Designing Omni-Channel Retailing to Align Financial Performance with Strategy

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Sunil Chopra describes how looking at combinations of product and channel through the lens of return on invested capital (ROIC) allows retailers to design omni-channel portfolios that align their products, service offerings, and pricing. By using each channel to improve invested capital turns or broaden profit margin, these portfolios increase the company's value.

The concept of omni-channel retailing has circulated for several years, yet no retailer has designed a consistently profitable omni-channel network that also satisfies customers. Macy's initial approach to omni-channel retailing was to use its stores primarily to fulfill online orders. To quote its CEO in the 2012 Annual report "We made a big leap in 2012 when we equipped 292 Macy's stores to fulfill orders placed online or at other stores that may have been sold out of a particular item."[1] Yet after a few years of using its decentralized network of stores as its primary fulfillment channel for both online and walk in orders, the company switched to using centralized fulfillment centers for most online orders. Meanwhile, although Walmart was initially hesitant, its omni-channel network now uses retail stores to encourage customers to use store pick-up rather than home delivery. Yet Amazon, despite having acquired Whole Foods, directs most of its effort in the United States toward encouraging home delivery. Clearly, different firms need different forms of omni-channel networks.

No retail channel is price competitive for all products, yet retailers can design omni-channel portfolios which produce the best combinations of product, service, channel, and pricing.

In each example mentioned above, the real challenge is to differentiate, within a given channel, between products that can be delivered at low cost and those that incur a higher cost and must therefore be addressed to customers who are willing to pay a premium for services. Whereas very slow-moving items may be expensive to sell through retail stores, fast moving products may be much cheaper to sell through the same channel. No retail channel is price competitive for all products, yet retailers can design omni-channel portfolios which produce the best combinations of product, service, channel, and pricing by examining these combinations through the lens of return on invested capital (ROIC).

A retailer can increase return on invested capital by increasing either profit margin or invested capital turns.

ROIC is the ratio of earnings before interest and taxes (EBIT) and invested capital (IC), where invested capital includes the two assets directly related to supply chain performance: inventories (I) and property, plants, and equipment (PPE). Thus:

$$ROIC = \frac{EBIT}{IC}; IC = I + PPE.$$

EBIT is determined by a combination of the customer's willingness to pay and the labor and transportation costs of the retail network. For the purposes of this discussion, I assume that all physical assets, including retail stores or warehouses, are owned by the retailer and included in PPE. I also assume a unit to be in the retailer's inventory as soon as it is physically received, regardless of whose books it appears in. While this view of inventories and PPE differs from that of accountants (for example, I ignore depreciation), it does get to the heart of how value is created by using a particular combination of product and channel to fulfill a customer's order. Observe that:

$$ROIC = \frac{EBIT}{Sales} \times \frac{Sales}{IC}$$

$$= \text{Profit Margin} \times \text{Invested Capital Turns}$$

Profit margin is the earning before interest and taxes per dollar of revenue. Invested capital (IC) turns is the revenue per dollar of invested capital. A retailer can therefore increase ROIC by increasing either profit margin or invested capital turns (or both). It can increase profit margin either by increasing the customer's willingness to pay for a given product by adding a valued service or by decreasing the operating costs (labor and transportation) of that product. Likewise, it can increase IC turns by decreasing either the required inventory (while still meeting customer demand) or the investment in PPE (while maintaining sales). For example, by moving a product from a decentralized network of retail stores to a centralized warehouse, the retailer can decrease the necessary inventory and PPE, and so reduce the necessary invested capital. However, this change also increases the outbound transportation cost and the time needed to deliver the product to the customer. Unless the customer values not having to go pick up their purchase at a store, this delay decreases the EBIT.

By focusing on the two components of ROIC, firms can identify combinations of product and channel for which they can tolerate a lower profit margin, because the value is drawn from increased turnover, and those for which they must charge a higher price, because of lower turnover or higher fulfillment costs. With this information they can identify whether a channel can compete on price alone or whether they must offer attractive services so

that customers will pay a premium. My framework builds on the ideas summarized in Figure 1.

