

International operations report

Introduction

As a manufacturer of security systems based in mid-Wales, Organisation X is aiming to establish a global presence for its product portfolio. To strategically position itself to control the manufacturing and distribution of these products globally, a shortlist of suitable manufacturing/distribution outsourcing locations has been produced within each region of interest, as shown in Table 1.

Table 1: Candidate locations for regional manufacturing/distribution hubs.

South America	Asia	Africa
Chihuahua (Mexico)	Shenzhen (China)	Durban (South Africa)
Montevideo (Uruguay)	Visakhapatnam (India)	Bulawayo (Zimbabwe)
São Paulo (Brazil)	Taipei (Taiwan)	Tunis (Tunisia)

This report will evaluate the suitability of each candidate to identify three recommended locations. It will also consider how international innovation standards, such as the ISO 56000 series, might aid the company during the operational expansion and mitigate the risks associated with it.

Outsourcing manufacturing/distribution

Outsourcing can be defined as the delegation of operations to an external entity specialising in the management of that operation (Trott, 2016). This differs from a more traditional buyer-seller relationship owing to greater levels of collaboration, information exchange and sharing of management control. However, there are a few risks that can arise from such outsourcing activities, such as:

- Key areas of expertise/knowledge within the company being lost to the outsourcing organisation over time.
- Increased risk of leaking sensitive information to competitors.

- Being 'eaten alive from the toes up' when outsourcing significant competencies within the business.
- Insufficient bi-directional information flows between the development and production teams leading to product designs that present unnecessary challenges/inefficiencies during the manufacturing/distribution steps.
- Excessive sharing of information resulting in theft of intellectual property, especially in countries where IP rights are inadequate or difficult to enforce.
- Political instability and sudden legal/fiscal/regulatory changes within outsourcing destinations resulting in significant and unpredictable challenges.

Considering these risks, the following aspects will be considered when evaluating the various locations:

1. Logistics and transportation: When outsourcing manufacturing/distribution the maturity of the location's logistics/transportation infrastructure must be carefully considered. There is little point in outsourcing manufacturing/distribution to cheaper regions, if increased logistical costs negate the savings in labour costs. Proximity to major markets is also an important aspect to consider as this will directly influence logistical costs and often ease of access.
2. Manufacturing and production: The maturity of the countries existing manufacturing bases will be considered. While labour cost is a significant factor, it is also necessary to balance this with factors such as the availability of a suitably educated workforce, since upskilling a workforce can be a costly and time-consuming process. Locations with established clusters of similar manufacturing activities are also far likelier to feature access to robust supply chains.
3. Quality: When outsourcing manufacturing activities to international locations, it is important to ensure that appropriately high-quality standards are maintained. This can prove more challenging when outsourcing due to the relinquishing of some control over the manufacturing process. A decrease in product quality can have a detrimental impact on the company brand (Neumeier, 2005) and in turn affect the prices consumers are willing to pay for the product.
4. Political, social, and cultural aspects: These will be considered when evaluating the suitability of the various locations. All countries are subject to varying political,

social, and cultural attributes evolving over time, although in some countries these can be erratic and highly unpredictable, which results in significant risk for companies operating within the region. Factors such as high levels of inflation and constant flip-flopping with regards to fiscal/taxation/regulatory rules can place significant pressures on profitability and operational efficiency. In addition to this, the geopolitical situation will be considered with regards to free trade agreements and market access. Given the increased importance of effective communication between in-house and external teams when outsourcing, the English language proficiency levels for each location will be considered.

5. Intellectual Property: IP theft and information leakage remain the primary risks associated with outsourcing manufacturing activities externally. While risk mitigation strategies must be carefully considered for all locations, the strength/enforcement of IP protections within each location will be considered. This is because strong, effective protections can reduce the associated risk significantly. In circumstances of trust regarding protection of IP, greater levels of open dialog between the in-house and external teams can improve product quality and production efficiency significantly.

Evaluation of candidate locations

South America

Chihuahua (Mexico)

Chihuahua is one of the leading centres for manufacturing within Mexico, including automotive, medical device and aerospace manufacturing industries. Given the established nature of these industries, it boasts a significant and highly educated engineering workforce and robust supply chains (Malottky, n.d.). The proximity to the United States also makes it an ideal location for exporting into that lucrative marketplace. Another benefit is the low labour and utilities costs associated with manufacturing within this area of Mexico (Offshore International, 2020). Mexico, at 60, is ranked significantly higher than the other candidates in the ease of doing business rankings, with Uruguay at 101 and Brazil at 124 (The World Bank, 2019). In terms of global manufacturing competitiveness, Mexico at 8 achieved a far

higher rating than Brazil at 29 (Deloitte, 2016). In terms of Logistics performance, Mexico also ranks the highest of the American candidates (The World Bank, 2018).

