



Fitting China into your global footprint

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China is no longer just a low-cost country suited to cheap mass production. It has now also developed the capabilities to serve as an R&D base. Companies must therefore design a new strategy fitting China into their global manufacturing and R&D footprint. This article outlines the key principles and benefits of a “China fit” logic and explains how to apply them in a step-by-step approach.

China is increasingly attracting business activities other than low-cost manufacturing. Conducting state-of-the-art R&D and producing latest-generation products in China is the next big thing. As the mix of business activities conducted in China becomes more complex, deciding which products or technologies have the best fit for development or production there becomes equally complicated. Global business executives need an effective decision logic for fitting China into their global manufacturing and R&D footprint. The logic should start from competencies (“What capabilities should we master?”) rather than products (“What components should we have?”). This avoids the common mistake of looking at China merely as an off-shore destination for otherwise unprofitable business. In this article we present the key principles and benefits of such a “China fit” logic.

Beyond manufacturing

Manufacturing in China is nothing new. Most manufacturing companies that compete in a global industry are already doing it or have at least thought about it. However, a common mistake is to conclude that the most viable “China strategy” is to move manufacturing of low-end products or simple parts to China to take advantage of low labour costs, whilst keeping manufacturing of high-end products and complex parts at home in an attempt to protect intellectual property and ensure high quality.

An Arthur D. Little study conducted in 2004 (see Prism 2004, no. 2, “Go East: How to Make it in China”) laid out how China could be more than just a simple low-cost manufacturing base. Many companies are broadening their scope in China. They now also manufacture advanced products, conduct R&D, set up global service centres and operate back offices in China. For instance, locally designed and manufactured Chinese commercial aircraft will soon hit the skies. The OECD states that China was the second-biggest R&D spender in the world in 2006.

With an R&D expenditure growth rate of 20 percent annually, 350,000 science and technology graduates pouring out of its universities each year, and US\$ 22 billion spent on importing foreign technology through licences in 2006, China is bound to keep that second place and could even move up to the top spot.

China's R&D now goes far beyond the copycat activities of a decade ago, as it has become the fifth-largest source of filings in the global ranking of patent applications. Not surprisingly, two recent Arthur D. Little studies showed that large multinational companies nearly all want a significant R&D presence in China (see Prism 2006, no. 2, "Global R&D: Where to Place the Bets?"). In short, "developed and made in China" labels on products ranging from space rockets to cars will make us forget the simple "made in China" seen on teddy bears and running shoes.

How can companies from outside China benefit from China's emerging skills in advanced R&D? It is a multi-faceted question. Many considerations have to be factored in before a convincing choice among a multitude of options can be made. As a result, the decision process often turns out to be time-consuming and expensive, as each new product or project proposal requires in-depth evaluation. What should you do every time somebody walks into your office with a great new China idea or, possibly, a potential China nightmare? Global business executives would benefit from an effective decision logic that fits China into their global manufacturing and R&D footprint. It should lead to a portfolio of Chinese activities that ensures a sustainable competitive advantage on both local and global markets.

The "China fit" logic that we have applied in our work with global companies seeking expansion into China is based on the following principles:

- Think in terms of competencies, not products;
- Define fit in terms of competitive advantage and availability;
- Make your competency development strategy forward-looking;

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- Combine fit with cost savings potential.

Below we describe each of these principles in more detail and explain the analytical steps through which they can be put into practice (see Exhibit 1).

Exhibit 1 Principles and analytical steps	
Principle	Analysis
<ul style="list-style-type: none"> • Think first in terms of competencies, not products 	Identify the competencies required to develop and manufacture the current and future products in your portfolio
<ul style="list-style-type: none"> • Define fit in terms of both competitive advantage and availability 	Assess for each competency whether China offers a competitive advantage for its development, and whether the necessary people, infrastructure, materials and partners are accessible
<ul style="list-style-type: none"> • Make your competency development strategy forward-looking 	Determine a development strategy for each competency on the basis of how well it fits with China and how well you master it, taking into account the expected evolution of the underlying technologies
<ul style="list-style-type: none"> • Factor in cost savings at the end 	Determine the "China fit" of your products by summing up the "China fit" of the competencies embedded in them, and by factoring in the cost savings potential at the end

1. Think first in terms of competencies, not products

When you evaluate what makes sense to put into China, move away from traditional product thinking. Carry out the analysis on the basis of competencies instead. A competency refers to know-how or capabilities a company possesses in order to develop, manufacture and sell its products. In this article, we focus on development and manufacturing competencies. These can be used for state-of-the-art products (e.g. electronic sensor design) or straightforward commodities (e.g. sheet metal processing and welding).

