4 Distribution services, technological change and the evolution of retailing and distribution in the twenty-first century
Roger R. Betancourt*

1 INTRODUCTION

In this chapter I develop two broad themes relevant for understanding the evolution of retailing and distribution in the twenty-first century. The first theme is the role of distribution services in retailing and distribution as characterized in the marketing and economics literature at the beginning of the twenty-first century. I include contributions that do so explicitly as well as others that do not do so explicitly but can be easily incorporated in the demand and supply of distribution services framework developed in *The Economics of Retailing and Distribution* (Betancourt 2004). My aim in both cases is to encourage further contributions that take advantage of the strengths of the framework.

While the selectivity implied by this approach limits the extent of topic coverage, the ability to illustrate in greater detail the benefits of the approach might stimulate others to pursue these ideas with the topics that are ignored. The second theme developed here connects the impact of technological change, broadly defined to include modern information and communication technologies (ICT) and, to a much lesser extent, institutional change such as the evolution of contracts and their enforcement, to the retailing of services in general and to the role of distribution services in particular. The thread that ties both themes together is their interdependence through the evolving role of distribution services in retailing and distribution as well as the use of a similar framework in the development of these themes.

One of the aims of the previously cited book, written over ten years ago, was to bring together relevant literature in economics and marketing that facilitated understanding the operation and performance of the distribution sector in general, and of the retail sector in particular, from an economics perspective. At the same time, however, it was hoped that this effort would provide a basis for enhancing analyses of the behavior of economic agents from a marketing perspective. This chapter in *The Handbook on the Economics of Retailing and Distribution* reflects progress with respect to these aims as well as a potential expansion of a platform for further advance in either discipline and with respect to each theme. In the next two sections I take up each theme independently. A brief conclusion provides perspectives that may be useful in guiding future research efforts in either discipline.

2   DISTRIBUTION SERVICES IN ECONOMICS AND MARKETING EARLY IN THE TWENTY-FIRST CENTURY

It is desirable to be precise about the meaning of the term distribution services at the outset of the discussion. In their interactions with the retail system consumers incur a variety of costs. These costs were originally described as distribution costs by Betancourt and Gautschi (1988) in their analysis of the economic function of retail firms. Nevertheless, they can also be described as transaction costs as in the tradition of Coase (1937) and Williamson (1979). These distribution or transaction costs map, not necessarily on a one-to-one basis, into a set of distribution services that differentiate stores from customers' point of view.[1]

For a broad variety of purposes, it has proven useful to map all potential distribution or transaction costs into a set of five broad distribution services. An illustration of their usefulness is their adoption as conventional wisdom in important strands of the marketing literature. For instance, Kopalle et al. (2009, p. 56) in their essay on retailer pricing and competitive effects write 'A key component of the output of retailing is a set of services, such as location, information, assortment, delivery, and ambience (Betancourt and Gautschi 1990; Betancourt 2004.)'.

Distribution Services as Outputs of Retailing

One of two fundamental reasons for their usefulness is that viewing each of these five distribution services as an essential economic function or output of retail firms or systems provides a rigorous foundation on which to build further analysis. For instance, output is an elementary concept for economists who learn in their introductory or intermediate courses that it has one very basic economic property: namely, producing higher levels of output entails higher costs.

Further progress along these lines is more nuanced but it leads us to a feature of modern retailing that affects the nature of retailing costs in a fundamental way from an economic perspective. Producing higher levels of any output can take place under either increasing, constant or decreasing returns to output, over broad ranges of output. In the first case, costs increase at a decreasing rate as output increases, or with declining marginal costs; in the second case, they increase at the same rate, or with constant marginal cost; and, in the third case, costs increase at an increasing rate as output increases, or with rising marginal costs. Of these three characterizations, the first is the most relevant in many retail settings. This feature has major economic consequences not all of which are widely appreciated.