Montevideo (Uruguay)

While Uruguay has a significant industrial base, it is mainly focused on the agricultural, food and beverage, and textiles sectors (Crédit Agricole Group, n.d.). Uruguay does rank favourably on the international property rights index, especially in areas such as rule of law and judicial independence (Property Rights Alliance, 2021). Uruguay also ranks higher than both Brazil and Mexico in terms of English language proficiency, at 53 compared with 60 and 93 respectively (Education First, 2021). However, there is little evidence of a strong manufacturing base within the areas that Organisation X are involved with.

São Paulo (Brazil)

São Paulo in Brazil has a diverse manufacturing base encompassing sectors such as agribusiness, automotive, machinery & equipment, and healthcare (Investe SP, n.d.) alongside strong transportation and communications infrastructure (Kemp, 2019). Brazil also outperforms Mexico in many aspects of IP protection (Property Rights Alliance, 2021). However, it's distance from the United States increases costs associated with exporting to that market.

Conclusion

Given its proximity to the US, existing manufacturing base/logistical infrastructure and qualified workforce, Chihuahua in Mexico represents the optimal location for establishing a manufacturing/distribution base in the Americas. One concern is the reported low levels of English language proficiency, however given the national language is Spanish, it is reasonable to expect that high quality translation services can be acquired with relative ease, if required.

Asia

Shenzhen (China)

China remains one of the most popular destinations for western companies when outsourcing manufacturing. It has been estimated that the Shenzhen makes around 90% of the world's electronics, leading it to be known as the world's factory (Yankowicz, n.d.). A major benefit of outsourcing manufacturing to this well-established location includes the ready availability of advanced manufacturing facilities, numerous potential suppliers of

almost any component, highly developed logistics networks and expert packing facilities. For these reasons, China has been ranked as the number one nation in the world for global manufacturing competitiveness (Deloitte, 2016). This is coupled with the highest rating of all candidate locations in terms of logistics performance (The World Bank, 2018).

Manufacturing within china also grants access to one of the largest markets in the world, with a rapidly growing consumer-class (Zipser, et al., 2021). A major downside to manufacturing within china remains the association with poor quality and prevalent copy-cat (or 'Shanzhai') culture within the country. However, in recent years there has been increased enforcement regarding intellectual property within China as the value of 'home-grown' intellectual property has increased (Sagami, 2021). Additionally, the zero-covid strategy being pursued by the Chinese government can lead to highly disruptive lockdowns and makes it very challenging for foreign company representatives to enter (Russell & Mitchell, 2021).

Visakhapatnam (India)

India is increasingly becoming an attractive option for western companies to locate manufacturing. The population is renowned for its resilience and resourcefulness despite economic limitations, the so-called Jugaad Innovation mindset (Radjou, et al., 2012). Some of the benefits of manufacturing in India includes initiatives such as the 'Make in India' campaign resulting in significant investments in manufacturing, high availability of cheap labour, reasonable levels of English language proficiency, a familiar legal system based on British common law, higher production quality when compared to china and a rapidly growing economy to sell into. However, there are also some significant downsides such as poor reliability of power supply, poor transportation infrastructure and poor enforcement of intellectual property rights (Hoyt, 2017). India, at 63, also ranks significantly lower on the ease of doing business rankings than both China and Taiwan, at 31 and 12 respectively (The World Bank, 2019).

Visakhapatnam is a port city within the region of Andhra Pradesh, with good shipping links. It contains a long-established special economic zone to encourage growth of manufacturing. However, this is currently more focused on 'heavy' manufacturing industries such as steel (Ministry of Commerce & Industry, Govt. of India, n.d.).

Taipei (Taiwan)

Taiwan is well known for its dominant position manufacturing semiconductor components for electronic devices (Lee, 2021). While the current focus is on component-level manufacturing activities, in recent years the Taiwanese government has been actively looking to expand its manufacturing base in smart machinery via the '5 + 2 industries plan' (Ferry, 2017). Taiwan also ranks significantly higher than both China and India on the intellectual property rights index, providing greater protections for the company from the risk of IP theft (Property Rights Alliance, 2021). A significant downside to using Taiwan as a regional manufacturing/distribution base relates to the significant tensions over sovereignty with China. Pressure from China has resulted in Taiwan being party to a relatively low number of free-trade agreements, when compared to regional competitors (Hille, 2021). This is a significant downside when aiming to establish a base for product distribution. Due to greater levels of economic development, labour costs are significantly higher in Taiwan when compared to China and India (Burkhart & Maegan, 2018).

