization, and focus on the China-specific client expectations (as described earlier in this article), there are other means that foreign players might want to consider.

**The reliability team:** Considering that Chinese accounts truly value 'reliability' when choosing a foreign vendor, a relatively untouched opportunity exists. Chinese customers are increasingly realizing that automated process cannot run on hardware alone, but require people who can manage and maintain them. As such, our idea is to create a 'reliability team' (and brand it as such), which consists of several people that assist the customer for as long as needed. This team will be responsible for troubleshooting the automation solution and helping the customer achieve the projected performance on a strategic and daily basis, thus fulfilling the promise of reliability. This offering will make it much easier for local factories to choose a foreign vendor with (much) higher investment requirements as they will know that they are taken care of. Machinery players, such as heavy presses makers used by automotive OEMs or corrugators used in the packaging industry, have followed a similar scheme for years with much success in China.

**Renting out operators:** As the qualification and training of the equipment and system operators will remain an acquisition barrier and endless source of problems for the automation vendor, companies will have to rethink the importance of the operator. Our idea is that foreign vendors should create a team of experienced and well-trained operators who are rented out to key customers (or are even part of the customer's overall investment package). As such, this could be a business similar to temporary talent deployment. This will reduce headaches on both sides, and should also strengthen the vendor's entrenchment with his customer.

**Managing the inputs:** Imagine a copy machine that stands in everybody's office – if there is a paper jam or serious technical problem, the machine vendor blames the cheap and dusty paper bought by the user, while the paper maker blames the copy machine maker, and the user blames one of them or both. Especially in China, foreign automation vendors deal with customers who install a sophisticated system where relatively low tolerance levels cannot cope with the low input quality local customers want to process or operate with it. Hence in some cases it can make sense for the foreign vendor to recommend, qualify, or certify the input that is known to work with his system. There may also be a possibility for a foreign vendor to create a strategic alliance with a leading manufacturer in China who makes quality inputs.

**System integrator interface:** Finally, China's current bottleneck is, and will remain with, the function and role of the integrator. Although we estimate the number of integrators in China to be in the hundreds if not thousands, there are not enough large, quality players to integrate a system for more sophisticated needs. As such, foreign robot makers and automation product makers will be, in many cases, at the discretion of the quality and competence of a local integration company. A much more important role of the integrator will be in active business development in the local market and a multiplier for component sellers. Our idea is that foreign vendors partner with one or more integrators (this could be based on a sector or geographic division) in order to access new projects across China they would never have heard of if they didn't have a well-connected integrator. This will help reduce new account acquisition costs for products and component makers.



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