Traditional product thinking focuses on splitting up a product by component, and then deciding where each of the components and the final product are best developed,

manufactured and assembled. A competency-based approach, on the other hand, focuses on splitting up products by what you need to know to successfully develop and manufacture them, and then deciding on where this capability is best built up (see Exhibit 2).

Exhibit 2 The two main approaches for China		
	Product-based approach	Competency-based approach
Starting point	<ul style="list-style-type: none"> What products should we have in China? 	<ul style="list-style-type: none"> What capabilities should we master in China?
Drivers	<ul style="list-style-type: none"> Reactive, driven by problems in developed markets Build products in China for which developed markets are no longer cost competitive 	<ul style="list-style-type: none"> Proactive, driven by opportunities in China Build products in China for which Chinese capabilities give a true competitive advantage, regardless of the cost competitiveness of developed markets
Resulting Chinese activities	<ul style="list-style-type: none"> Manufacturing of low and middle end products complemented with development for the local Chinese market 	<ul style="list-style-type: none"> Manufacturing of low- as well as high-end products complemented with research and development for the local Chinese and the global market
Resulting competitive advantage	<ul style="list-style-type: none"> Uncertain No answer to local Chinese players effectively moving into higher quality segment No answer to global players able to deliver top quality products from a low cost base 	<ul style="list-style-type: none"> Sustainable Innovative with quality products at low cost preventing local Chinese players to move up to higher quality segments Top quality products for global markets at prices unreachable by a pure developed market strategy
Implementation challenge	<ul style="list-style-type: none"> Limited, seen and done many times before 	<ul style="list-style-type: none"> Tough, prejudice needs to be overcome and strong knowledge of Chinese capabilities needs to be built up

The competency-based approach (“What capabilities should we master?”) avoids many China nightmares that are otherwise encountered when following a product-based approach (“What components should we have?”). Indeed, further to a successful transfer of low-end and middle-end manufacturing and assembly to China, many companies find themselves squeezed by strong local Chinese and smart global players. After careful investment in a local manufacturing plant, they realise that the best local Chinese players are also able to manufacture good-quality products. Furthermore, it is an illusion to think you will do it at the same cost as local Chinese players: they master the highly dispersed and opaque supplier, distribu-

tion and governmental network far better than you do. In order to hold off these Chinese players, you need to build on the best Chinese capabilities and complement them with your well-mastered innovation skills. This is very hard to achieve if you pick simple products for production in China. On top of this, you will encounter increased price competition on the global market from companies that are using lower-cost bases effectively for top-quality products.

The competency-based approach offers several additional advantages over the product-based approach:

- It encourages platform thinking;
- It points to limited-risk early-mover opportunities;
- It enables smart decisions on intellectual property protection and outsourcing.

Let’s have a closer look at each of these. First, an analysis based on competencies encourages platform thinking, both in terms of components and processes. Platform thinking for components refers to the use and re-use of common modules across a variety of products. While this concept is not novel and is already used in many industries such as automotive, it is not always implemented effectively. Effective modularisation starts by analysing the functions the product fulfils. It then links these to the development and manufacturing competencies required to achieve these functions. The competency-based approach to the “China fit” question will greatly facilitate this analysis.

Platform thinking applies also to processes and technologies such as precision machining and mechanical prototyping. These are often common to diverse products, product variants and business units. The know-how embedded in them can be re-used across the global organisation. The competency-based approach to the “China fit” question will help you see more clearly into what these global platform processes and technologies are.