Conclusion

Despite on-going concerns over the protection of intellectual property rights and Covid-19 related disruptions, Shenzhen represents the most promising location in which to establish a manufacturing/distribution base in Asia. This is primarily due to the significant supply chain advantages, established logistics networks and privileged access to Chinese commercial and consumer markets in which to sell products. China also ranked similarly to India in terms of English proficiency (Education First, 2021).

Africa

Africa as a manufacturing location

In recent years, Africa has gained increased attention as an alternative to Asian low-cost-countries for outsourcing manufacturing (Assegaf, et al., 2017). This is due to benefits such as the large abundance of natural resources and low labour costs. In addition to this, a comprehensive continent-wide free trade agreement has recently been established (Ighobor, 2021).

However, there are some significant challenges that must be overcome including an unreliable power grid resulting in frequent power outages, poor infrastructure making

transport via roads difficult and expensive, and comparatively poor levels of education among the workforces (Assegaf, et al., 2017).

Durban (South Africa)

South Africa possesses an established manufacturing industry, contributing around 14% to the country's GDP (South African Market Insights, 2021). From the shortlist, South Africa is the only African location listed in the global manufacturing competitiveness index (Deloitte, 2016). However, this manufacturing output is predominantly based on the food & beverage and heavy industries, with more complex electronic device manufacturing contributing a far lower percentage, as shown in Figure 1.

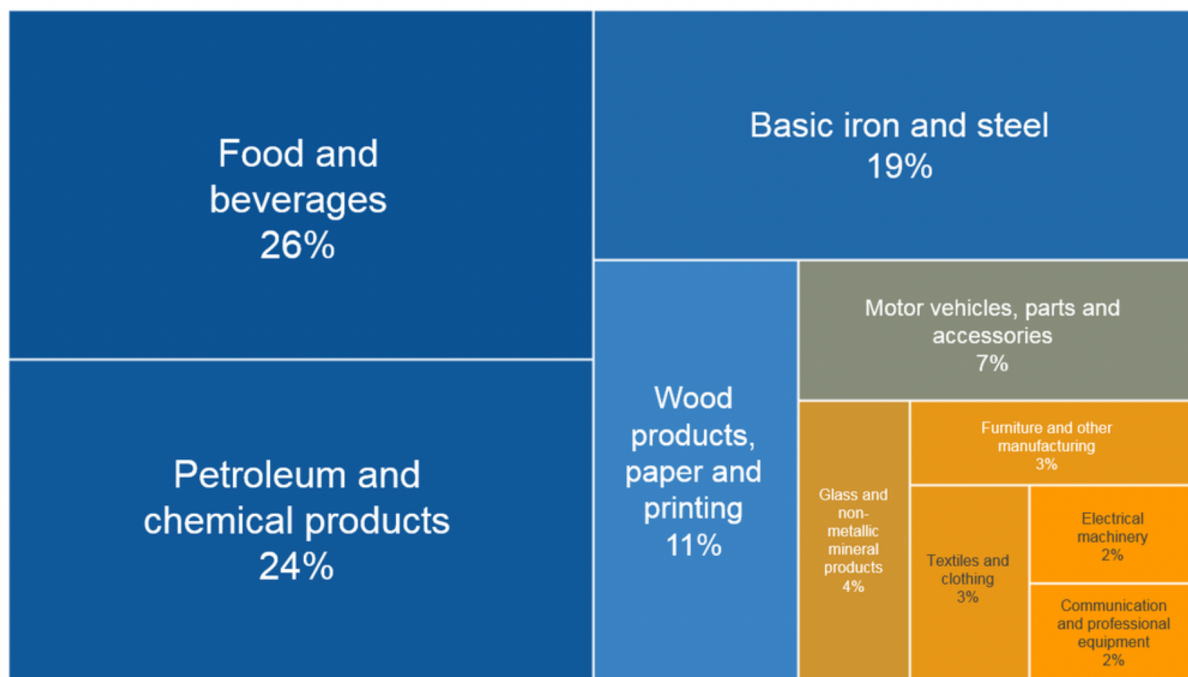


Figure 1: Relative contributions to South Africa's manufacturing industry (South African Market Insights, 2021).

South Africa ranks highly in terms of infrastructure development (Statista, 2021) and logistical performance (The World Bank, 2018) when compared to other African nations and the prevalence of the English language within business contexts represents a major benefit. South Africa is a signatory to numerous international IP agreements, although enforcement of these protections can often prove difficult (Department for International Trade, 2021).