Modern retailing is a multiproduct activity. For instance, one of the most salient trends of the last two decades of the twentieth century in US grocery retailing was the decline in the limited product variety category of traditional supermarkets from 52.1 percent of food stores sales in 1980 to 13.4 percent by 1998 and the concomitant rise of other supermarket types with much greater product variety from 16.2 percent of food stores sales in 1980 to 52.7 percent in 1998 (Betancourt 2004, p. 136, table 7.1).[2] One source of increasing returns in retailing at the store level is spreading the fixed costs of providing any or all of the five distribution services or outputs mentioned above at a higher level over a larger number of items or products offered for sale at an explicit price. Fixed costs as a source

of economies of scale in general terms, but without relating them explicitly to distribution services, have been stressed in earlier retailing literature (Ofer 1973; Shaw et al. 1989).

Economies of Scale in Retailing

Fixed costs in providing distribution services as a source of increasing returns to scale for stores can be illustrated in terms of simple, perhaps compelling examples. For instance, supermarkets provide parking facilities in terms of a parking lot or a parking garage to their customers as a means of improving accessibility of location for their clients. The costs of building and maintaining any parking facility are fixed to a very large extent. Thus, any excess capacity in the use of the parking lot or garage that can be reduced becomes a source of increasing returns to scale. The rationale is that these fixed costs can be spread over a larger number of (or higher value of) purchased items in different ways by increasing the planned levels of other distribution services in the design of a store. Assortment can be used in two different ways to increase the number or value of purchased items. The breadth of assortments can be expanded by increasing the number of broad product lines (for example, offering clothing and furniture in the same store) or the depth of assortments can be expanded by increasing the variety or type of items within a product line (for example, offering different brands within a given broad product line such as shoes).[3]

Similarly, assurance of product delivery at the desired time can be increased in two different ways to obtain a larger number of expected purchased items: (1) increase the number of checkout counters and/or of employees servicing them so additional purchases can take place within a given unit of time that a car is in the parking lot or garage; or (2) lower the probability that the customer will not find the item he or she is looking for during a given parking stay by preventing stock-outs through increased storage. In this setting building a larger store interacts with the fixed capacity of the parking lot and the checkout counter in generating economies of scale. That is, given the ratio of selling area to storage area in a store, the capacity of a store with respect to selling area increases in square terms while the capacity of a store with respect to storage area increases in 'almost' cubic terms. Since costs go up in proportion to total area, we can describe the relation between costs and capacity as $C = aS^{2/b3}$. C is costs, S is capacity, $a > 0$, and b measures 'almost'. As long as $b > 2/3$ there are economies of scale with respect to capacity.[4]

A general quadratic functional form for cost functions that can capture these features of distribution services and the quantity of items sold at the store level in simple fashion was proposed by Baumol et al. (1982). It is adapted for these purposes in equation (4.1):

$$C = C(v, X, Q, D) = C^*(v, X) \cdot [\alpha_1 Q + \alpha_2 Q^\beta + \alpha_3 QD + \alpha_4 D + \alpha_5 D^\gamma] \qquad (4.1)$$

C^* is a unit cost function for a store that depends on input prices faced by the store (v) and store cost shifters, X. Q is an index of the quantity of items sold by the store in a given calendar period and D is an index of the level of distribution services provided by the store over this period. Finally, $\alpha_1 - \alpha_5$, β, and γ are parameters. This cost function generates the expression below for returns to scale (RTS) at the store level and its parameters can be estimated with store-level data:

$$RTS = 1 + [(\beta - 1)\alpha_2 Q^\beta + (\gamma - 1)\alpha_5 D^\gamma + \alpha_3 QD]\frac{C*}{C} \qquad (4.2)$$

Increasing returns to scale at the store level require the bracketed expression to be negative. The parameters α are usually positive in the absence of cost complementarity between Q and D. Thus, increasing returns require either β or γ to be less than unity. That is declining marginal cost with respect to the quantity of items sold or distribution services, respectively. A store-level study of grocery retailing in the US shows declining marginal costs with respect to distribution services as the main source of returns to scale (Betancourt and Malanoski 1999).