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For example, by centralizing diapers in a fulfillment center rather than selling them in stores, a firm can only decrease inventory very slightly, while its transportation cost increases sharply. Diapers from a fulfillment center are thus in the high IC turns, high fulfillment costs quadrant. Selling diapers online may therefore be appropriate only for customers who are willing to pay for the convenience of having them delivered because the price must be raised enough to compensate for the increased fulfillment cost. By contrast, stocking a seldom-read book at a centralized warehouse, rather than in every store, decreases the necessary inventory (and the IC) by a great deal, while increasing its transportation cost by only a little. The online channel may thus be appropriate for selling such books to price sensitive customers who are willing to wait a few days for delivery. A firm with an omni-channel portfolio, rooted in the ROIC, can therefore make the best use of both localization and centralization to serve its customers profitably.[2]

Characterizing Products, Customers, and Channels

To create an omni-channel portfolio that aligns combinations of product and channel with the needs of customers, we must first characterize products, customers, and channels. I have selected three dimensions by which to categorize products: demand uncertainty, the ratio of value to weight or volume, and complexity of information. Demand uncertainty is measured by the coefficient of variation (cv) of demand (cv = standard deviation / mean). Demand for slow moving products is much more uncertain than for those which are purchased frequently. The demand for toothpaste, for example, is relatively predictable and thus has low uncertainty. Each diamond, on the other hand, is unique, which makes the demand for any specific stone impossible to predict. A product's value is typically measured in relation to its weight or volume. A jug of detergent has low value relative to its weight which means that the cost of holding inventory is small compared to the cost of transportation. A diamond has a very high value relative to its weight, so that the inventory holding cost is quite large compared to the transportation cost. Information complexity describes how much information a customer needs in order to completely understand a product. A fairly limited amount of information can describe a tube of toothpaste. In contrast, a customer may need to try a dress on to entirely understand its fit. The dress, therefore, has a high information complexity that can only be resolved by personal testing.

I characterize customers by their willingness to pay for services, such as help with product selection, responsiveness, home delivery, or the luxury of shopping in a particular environment. Price sensitive customers try to select the channel that offers the lowest price, even if it means weak service offerings. Customers who are more sensitive to service or convenience are willing to pay a premium to use a channel that provides those services. A service sensitive family with young children may be willing to pay extra to have its groceries delivered, while a price sensitive family with older children may drive several miles to Costco to get the same groceries at a lower cost.

I characterize channels by the information and product flow which each offers to customers. Retail customers can exchange information either face-to-face, as in a retail store, or remotely when shopping online. They can get their products through either customer pickup (in which the customer comes to the product) or home delivery (in which the product comes to the customer). I use these different methods of information and product exchange to define the four components of omni-channel retail (see Figure 2).

Supermarkets, jewelry stores, and bookstores are all traditional retail outlets at which customers receive product information face

IC Turns in Channel	Fulfillment Cost of Channel: Low	Fulfillment Cost of Channel: High
Low	Price must be high enough to compensate for low turns	Price must be high enough to compensate for low turns and high fulfillment costs
High	Channel can compete on price	Price must be high enough to compensate for high fulfillment costs

FIGURE 1: The Strategic Impact of ROIC Components on Combinations of Product and Channel

