



MIT SCALE RESEARCH REPORT

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This reprint is intended to communicate research results of innovative supply chain research completed by faculty, researchers, and students of the Global SCALE Network, thereby contributing to the greater public knowledge about supply chains.

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Future Supply Networks at Hewlett Packard
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Future Supply Networks at Hewlett Packard

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EXECUTIVE SUMMARY

Hewlett Packard faces many challenges managing products with a short life cycle in a supply network that became truly global in the past decades. Understanding how macro factors like oil, labor costs, currency exchange rates and trade barriers can impact the performance of this network is vital information for supply chain executives for planning the supply chain strategy that will perform best in the future.

HP consumer printer business produces and sells, around 8 million inkjet printers annually worldwide. The demand market is distributed with 45% in Europe, 25% in North America, 16% in Asia, and 14% in Latin America. The current supply network is established as follows: sourcing is concentrated mainly in Asia (93%) with a small portion in Latin America (7%), Postponement activities take place in Europe (13%), Latin America (11%) and North America (9%) with the remaining 66% of units following the *Low Touch* strategy, where finished products are shipped directly from factories to the distribution centers.

Aligned with the Supply Chain 2020 project, led by MIT, which established the bases for understanding the main factors and the main visions for the most efficient supply chains in the year 2020, we believe that the following scenarios can help HP understand the future and evaluate the performance of its global operation:

Main Scenarios:

- Increase of labor cost in Asian Countries
- Increase of oil prices and transportation costs
- Exchange rates appreciation for Asian and Latin America Countries
- Eastern Europe as an alternative and competitive sourcing

Based on the scenarios above, the following insights can be developed regarding different sourcing locations for inkjet printers and how the current network can change. For the purpose of the analysis, the product referred to as *printer 1* is single function, low-end inkjet printer targeting mostly domestic users; *printer 2* is a multifunctional high-end printer targeting more sophisticated home users and small and medium businesses.

- **Asian Countries:** For many scenarios, China loses part of its production to Thailand due to higher costs, but remains strong in many scenarios due to a strong domestic market. Thailand becomes the most competitive alternative in Asia in many scenarios due to competitive factories and PCCs. Vietnam is competitive when China increases costs, but because configuration activities are not as efficient as Thailand and transportation costs are similar, it is not sustainable in many scenarios.
- **Latin America:** Brazil and Mexico keep the postponement centers to attend to the regional markets in most scenarios. Mexico also can execute postponement for the US

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due to duty advantage. When an increase in transportation costs reaches a considerable rate, factories are opened in Mexico and in Brazil and become regional sourcing points, only an increase in transportation as high as 500% will cause Mexico to become actually a global sourcing serving other regions.

- **Eastern Europe:** Under the assumptions taken, Romania arises as a potential regional and global source in many scenarios, mainly when lead time constraints take place. The strategic location and technological advantage are the main reasons for this trend.
- **US and Europe:** Germany will keep a postponement center in many scenarios and also host factories when duties are increased, labor costs rise in Asia or lead time is constrained, the US does not keep the postponement center or factories, mainly because in many scenarios, Mexico becomes the preferred low-cost source located nearby.

In order to face different scenarios and develop a robust supply network, some of the supply chain strategies already in place or to be implemented, have to be considered:

- **Postponement:** For countries where the gap in labor and material costs with Asia are not very high, like Latin America and Eastern Europe, customizing the product within the regions is a robust strategy and remains sustainable in most scenarios. In addition to regional markets, these countries also arise as potential postponement centers, to attend the major markets in the US and Western Europe.
- **Low Touch:** Shipping the finished product directly from factories has proven to be sustainable in many scenarios to attend to the US and Europe, mainly for printer 1. In most scenarios, the US received products directly from suppliers in Asia, or from Mexico (in the extreme scenarios of very high transportation costs). Europe leaves the low-touch model only when lead time constraints are imposed.
- **Flexibility/real options:** An interesting result was that printer 2, which was claiming more responsiveness was the one with longer lead time in the optimization model, mainly because lost sales and markdown were not considered in the model. However the insight for managers is that the cost of responsiveness for high value products is high, therefore, changing the network might not be the best option. Rather working with flexibility contracts or real options allows the firm to take advantage of Low Cost Countries while minimizing the risk of losing the profits on lost sales or markdowns.

Even though, this research is not comprehensive for all products and locations, the insights obtained by the different scenarios indicate that some of the strategies used by HP in the past, like postponement, will remain sustainable for some categories of products and for some regions. However some innovative strategies focused on flexibility will be required to face the increasing uncertainty in demand without losing the advantage of the Low Cost Countries that will most likely continue to play a significant role in the global supply chain design.