Accessibility of Location and Assortment: Walmart and Big-Box Retailers

Modern retailing has also been dominated by the growth of chains and their capture of increasingly large shares of the retail market. A prime example of this process is the evolution of Walmart as a retailer. In an insightful paper Holmes (2011) empirically identifies a pattern of store expansion for Walmart as one that maintains a high store density and a contiguous store network along the way. He further notes that this was true of its initial expansion as a general merchandise retailer in the 1960s and after its introduction of the supercenter format with a full-line grocery store along the traditional general merchandise store in 1988. He explains this pattern in terms of the substantial benefits of economies of high density. The latter extend significantly beyond the benefits of savings in trucking costs and overcome any cannibalization of sales from existing stores as a result of expansion.[5]

Walmart is a vertically integrated retailer supplying its stores through its distribution centers for about 85 percent of the items sold (MWPVL International n.d.). The pattern of expansion identified by Holmes can be viewed as a strategy where Walmart is lowering its costs of providing a distribution service to itself as its own main supplier. The distribution service is accessibility of location to a supplier, measured in terms of the distance between a distribution center and a store. One aspect of this view worth emphasizing is that the impact of distribution services on retailing affects both interactions between retailers and their suppliers as well as interactions between retailers and their customers. A simple way of incorporating the interaction with suppliers at the store level through the cost equation, equation (4.1), would be either as a lowering of the subset of input prices for the affected items in v or as downward shift in one of the cost shifters in X.

More generally, however, the rise of retail chains has been accompanied by a rise in big-box general merchandise retailers of which Walmart is an important example. Basker et al. (2012) document two trends related to this association. First, stores that sell a wider breadth of products are larger and grow faster than other stores. The former stores belong to chains in the general merchandise sector; the latter stores belong to chains in other retail subsectors. Second, these general merchandise chains also operate more stores than other chains and are also growing faster in this dimension. The first dimension represents a trend toward general merchandise chains providing one-stop-shopping opportunities to their customers through higher levels of breadth of assortment in each store; the second dimension represents a trend toward general merchandise chains

providing higher levels of accessibility of location to their customers by increasing the number of stores in the geographical areas where they operate.

Both of these distribution services are what have been labeled common distribution services in that once provided they apply to all items in a store.[6] Using a panel of micro data from the Census of Retail Trade for the period 1977–2007, Basker et al. (2012) show that there is a positive and robust association between the number of within-firm product lines and the number of stores operated by a firm. To explain this correlation they develop a model based on a chain's choice of level of assortment, which they call scope, through the choice of the number of product lines in its stores, and of accessibility of location, which they call scale, through the choice of the number of stores available to its customers.

Advances in technology with respect to inventory management, logistics and distribution lower the costs of adding product lines and/or stores. These advances are captured through a technology index in the chain's cost function, which lowers coordination costs in adding additional products and/or stores. Sufficiently advanced technologies generate strategic complementarities leading to higher rates of expansion in both scale and scope for general merchandisers than for specialist retailers in their profit-maximizing game theoretic model. In addition to assuming that the chain offers the same product line in all stores, the authors postulate a variable cost function in the number of items that exhibits decreasing marginal cost in these items to obtain these results. The first assumption is broadly consistent with the evidence on the expansion of product lines provided by their data. The latter indicates that stores in general merchandise chains offer similar product lines in each of their stores. Their motivation for the second assumption, decreasing marginal cost of items, is bargaining power in negotiating with remote suppliers, for example, in less developed countries.[7]

Assurance of Product Delivery in Terms of Desired Form

Assurance of product delivery in the desired form is an aspect of distribution services that is helpful in illustrating three features of distribution services in their role as outputs of retail firms. First, it can be used to illustrate that higher output in providing a service by the retailer implies higher costs. Second, it illustrates that distribution or transaction costs can be shifted between the retailer and the consumer as a result of providing higher or lower levels of output. Finally, it illustrates the emergence of a modern retail form specializing in providing low levels of a distribution service in exchange for lower prices.[8]

One way of describing an important aspect of assurance of product delivery in the desired form is as 'breaking bulk' or, for example, retailers selling items in small rather than large packages. It usually costs more, for example in terms of the physical space required, to store the same number of items in small packages than in large packages. If a retailer chooses to provide the items in larger packages, it is transferring these costs of physical storage to its consumers. Interestingly, a retail format that specializes in providing items to consumers in large packages is one of the four categories that has grown rapidly at the end of the twentieth century, namely, warehouse clubs or super warehouses. This format is characterized by low services, low item prices, broad but shallow assortments and a club membership fee.