The second advantage of the competency-based approach is that it points to potential early-mover advantages you can grab. Imagine you are a producer of advanced, low-

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volume products with stringent quality requirements, such as medical devices. You are considering developing and manufacturing these products in China. If you follow a product-based approach, you may quickly rule China out: you look around in China, notice that similar products are not yet available, and conclude that you would be an early mover with all concomitant risks. If you follow a competency-based approach, you may arrive at the opposite conclusion: you notice that a substantial number of the underlying competencies are already deployed in China, albeit in different product categories. From that perspective, a fair part of, say, a high-end respiratory device – hitherto not made in China – is quite similar to an advanced copier – already abundantly present in China. In other words, you will decide to exploit early-mover opportunities that you would otherwise have discarded as too risky.

The third advantage of the competency-based approach relates to the protection of your intellectual property (IP). As you analyse the competencies embedded in your products, you can easily identify those that give you a differentiating and sustainable competitive advantage, as opposed to the “must haves” that are widely spread and well mastered throughout your industry. For the former you will normally want to adopt special IP protection measures in China or keep parts of them in countries where IP protection is high and enforceable. Likewise, you can consider the benefits of outsourcing the latter.

2. Define fit in terms of both competitive advantage and availability

Once you have unbundled the competencies embedded in your current and future product portfolio, you can assess their “China fit”. In essence, two factors determine “fit”:

- The potential competitive advantage China offers, i.e. can you develop and exploit the competency more cheaply or effectively in China than elsewhere? Competitive advantage is not only a matter of cost or even quality-adjusted cost. It also depends on other criteria such as IP risk, transaction costs and supply chain efficiency. The region where a competency is widely

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spread at a high-quality level may not be the location you had in mind initially.

- The availability of the competency within China, i.e. how accessible are the people, infrastructure, materials and development partners required to develop and exploit the competency?

The best-fitting competencies are those for which China offers a strong competitive advantage and that are securely available (see Exhibit 3).

Exhibit 3 Defining the China fit		
	Competitive advantage	Availability
Manufacturing competencies	<ul style="list-style-type: none"> ■ Potential cost savings, e.g., labour costs, labour rate, labor productivity, material costs, overhead cost ■ Product quality, e.g., defect ratio, returned products ■ Supply chain efficiency, e.g., sourcing and transportation efficiency ■ Need, ability and mechanisms to protect intellectual property 	<ul style="list-style-type: none"> ■ Talent pool and competency level of personnel/operators ■ Infrastructure, local availability of the necessary equipment and process know-how ■ Local availability of raw material
R&D competencies	<ul style="list-style-type: none"> ■ Potential cost savings, e.g., engineers' salaries, prototyping and testing costs, R&D facility costs ■ Transaction costs associated with communication between China R&D and main, overseas R&D ■ Quality of design, e.g., number of engineering changes and customer complaints ■ Need, ability and mechanisms to protect intellectual property 	<ul style="list-style-type: none"> ■ Talent pool, number of qualified engineers working in the related fields ■ Related, quality research activities in universities and research institutes ■ Public and/or private development partners

When assessing “fit”, it is important to define competencies at the right level of granularity. Take, for example, the case of embedded software development. When looking at the vast talent pool and multitude of potential partners for embedded software development in China, one may conclude that availability is high. But when zooming in on the issue, one will see that the greater part of embedded software activities relates to telecommunications, and to mobile phone applications in particular. Furthermore, in many cases software development is carried out by small companies lacking the critical mass required to deliver the expected quality. In other words, a company looking for

embedded software competencies should specify its needs more precisely: software for telecommunications is different from software to control, say, a robotics arm.

It is also important to reframe the competencies in a Chinese context. Take, for example, the case of detection and removal of faulty components from a conveyor belt. In Europe, these processes are highly automated. Simply copying the European automated process into a Chinese facility may not lead to substantial cost advantages. Greater cost advantages can instead be obtained by using manual labour for process steps that are not quality-critical. At the end of the process, possible human errors are avoided by cross-checking the bar codes of manually removed components with the barcodes of products that were labelled as faulty by the testing device. You can thus deliver similar quality but at a reduced cost.