Bulawayo (Zimbabwe)

Once celebrated as the nation's manufacturing hub, Bulawayo has experienced significant levels of de-industrialisation in recent years. However, there have been significant investments recently into the steel sector by Chinese investors, which may lead to a reversal

in this trend (Phiri, 2022). The failure of previous efforts to reverse the de-industrialisation trend in Bulawayo have been attributed to lack of funding, antiquated machinery, poor economic policies, poor infrastructure, and the high cost of utilities (Chinjova, 2019). Zimbabwe also ranked 140 out of 190 in the ease of doing business rankings, far lower than Tunisia at 78 and South Africa at 84 (The World Bank, 2019).

Tunis (Tunisia)

With an economic model long geared towards exports and industrialisation, Tunisia represents a great choice for international companies looking to set up manufacturing/distribution hubs abroad. Despite some difficulties with a more general economic slowdown and a limited domestic market, it boasts some significant benefits when compared to the other African candidates. This includes a highly developed industrial infrastructure, a well-developed education system, efficient logistical infrastructure, significant growth of MEEIs (mechanical, electrical, and electronic industries), and its proximity to the lucrative EU market (Oxford Business Group, n.d.). Tunisia also ranks significantly higher on the global peace index, when compared to South Africa and Zimbabwe (Institute for Economics & Peace, 2021). Tunisia has well established trade links with both the EU (European Commission, 2021) and the UK post-Brexit (Department for International Trade, 2019). There have been on-going negotiations for an even deeper and more comprehensive trade agreement between Tunisia and the EU, although these discussions have stalled in recent times (González, 2021). While comparable to South Africa in terms of physical property rights, it lags South Africa in terms of IP protections (Property Rights Alliance, 2021). Tunisia is considered to have 'moderate' levels of English language proficiency (Education First, 2021).

Conclusion

Despite several positive aspects related to South Africa such as high levels of English proficiency and intellectual property protections, Tunisia represents the best candidate for establishing a manufacturing/distribution base for our specific product lines. This is due to several factors such as established and efficient logistical links to the EU marketplace, significant presence of existing MEEIs and associated industrial infrastructure, and a workforce possessing high levels of technical education.

Tools to aid implementation of outsourcing strategy

ISO 56000 series

While Mexico, China and Tunisia have been identified as promising locations within which to outsource manufacturing, there remains some challenges that must be overcome to ensure successful implementation of this approach. The realisation of value is an essential element of innovation, and effective manufacturing/distribution of products is a critical enabler in the realisation of value. The ISO 56000 series helps organisations design an approach where ideas can be heard, tested, and implemented effectively.

The standards currently available are as follows:

1. ISO 56000 - Fundamentals and vocabulary (ISO, 2020): This standard provides guidance to ensure that all participants speak the same 'language' with regards to innovation. This is especially important when operating internationally where differences in language/culture can result in widely differing views with regards to the meaning of various terminology.
2. ISO 56002 - Innovation Management System (ISO, 2019): This standard provides guidance on establishing an effective system of innovation across the organisation. This will help the organisation recognise the essential elements that must be maintained when expanding internationally.
3. ISO 56003 - Tools and methods for innovation partnerships (ISO, 2019): This standard provides guidance on selecting, establishing and the governance of innovation partnerships.
4. ISO 56004 - Innovation management assessment (ISO, 2019): This standard provides guidance on assessing innovation capabilities across the organisation. An innovation assessment can be useful in identifying weaknesses within areas of the business. Performing an innovation assessment can help the organisation identify weaknesses within its innovation management system before they are exposed by the challenges of expanding internationally (especially in areas such as cross-departmental communication).
5. ISO 56005 - Tools and methods for intellectual property management (ISO, 2020): This standard provides guidance on establishing and managing the intellectual property portfolio of companies. As discussed previously, protection of intellectual

property remains one of the primary risks when outsourcing manufacturing internationally. It is therefore imperative that the company has a clear, well-defined, and robust IP strategy to mitigate these risks. Considering the international perspective, the guidance contained within ISO 56005 can prove incredibly useful in ensuring this.

Product Design Specification considerations

When outsourcing manufacturing internationally, it is essential that the in-house design and development teams are aware of the various challenges and opportunities arising from locating manufacturing/distribution within these specific areas. Manufacturing, market, and logistical considerations remain critical components of the Product Design Specification (Pugh, 1991). It is unlikely that these considerations will remain completely the same between the various locations, so it is also essential that the location-appropriate information is fed back into the PDS (of both upcoming and existing products) to ensure the product design strategy is fit for purpose.

Conclusion

While there remain some considerable challenges associated with outsourcing that must be overcome, the ISO 56000 series provides clear guidance that can help the company competently meet these challenges. While communication flows will inevitably suffer compared to co-location of teams, a comprehensive product design specification can help the company ensure effective communication across the various teams throughout the innovation funnel, wherever they are located.

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