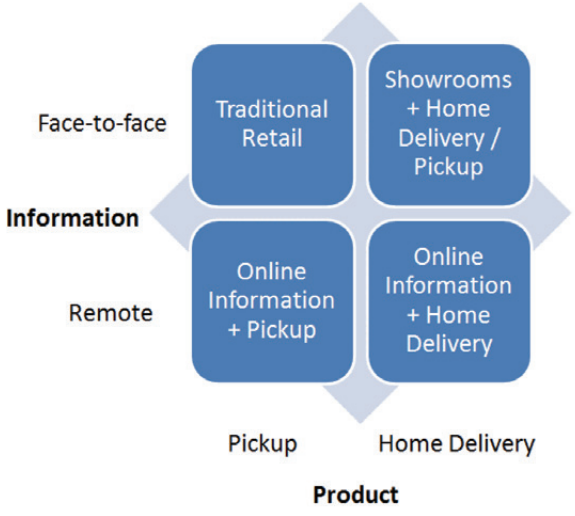

FIGURE 2: Channel Alternatives in Omni-channel Retail

to face and pick up their products upon purchase. Traditional retail relies on many decentralized facilities to be close enough to customers to support this model.

The apparel retailer Bonobos exemplifies the showroom channel. Bonobos Guideshops allow customers to try on different styles, get advice from salespeople, and be personally fitted. These showrooms facilitate face-to-face information exchange, but do not house inventory which customers can carry away. All purchases are shipped from a centralized warehouse. Blue Nile, on the other hand, is an entirely online channel which allows customers to browse and order diamonds and jewelry online, to be delivered from a centralized warehouse.

Many retailers now offer the fourth option, which allows customers to place orders remotely and then pick them up at a specified location. Walmart advertises "free in-store pickup" of online orders. Similarly, grocery retailers in the United Kingdom, such as Tesco and ASDA, offer a "click & collect" service which allows customers to order online and then retrieve their products from designated pickup locations.

The Strengths and Weaknesses of Each Channel

In order to strategize successfully, a firm must understand whether each interaction targets price sensitive or service sensitive customers. It must then evaluate the costs of fulfilling the order through each channel so it can use the channel that generates the most value. Different channels have different strengths which affect the two components of ROIC, profit margin and IC turns, for any given product.

Performance of channels in meeting customer needs

If its customers are willing to pay a premium for service elements such as variety or customization, speed, or the convenience of delivery, a retailer can increase profit margins as long as fulfillment costs are contained. Each channel has its own service strengths and weaknesses.

By keeping products in stock, retail stores allow nearby customers to quickly pick up physical products. Retail stores are also ideal for products with a lot of information complexity because they allow customers to try the product in person. However, these same stores can carry only a limited variety of products. The online channel, although it cannot deliver as quickly, can offer a much wider selection of products. Blue Nile uses its website to offer customers more than a hundred thousand diamonds at any given moment, while jewelry stores generally carry, at most, only a few hundred diamonds. Blue Nile's online channel also offers the convenience of having the product delivered to your doorstep.

The showroom channel can even offer an greater variety than the online channel for products with high complexity of information and customization because it allows customers to make more precise selections, for example by being measured. Indochino, a seller of men's suits, uses small showrooms to help customers select fabrics and styles and to be measured. The made-to-measure suits are then produced offsite at a low-cost location and shipped to the customer. Indochino can thus provide a unique product for each customer at a reasonable price. Because of the high information complexity associated with a customized suit, it would be harder to get such good results through an online channel.

Performance of channels in terms of cost

As well as customers' willingness to pay, profit margins and turnover are also influenced by the cost of meeting those needs through each channel. The performance of each channel must therefore also be considered in terms of the necessary investment in inventory and facilities, and the cost of labor and transportation. Each channel uses either a centralized or decentralized structure to manage inventory and fulfill orders.

Figure 3 describes how aggregation of facilities and inventories affects a retailer's costs. Decentralization increases a firm's investment in facilities because it entails losing the advantage of economies of scale. When a firm decentralizes it must invest more in inventory because the underlying demand becomes less predictable at the local level. Decentralization also increases labor costs because the workload becomes less predictable than at a centralized facility like a warehouse. On the other

Table 1: Relative Costs of Each Channel to the Retailer				
	Inventory	Facilities	Transportation	Labor
Traditional Retail	High	High	Low	High
Showrooms + Home Delivery	Low - Medium	Medium	High	Medium
Online Information + Home Delivery	Low	Low	High	Low
Online Information + Pickup	Low - Medium	Low - Medium	Low - Medium	Medium - High

hand, decentralization lowers transportation costs by decreasing expensive outbound shipping.

