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by **Ajay Chamania, Heral Mehta, and Vikas Sehgal**

Many companies choose particular locales as the homes of new engineering, R&D, and design sites for all the wrong reasons. Some cities get the nod because a top executive lives nearby or the person in charge of looking for space has been there before and likes the restaurants. Other places are picked because they're trendy (everybody's going to Mumbai, so we should go to Mumbai, too). Sometimes a city is chosen because the company has a factory in the region.

But such a casual, even offhanded approach to picking a future engineering beachhead — perhaps the most critical long-term decision in establishing a profitable global engineering footprint, and one that is increasingly on the minds of multinationals as they place R&D facilities in emerging nations — can be a big mistake. Instead, an array of concerns must be considered. On the one hand, some cities well known for their skilled technical professionals are in such demand among multinationals that the competition for good engineers is stunningly steep. As a result, compensation for the engineering workforce in these areas is inflated and still rising.

Unless it is absolutely essential to hire the very best engineers, a facility in these cities could wreak havoc with a company's cost structure. On the other hand, if a design site is going to be completely supervised by, say, U.S.-based management, a Chinese Tier Two or Tier Three rural town might be bucolic and remarkably inexpensive, and might have enthusiastic if not highly skilled workers, but it would also represent such a cultural mismatch that it could take years before the center produces anything of true value.

To avoid the missteps many companies make when choosing a new engineering or R&D site, particularly in low-cost countries, multinationals must weigh five factors: We call them the five Cs. Companies should identify which one or two of the five Cs are the most important for their decision to locate a facility, and then determine which cities meet these criteria. It's essential to assess the characteristics of prospective locations today and to anticipate what they will be like in three to five years. Will the infrastructure be better or worse, will investment increase, will costs rise, will the number of skilled workers decline, will crime escalate, will the political situation worsen? Those and other similar questions, keyed to the specific traits that the com-

pany is looking for in an engineering site, must be addressed in order for the company to avoid making a decision that it will regret in a matter of months. The five Cs are:

1. Cost: attractiveness of location based on required expenditures for setting up engineering centers and covering ongoing operating activities. Included are the costs of buying or leasing land, office equipment, communications, wages, training, taxes, and IT infrastructure. Expenses are always important — indeed, cost cutting is the default mode for many companies — but in most cases they cannot be the only element driving the decision of where to place new facilities in low-cost nations. Companies solely seeking the lowest-cost venue, rather than one that matches the organization's needs and capabilities, often end up paying more than they anticipate. However, if cost is paramount, make sure to carefully forecast how the local standard of living — particularly when it comes to wages — may change in the near future. For example, Kuala Lumpur in Malaysia is often short-listed because for a relatively inexpensive city, the population's English skills are excellent and there are a large number of technically advanced workers. But a minimal investigation would reveal that costs in the city are rising rapidly, and in five years Kuala Lumpur will be as expensive as, say, London. Thus, a better option could be a nearby Malaysian city like Penang, which has many of Kuala Lumpur's benefits without its cost trajectory.

2. Capacity: availability of engineers and technical universities — or, put another way, the number of engineers in the region who have graduated from three- to four-year

engineering programs in the previous 10 years. Capacity is of utmost importance when a company needs to scale up engineering centers in a short period of time and can use its in-house talent to develop these new employees. Many regions in developing nations that have stellar technical capacity are still relatively inexpensive (though not quite the lowest cost) because these areas, structured to mimic the wide-ranging ecosystem of Silicon Valley so they can attract multinationals, have a large and continuously expanding pool of potential applicants for engineering positions. For example, India's Bangalore boasts more than two dozen technical colleges and hence was the perfect location for two highly touted multinational R&D centers that ramped up aggressively over just a couple of years: the Honey-

cific engineering skills and expertise that a company explicitly needs, as well as a sufficiently sophisticated work and operational environment. This category includes such desirable features as nearby R&D, design, testing, and prototyping centers established by foreign and local companies. Also valuable is reliable infrastructure: robust communication lines, sufficient power and energy supplies, and modern transportation systems. In addition, companies that seek high capability should look for the presence of innovation clusters — interconnected firms with skilled expertise for a given industry — targeted at their line of business. For example, Poland, Hungary, and the Czech Republic are known for their automotive design and engineering clusters, and India is dotted with

not in a position to train a new group of engineers from scratch. U.S. auto supplier Delphi Automotive Systems LLC chose Poland as its engineering center for worldwide around-the-clock support and for designing high-performance shock and strut systems because the company wanted to stake a claim as a global leader in sophisticated auto supplies. Eastern Europe offered the following capability advantages: Its engineering skills and infrastructure are among the best in the world; many automakers and suppliers of advanced parts to the industry have already implemented advanced development technologies in facilities there; and its culture and intellectual property protections are closer to the U.S. model than those of, for instance, China or India.

4. Communications: ability to seamlessly share information between the new site and company headquarters without cultural and language obstacles. Engineering knowledge in most companies is tribal — that is, processes and methods are not documented. In addition, product engineering is often iterative, with multiple cycles among many functions, including design, development, testing, prototyping, and manufacturing. This makes regular two-way communication between a new engineering location and headquarters critical to ensuring successful integration of the site into the global network as well as critical to the ongoing operations. Compatibility of language thus plays an important role in the site selection process. In addition, the ability of engineers in the new facility to conduct business or technical tasks in the home-office language is necessary to ensure high productivity and fast turnaround.



well Technology Solutions Lab (now with more than 5,000 employees) and the Intel Indian Development Center (which has about 2,000 employees). Cities such as Bangalore, Chennai, and Hyderabad in India and Guangzhou in China often provide the perfect balance between cost and capacity.

3. Capability: presence of spe-

software development clusters. Similarly, Ireland is fast becoming a haven for medical device companies because of its local technical expertise, and costs that are lower than those in the rest of western Europe. Companies that focus on capabilities typically plan to hire a small number of highly adept technical staffers in specialized fields and are

5. Culture: ability of the location to attract talent, measured by the accessibility of airlines, railroads, and highways; macroeconomic factors such as the level of political stability, inflation, government policies supporting R&D, and bureaucratic red tape; and quality of life, including standard of living, schools, safety, pollution levels, climate, entertainment, and the presence of an expatriate community. By way of illustration, many European companies, such as Volkswagen, Siemens, Faurecia, and ABB, have established R&D centers in eastern Europe, although costs there are higher than in other developing countries. The lure is primarily cultural: a shared history and neighborhood, the same or nearby time zones as those at headquarters, and excellent transportation infrastructure.

Although the five Cs are of the utmost importance, there is another C that should not be overlooked — the customer. To be close to exploding consumer markets, companies often find that opening engineering and product design facilities in China and India, for example, is essential. In those cases, even after completing a conventional five C

analysis, companies for which the customer base is crucial may find that this gives them a smaller number of cities to choose from. But that constraint must not deter companies from choosing a location primarily based on the five C factors. Whatever the region, in today's globalized environment, more than a few cities will manifest each of the best characteristics to match a company's needs. +

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