Forcing consumers to buy in bulk is a critical element in warehouse clubs' low service

provision that allows them to provide low prices. Another recently emphasized element of these clubs' low service provision, which also contributes to their low prices, is that their broad assortments have little or no depth. For instance, warehouse clubs and super warehouses have on average far fewer stock keeping units (SKUs) than warehouses. This means, for example, that consumers are less assured of finding a particular product at the time they visit a super warehouse store than at the time they visit a warehouse store. Costco, for example, usually has an average of fewer than 4000 SKU's in its stores (Lin 2014). Leibtag (2002) found an average number of 21 141 SKUs for the standard warehouse category. Finally, most of its profits are generated by the membership fee, which is also a factor in its ability to provide low prices (Phillips 2014).

Information, Ambience and Joint Provision of Outputs

Left until last to be discussed are two distribution services that are also essential outputs of a retail firm or establishment and share a special feature in their role as outputs. This feature is noteworthy, but for a different reason: namely, there is joint provision of the service either with other distribution services or with other activities valued by consumers. In the case of information, this feature is its joint provision with other distribution services; in the case of ambience this feature is its joint provision with leisure or consumption activities.

In the context of retailing, consumers are provided with information on the prices, characteristics, location and availability of products. The higher the level of these information services provided by a store or retailer, however, the higher will be the level of assurance of product delivery in the desired form by consumers who receive the information. That is, by providing information the retailer also provides an aspect of assurance of product delivery in the desired form. This joint provision affects the levels of both services that can be produced. In the case of online channels, for example, joint provision limits the ability of producing high levels of both services relative to offline channels for sensory dependent items (Betancourt et al. 2015).

All four distribution services discussed thus far can be viewed mainly as mechanisms for affecting customers' purchasing costs in terms of time or money directly or indirectly. By contrast, ambience is a distribution service that affects utility directly in terms of what may be described as psychic costs of interacting with the retail environment. One consequence of this difference, for example, is that the provision of this output becomes joint with the provision of consumption activities in which customers engage during their interactions with the retail environments. This feature is important for understanding outcomes in a variety of settings and it is generally unappreciated in the economics literature.

For instance, a setting where this feature becomes very salient is in the analysis of expansion of recreational facilities in regional and super-regional malls. Through this expansion, the shopping-center authority takes advantage of the external economies that these facilities generate in similar fashion to those provided by department store anchors in standard malls. The latter were emphasized by Pashigian and Gould (1998) in explaining differential rental rates per square foot of different store types in shopping centers. An analysis of consumers at three super-regional malls found that 24 percent of consumers are 'enthusiasts' who go to these malls for purchase activities, usage of the mall and experiential consumption, and 20 percent are 'grazers' who go for experiential

consumption but in so doing purchase goods and services (Bloch et al. 1994). Thus, for 44 percent of the patrons visiting these malls the ambience provided by the retailer led to their undertaking jointly purchasing and consumption activities.

Distribution Services as Fixed Inputs in Household Production Functions

The other fundamental reason for the usefulness of viewing distribution services as essential outputs of retail establishments is that these outputs can also be viewed as fixed factors or inputs in the household production functions of consumers. The household production framework can be used to generate retail demand functions for consumers with formally derived properties with respect to prices of items as well as with respect to distribution services operating as fixed factors or quantities that are the dual of prices for distribution services (Betancourt and Gautschi 1992).