Traditional retail usually requires the highest investment in inventory because every local store must be stocked with inventory. Online and showroom channels require less inventory because that inventory is aggregated into only a few locations. Blue Nile, for example, stores its entire global inventory of diamonds at two warehouses. Tiffany, by contrast, needs a larger total inventory because it must stock about 300 retail stores. As a result, Blue Nile turns its inventory over ten times faster than Tiffany, in terms of cost of goods sold: 9.8 turns in 2012 for Blue Nile[3] compared with about 0.73 turns for Tiffany.[4]

The online and showroom channels can operate with even less inventory if they do not introduce variety until after the customer has ordered. Indochino, for example, carries very little inventory because it does not start production of a customized suit until after an order is placed. Amazon, likewise, reduces inventory by using print on demand technology for books that sell infrequently.

The online channel with home delivery requires the lowest investment in facilities because it allows firms to centralize their operations in a few locations. Traditional retail requires the highest facility investment because face-to-face information exchange and product pickup rely upon many locations. In 2012 Blue Nile earned about $50[3] in sales for each dollar invested in PPE, whereas Tiffany earned less than $5.[4]

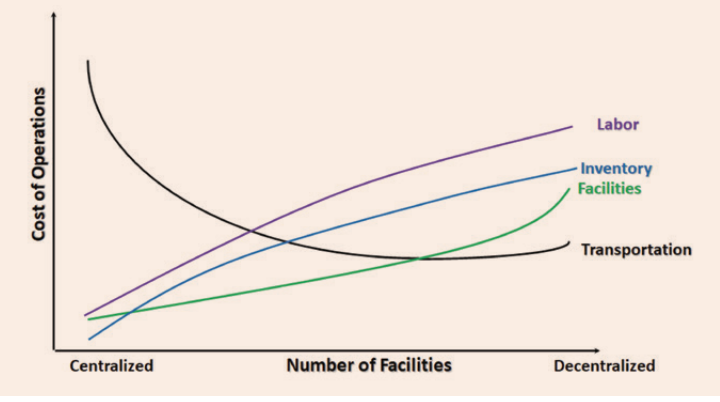

FIGURE 3: The Impact of Aggregation on Retailer Costs

Centralized channels like Blue Nile also make much better use of labor and have lower operating costs because they pool their resources. Filling online orders from decentralized stores increases labor costs because employees, rather than customers, must pick each order. This increase in costs is hard to justify if customers are not willing to pay a premium for the service. The efforts of Macy's to use its stores to fulfill home delivery orders failed largely because its in-store fulfillment costs increased but it did not reap the benefits of aggregating its inventory into centralized warehouses.

Because the showroom channel needs smaller and fewer facilities than a traditional chain of retail stores but more than the online channel, it is likely to incur facility costs that are somewhere in between.

The online channel with pickup is likely to incur low facility costs if it uses existing locations (like Walmart), but medium facility costs if it must build new pickup locations. Offering pickup can, however, significantly increase the cost of labor if it requires employees to do tasks that were previously performed by customers. Click-and-collect gro-

cery services increase labor costs because workers, rather than customers, pick the orders. This is especially true of orders picked at local retail stores instead of at fulfillment centers.

The decentralized traditional retail channel is most price competitive for products like detergent, toothpaste, or diapers, whose value to weight ratio is low and whose demand is predictable.

By aggregating their inventories, firms incur higher transportation costs because of the need for outbound shipping directly to the end customer. Whereas traditional retail incurs the lowest transportation costs, the showroom and online channels which offer home delivery incur the highest transportation costs because the product is shipped to each individual customer from centralized locations. If products are shipped in sufficient volume to a pickup location, customer pickup can lower the cost of transportation for the showroom and online channel to nearly that of traditional retail, which explains Walmart's enthusiasm for in-store pickup of online orders.