3. Make your competency development strategy forward-looking

Not every competency that, at first sight, fits perfectly with China should effectively be developed there. Vice versa, not everything that initially does not fit well should be kept out.

Once you have assessed the “China fit” of the competencies embedded in your current and future product portfolio, you can determine the development strategy for each of these:

- If the “China fit” of a competency is high and you master the competency well, it is natural to retain and fully exploit that competency in China.
- If the “China fit” of a competency is low and you don’t master it well either, you should not maintain the development of the competency in China.
- If the “China fit” of a competency is high but you don’t master the competency, you should consider building it in China.
- Finally, if the “China fit” of a competency is low even though you master it well, you should explore opportunities to milk it.

While making the above assessment, a couple of other considerations have to be made. First, not every compe-

The successful deployment of one competency may depend on the availability of another. For example, certain R&D competencies are an important support to manufacturing competencies.

tency that, at first sight, fits perfectly with China should effectively be developed there. Vice versa, not everything that initially does not fit well should be kept out. Before delivering the final verdict, you should also consider the expected future evolution of the competencies concerned. Competencies and technologies evolve rapidly in emerging markets. What makes little sense today can be the main thing tomorrow. Take, for example, liquid crystal display (LCD) manufacturing. Until recently, China possessed only competencies related to so-called fifth-generation LCD manufacturing. Korean companies, on the other hand, already master seventh and soon eighth-generation technology. However, investment in China is now rapidly pouring into upgrading LCD-related competencies to the level of the next generations. Soon China will also master LCD glass manufacturing – a skill globally found only with selected leading high-tech manufacturers.

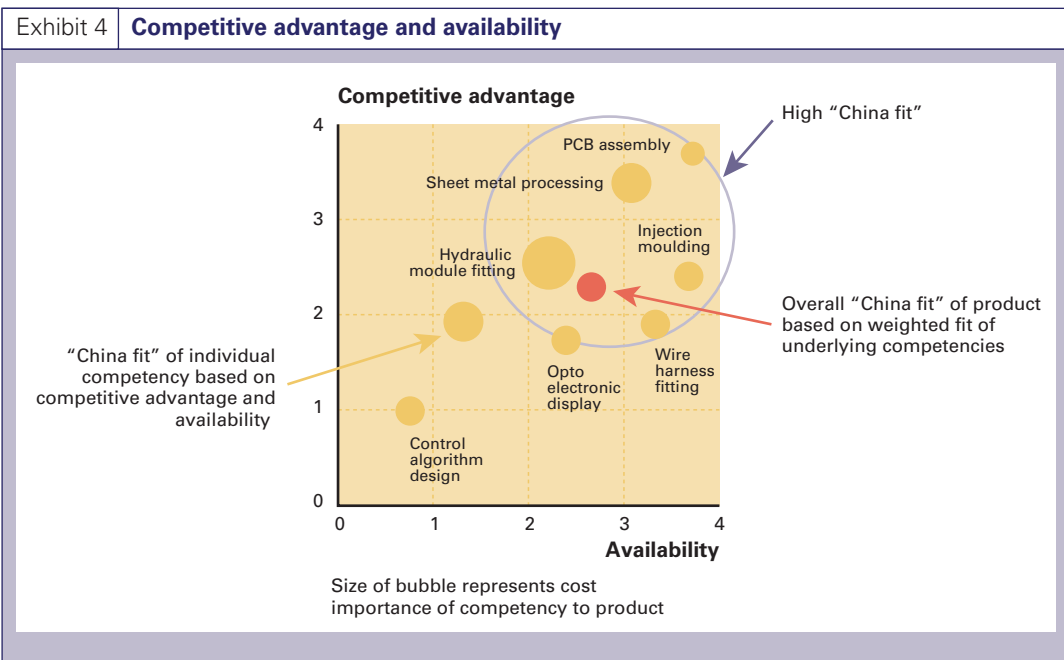
Secondly, the successful deployment of one competency may depend on the availability of another. For example, certain R&D competencies are an important support to manufacturing competencies. The full cost-saving potential from mastering manufacturing competencies will only be reached if they are supported by a minimal set of development skills for introducing small design changes and steering local suppliers.