One consequence of adopting this framework is the ability to show rigorously several properties of retail demand (Betancourt 2004, ch. 3): that is, increases in distribution services by a retailer increase consumer demand for the retail products of this retailer; they can also increase demand for the products of other retailers, especially when they share space in retail agglomerations; items purchased from a single retailer tend to be gross complements; and distribution services tend to be gross complements with all items in any retailer's assortment. The framework thus provides the conceptual basis for the analysis of demand with purchase data from retailers, as opposed to consumption data from consumers, and in more subtle ways for the explanation of retail demand in retail agglomerations. A very general Marshallian demand function for retail products based on the household production function framework above and adapted to highlight these features is presented in equation (4.3):

$$Q_k(A) = g_k\{\mathbf{p}(A), \mathbf{p}(B), \mathbf{D}(A), \mathbf{D}(B), f[\mathbf{p}(A), \mathbf{p}(B), \mathbf{D}(A), \mathbf{D}(B), W]\} \qquad (4.3)$$

$Q_k(A)$ is the quantity demanded of retail item k from retailer A, g_k is a Marshallian demand function that captures a two stage optimization procedure (Deaton and Muellbauer 1980). The **p**s and **D**s appearing first are vectors of prices and distribution services generating production effects as a result of changes in prices and distribution services of retailers A and B patronized by the household. The quantities of retail products chosen in the first stage are the result of an optimization where the quantities of retail products are chosen to minimize the costs of attaining given levels of consumption activities produced by the household, which include purchasing activities as part of the production process.

The **p**s and **D**s appearing within the square brackets are similar vectors generating consumption effects that lead to changes in the quantities of retail products as a result of changes in prices and distribution services inducing the household's reallocation of consumption activities in the second stage optimization. The latter maximizes utility subject to the constraint that income, W, be greater than or equal to the cost-minimizing level of using retail products and the household's own resources, including time, to attain any given level of production of these activities, that is, the cost function obtained in the first stage. The references cited above show that the consumption effects are powerful drivers towards complementarity between retail items, between common distribution services

and all retail items, and even between the retail items of different retailers in the same agglomerations.

Few studies have incorporated explicitly the aspects of retail demand developed above. One exception is Feenstra and Shapiro (2003) who rely on the model above to advocate for the use of scanner data, which measure purchases, to construct price indexes. One problem that they solve with this approach is that standard cost of living indexes are based on the measurement of consumption and cannot be applied directly to purchase data. In particular, they adapt the model above to generate an expression for the cost of living that can be computed with high frequency purchase data (weekly in their case). This expression allows them to account for the possibility of inventory behavior by consumers over a longer planning period than that for which the data is available when computing the cost of living index.

The Distribution Services Elasticity of Demand

Another exception that relies on features of the role of distribution services in retail demand is Richards (1999). This contribution can be viewed as focusing on the impact of information on retail demand. An increase of information on an item generates a distribution services elasticity of demand composed of two effects: a production effect and a consumption effect. The former effect captures the impact on the quantity of a retail product as a result of the first stage optimization. It is always positive for the own distribution service elasticity, that is, the production effect of information increases on good k increases the demand for good k. Nonetheless, the production effect can be negative, zero or positive in the cross-elasticity with other goods, that is, depending on whether these other goods are substitutes, independent or complements in production with good k, respectively. The latter effect captures the impact on the quantity of a retail product of the second stage optimization. It is always positive for normal goods. If retail items are independent or substitutes in the production of any consumption activity, then the production effect is zero or negative, respectively. Even in the case of substitutes, however, the overall effect can be positive if the consumption effect dominates the production effect.

Richards (1999) develops a dynamic household production version of the above retail demand framework, which he estimates and uses to analyze the impact of advertising expenditures by the Washington Apple Commission. Advertising expenditures are a means of providing information (one of the **D**s in the specification of retail demand in equation (4.3) above) with the property that more advertising expenditures increase the amount of information provided. Just as one would expect, the increased information on Washington apples provided by the Washington Apple Commission advertising expenditures had a positive effect on the demand for Washington apples. But, it also had a positive effect on the demand for apples from the rest of the US as well as on the demand for bananas, oranges and other fruits. The advertising campaign generated a positive own elasticity of demand for this distribution service which is substantially higher in magnitude than the cross elasticity of demand of this distribution service with respect to apples from the rest of the US, bananas, oranges and other fruit.[9] These results are consistent with the view that the consumption effect dominates the production effect in each of these cases.