Designing the Omni-Channel Portfolio

Given the large variety of product characteristics, firms need a portfolio of channels to fulfill the needs of all their customers. Whereas price sensitive customers may choose to buy diapers cheaply from a local store, service sensitive customers may prefer to pay a premium for home delivery of the same diapers. Figure 1 illustrates how, by focusing on ROIC through turns achieved, labor and transportation cost, and each channel's potential price premium, firms can design a suitable omni-channel portfolio. The decentralized traditional retail channel is most price competitive for products like detergent, toothpaste, or diapers, whose value to weight ratio is low and whose demand is predictable. The high demand and low cv of such products naturally result in high IC turns, while the traditional retail channel keeps transportation costs low. A decentralized retail network can therefore get a good ROIC for such products even while keeping prices low. Costco is an excellent example of this model. By selling no more than 5,000 fast moving products for which the demand is predictable, Costco achieves excellent IC turns at its nearly 800 stores with a better inventory turnover than Amazon. With all products brought to stores in quantity, Costco also has very low transportation costs. And because its products are fast-moving, its labor costs are relatively low per dollar of sales. The company's high stock turnover, coupled with low transportation and labor costs, allows Costco to achieve a high ROIC despite low prices.

Hyper-local retail, in which stores address the specific needs of their own communities, is another model which allows firms to exploit these advantages. Nike by Melrose[5] and Amazon 4-star[6] use dedicated physical locations to provide locally popular products. Because their products are locally popular, the stores' IC turns are high enough to be worthwhile. Nike and Amazon can thus achieve a decent ROIC while providing local customers with face to face service and the opportunity to examine products firsthand before purchase.

Meanwhile products such as diamonds or fashion goods, for which there is low demand and which have a high cv and value, produce poor IC turns through the traditional retail channel because they require a relatively high investment in inventory and facilities. Their cost of labor also tends to be high in the retail channel. As a result, firms must be able to set store prices high enough to generate a high profit margin if they want to get a decent ROIC for such products through the traditional retail channel. Stores must offer their customers some valuable service, including the opportunity to try high information complexity products, so that they will be willing to pay a premium. The brand prestige and luxury experience of shopping at Tiffany carry enough cachet that its customers will pay a premium to buy an engagement ring at a Tiffany store. Tiffany's gross profit margins are around 55 percent[4] so, in spite of poor IC turns, Tiffany stores achieve a good ROIC.

The showroom channel is ideally suited to offer competitive pricing on products with greater information complexity, unpredictable demand, and high value.

Another way for traditional retail to compete on price is through strategic actions, such as fast fashion, that improve their IC turns. Zara achieves high IC turns by restocking its stores with very little lead time which ensures that the products most in demand are quickly available in-store. Uniqlo, by contrast, improves its IC turns by offering a limited variety of products in its stores. Because of their high IC turns, both Zara and Uniqlo can charge comparatively lower prices in their stores and still achieve a high ROIC.

Using a physical showroom also allows customers to experience products firsthand while yielding better IC turns by fulfilling orders from a centralized location. The showroom channel is ideally suited to offer competitive pricing on products with greater information complexity, unpredictable demand, and high value. As long as customers are willing to wait for the product, the retailer can also keep its inventory in the form of raw materials, producing its products to order at lower cost facilities or even in low cost locations. Fashion goods, bespoke suits, and expensive customizable cars are well suited to the showroom channel. Companies such as Indochino and Black Lapel used the showroom channel to sell men's suits and shirts, highly customized products for which it is hard to achieve an individual fit online. The showroom channel allows them to customize fit in person, while achieving high IC turns by centralizing and postponing production, thereby attaining a high ROIC even while giving up profit margin by charging lower prices than a traditional retailer.