Last but not least, you have to take into account the available investment budgets. Budget constraints mean that not every competency that fits perfectly well with China can be developed at once. However, by making smart make-or-buy decisions, you can greatly limit the investments required for non-core competencies.

4. Factor in cost savings at the end

To close the decision-making loop, you have to go back from competencies to products. After all, the decision to carry out a certain activity in China is not made at the level of competencies but for a tangible project, product or component. For example, you don’t start developing a precision machining competency unless there is a product you plan to manufacture which requires that competency.

Therefore, assess the “China fit” not only of competencies but also of products. You can do so by linking the products with the competencies embedded in them, i.e. those that are needed to develop and manufacture the product (one way to assess the dependency of a given product on a competency is to estimate the impact of the competency on the cost of the product). In other words, a product with a high “China fit” is one that makes use mainly of competencies with a high “China fit”, i.e. for which China offers a strong competitive advantage and that are securely available within China. The overall “China fit” of a product is the weighted average of the “China fit” of its embedded competencies (see Exhibit 4)



Finally, factor in the cost dimension. When comparing the “China fit” of different (future) products, product alternatives or R&D projects, compare the fit of each investment proposal with its cost savings potential. Transfer to China the proposals that come out best.



Case study: Dräger Medical

Dräger Medical, headquartered in Germany, is one of the world’s leading manufacturers of medical equipment. As a global company employing about 6,000 people in 190 countries, it is naturally involved in China.

“We are early movers into China and have been successfully manufacturing and selling anaesthesia machines in China for more than 13 years,” says Wolfgang Syhr, General Manager of Shanghai Dräger Medical Instruments. “Our challenge is to decide the next steps, especially to focus our resources and investments on our core competences. And, looking back, our traditional product-based view simply doesn’t tell us what we should best be doing in the future.”

“For example, you might easily conclude we should be producing various kind of carts for medical equipment Dräger builds at other worldwide production sites, just because our China-built anaesthesia machines also use these cart assemblies. However, if you check the capabilities required, such as large-scale plastic foam moulding, you will find that China does not have any advantage in these competencies, even if we don’t consider the high transportation costs. So the product-based view made us look for opportunities in other attractive areas, especially related to electronics.”

The Chinese medical device market – still dominated by global players – is growing fast and attracting more and more players to set up local manufacturing and product development. Furthermore, local Chinese manufacturers are getting more advanced and will increasingly become active outside of China. Facing this increased local and global competition, Dräger Medical decided it needed to get more out of its investment in China and replace ad hoc decision-making with a focused long-term China strategy. “Our past investment decisions were based on individual project assessments, with limited check of their alignment to the global R&D and manufacturing strategy,” Syhr says.

“We needed quick decision-making as well as maximum benefit from emerging R&D skills and improved supply chain quality, but above all a consistent direction,” he says. Dräger Medical decided to follow the competency-based approach. The company came to some surprising conclusions. Products that previously had been quickly ruled out of China now promise a huge advantage. “In addition to our defined core competencies, we now have an assessment tool guiding us to prioritise and focus our resources on the most valuable opportunities with long-term benefits,” Syhr says.

Insights for the executive

The “China fit” logic described above leads to a well-founded, powerful and easy-to-communicate overview of the products that could be developed and manufactured in China, and those that are better kept out. It also allows efficient comparison between alternative investment proposals. Once you have the overview, you are well equipped to focus further evaluation efforts on the alternatives that really make good sense in China. You avoid time-intensive and costly evaluation of alternatives with low potential.

By linking products to the competencies embedded in them, you can define what competencies you have to develop, maintain or divest in China. From this you can easily derive your China growth strategy and the corresponding investment plan in both R&D and manufacturing. Deciding to transfer a product to China is no longer just a short-term offshoring decision, but a long-term investment in a sustainable competitive advantage.

You can use the same approach for any other emerging market. The results are invaluable for the design of your global R&D and manufacturing footprint.

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