The online information with delivery channel is most price competitive for long tail products with relatively low information complexity.

The online information with delivery channel is most price competitive for long tail products, niche products for which there is low but ongoing demand, with relatively low information complexity. Most books are in this category because the demand for each title is low and the product information is easily conveyed through a brief synopsis augmented by reviews and customer ratings. The combination of online channel with long tail products can be highly price competitive because, by centralizing inventory, it achieves much higher IC turns and lower labor costs than traditional retail. As a result, this channel supports competitive pricing for products with unpredictable demand and high value to weight ratios such as diamonds or designer apparel. Currently, the value of this combination is limited by the high information complexity of most high value products, which customers prefer to experience in person. However, as we improve our ability to interact with complex information remotely, through such technologies as virtual reality, the online channel will become highly price competitive for expensive products with complex information.

For fast moving, low cv, low value-to-weight products such as bottled water, however, the online information with home delivery channel cannot compete on price. For such products, centralizing inventory does not significantly improve IC turns but it does incur considerably higher transportation costs. To achieve a high ROIC on such products, the online channel must either charge higher prices for home delivery or reduce transportation costs. Amazon has, in many instances, used the former strategy. For example, Amazon used to sell a six-pack of Smartwater for home delivery at $6.99. In August 2018, however, it raised both the minimum order and the price per unit by changing the default to a 24-pack for $37.20.[7] Firms can reduce transportation costs by offering such products only as add-ons to more profitable items or as part of a minimum sized order. Another way to reduce transportation costs is to use decentralized fulfillment centers. Albertsons, Walmart, and other grocery chains have begun building small fulfillment centers near existing stores and customers so they can quickly fill online orders.[8] For grocery items with low uncertainty and value to weight ratios, decentralized fulfillment centers improve the company's responsiveness and lower its transportation costs without giving up much in terms of IC turns.

With its lower delivery cost and much lower chance of package theft, the online information with pickup channel ideally complements the home delivery channel. Walmart encourages store pickup because its additional cost and investment is much lower than that of home delivery. Meanwhile, Amazon has been hard pressed to adopt this option in the United States because it has far fewer facility locations. The relative advantage Walmart gains by offering pickup grows significantly in rural areas, where the cost of last mile delivery is very high and Amazon has no physical locations. This channel may also become more important in urban areas where package theft is on the rise. A recent report found that about 90,000 packages are stolen every day in New York City.[9] Given the cost of last mile delivery and the danger of theft, this channel is likely to be increasingly important worldwide. Magazine Luiza, a large retail chain in Brazil, uses it to serve rural customers at a cost that neither traditional retail nor home delivery can match.

It is important that retailers devise a portfolio of channels which match products to customer needs. A department store should thus carry the items which are most popular locally in store inventory. These products can also

Tables 2 - 4 summarize how different channels can best compete over a range of product characteristics and customer needs.

Table 2: Competing for products with different uncertainty

	Predictable demand product	Unpredictable demand product
Traditional Retail	Compete on price	Compete on service for high information complexity products
Showrooms + Home Delivery	Not suitable	Compete on price and customization for high information complexity products using centralized production and fulfillment
Online Information + Home Delivery	Compete on service from decentralized fulfillment centers	Compete on price and variety from centralized fulfillment centers
Online Information + Pickup	Compete on ability to provide some service at a lower price	Compete with home delivery on price

Table 3: Competing for products with different value to weight ratios

	Low value/weight or volume product	High value/weight or volume product
Traditional Retail	Compete on price for products with predictable demand	Compete on service for products with uncertain demand and high information complexity
Showrooms + Home Delivery	Compete on high variety/customization at reasonable price for high information complexity products	Compete on price for customizable, high information complexity products using centralized production and fulfillment
Online Information + Home Delivery	Compete on service from decentralized fulfillment centers	Compete on price and variety from centralized fulfillment centers
Online Information + Pickup	Compete on ability to provide some service at a lower price	Compete with home delivery on price

be shipped to service sensitive customers at a premium, perhaps from a more central location. Retail stores should also be used as showrooms for customized products and those that are only stocked centrally, like clothing in less popular colors. Using the store as a showroom does, however, require more skilled salespeople than selling regular inventory. To sell a wide variety of slow-moving items, firms should stock centrally and sell online at competitive prices. Only if service sensitive customers are willing to pay a premium should these products be stocked in retail stores. Such stores should also be equipped as pickup locations where price sensitive customers can save on shipping costs.

A firm's success will depend on its ability to first describe the strengths of each channel to customers in terms of services and price and then be agile enough to

Table 4: Competing for products with different information complexity		
	Low information complexity	**High information complexity**
Traditional Retail	Compete on price for predictable demand products	Compete on service (price) for products with uncertain (predictable) demand
Showrooms + Home Delivery	Not suitable	Compete on price for customizable products with uncertain demand using centralized production and fulfillment
Online Information + Home Delivery	Compete on price for products with uncertain demand from centralized fulfillment centers	Compete on price and variety for products with uncertain demand from centralized fulfillment centers
Online Information + Pickup	Compete on price for products with uncertain demand	Compete with home delivery on price.

match the strengths of each channel with the characteristics of each product to fulfill the needs of every customer.

A firm's success will depend on its ability to first describe the strengths of each channel to customers in terms of services and price and then be agile enough to match the strengths of each channel with the characteristics of each product to fulfill the needs of every customer.

How to Adapt an Omni-Channel Portfolio

It is vital that a firm be able to adapt its omni-channel portfolio to different countries and to changes in technology and customer preferences. Amazon is now investing in putting Amazon Easy stores across India to help people place online orders.[10] These stores are not only pickup locations, eliminating the high last-mile delivery costs common in emerging economies, they are also virtual showrooms where customers can experience a product, a service that first-time users in such economies tend to value. Amazon has also partnered with local shopkeepers in smaller Indian cities to supply groceries.[13] This partnership broadens Amazon's omni-channel portfolio which improves both its own ROIC and that of the local shopkeeper. The shopkeeper's ROIC is improved by higher sales without greater investment. One small vegetable shop in central Bhubaneswar reports earning an additional $200 a month by handling deliveries to nearby customers.[11] Meanwhile Amazon increases its sales without having to invest in PPE or incur significant delivery costs. Given the high cost of last mile delivery in emerging economies, the omni-channel portfolio must rely heavily on local facilities, often through partnerships, to serve as showrooms, micro-warehouses, and pickup locations. The use of such facilities can also be important in the large cities of developed countries.

It is vital that a firm be able to adapt its omni-channel portfolio to different countries and to changes in technology and customer preferences.

And evolution in experiential and production technologies is likely to drive significant evolution in these portfolios. As technology which allows customers to experience a product remotely improves, the centralized online channel is becoming a better option for products like jewelry, fashion, and shoes, which have a high information complexity as well as high demand uncertainty and high value to weight ratios. Centralizing such products improves turnover considerably. Firms should therefore be prepared to respond to improved experiential technologies by increasing their use of centralized channels.

As flexible production technologies, such as 3-D printing, become cheaper, firms should be ready to move them into local facilities, making retail stores into local, flexible production sites while reducing their inventory of finished goods. Customers will be able to exchange complex product information like their measurements while, by postponing production, firms will be able to improve inventory turnover despite the need to stock raw materials locally. In India, where low-cost tailoring is readily available, department stores carry pants that are separated by waist size but not by inseam length, which reduces their total investment in inventory. Onsite tailors then customize the inseam length for each customer in a few minutes. Cheaper flexible production technologies thus favor firms increasing their use of local, decentralized channels.

By building an omni-channel fulfillment portfolio, firms can best serve their customers and generate good financial results while retaining the flexibility to change the portfolio in response to evolving conditions.

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