In a careful and interesting study, Lewis and Reiley (2014) develop a methodology to investigate the causal effect of online advertising on online and offline sales. Relying on Yahoo users that were also in a retailer's database, the authors designed a randomized experiment to assess the impact of an online advertising campaign on online and offline sales of the retailer. A critical feature of the advertising was to promote a positive image of a store by a campaign that 'features beautiful images of products and emphasizes the name of the retail store' (Lewis and Reiley 2014, p. 236). This type of campaign provides information as a common distribution service that affects all store products in a similar manner to information on opening hours.

One relevant aspect of this feature of the campaign is that the analysis of retail demand in the references above shows that the effects of distribution services on demand are far more powerful for common distribution services that affect all items in an assortment than those of specific distribution services associated with a particular item or subset of items. Thus, the type of advertising campaign selected had the effect of maximizing the potential impact of the advertising as a mechanism to provide information to customers. While the direct experimental results are statistically weak, the authors exploit the panel feature of their data to do a difference-in-difference estimation of sales behavior before and after the campaign, which generates economically and statistically significant results of the ad campaign for total sales.

Most of the effect of online advertisements in their experiment takes place through offline sales, which they indicate will surprise some. While the authors state that the effect is 'approximately' proportional to the ratio of online to offline sales, 'approximately' has a somewhat peculiar meaning. That is, a ratio of 7:93 in terms of online to offline sales as a result of the advertisement, or a treatment effect of 7.53 percent, is viewed as the same as a ratio of 15:85, or 17.65 percent, in terms of online to offline sales when using total sales. This result is not surprising but its understanding is substantially enhanced if viewed in the context of the retail demand specification in equation (4.3) above, where A and B identify, for example, online and offline retailing, and Richards's (1999) results described earlier.

For, the increase in advertising is an increase in information through a distribution service of the online channel, let us say $\mathbf{D}(A)$ in equation (4.3) above, and, in general, would be expected to have an effect on both offline product sales and online product sales. If one were to take into account an additional aspect of distribution services in both channels, that is, assurance of acquiring the product immediately in the offline channel but not in the online one, it is not surprising that the actual effect of the advertisement on offline sales is in fact greater than proportional to its ratio in terms of total sales rather than 'approximately' the same.

Demand and Supply Come Together: Customer Satisfaction and Productivity

Bringing the demand and supply side of the analysis together provides a link with a critical variable in the marketing literature that can be applied to retailing: customer satisfaction with a retailer. Betancourt et al. (2007) show that customer satisfaction is a function of the distance between the maximum or optimal levels of distribution services demanded by customers and the levels of these services supplied by retailers. They measure distribution services with survey data for supermarkets and show that in this

sector all five broad types of distribution services discussed here impact customer satisfaction. In subsequent work, however, Betancourt et al. (2014) show that not all five broad categories of distribution services are relevant for determining customer satisfaction with gas stations, that is, the impact of distribution services on customer satisfaction varies across retail sectors.[10]

To conclude this section we discuss briefly two implications of our analysis for a subject treated at length by Ratchford in Chapter 3 of this volume, namely, productivity in retailing. Ratchford emphasizes in his analysis the difficulties in productivity measurement. One way of viewing these difficulties is as stemming from the difficulty of measuring output in retailing (Betancourt 2004, ch. 4, s. 1). In an ideal world deflated sales would be a measure of the quantity of goods or turnover in the retail sector; in a similar ideal world value added or the gross margin would be a measure of the value of net or gross service output provided by the retail sector. In reality, however, the world is not ideal, that is, does not satisfy our assumptions. Thus, any price deflator for sales captures partially the effect of distribution services. Similarly, economies of scale render value added or the gross margin to be measures of service output that are affected by the quantity of goods sold. In sum, it is impossible to reduce two different types of outputs (quantity sold and distribution services) to a single aggregate perfectly.

Ratchford also discusses the functional shifting between retailers and their suppliers and retailers and their customers in his analysis of productivity. These interactions are implemented by changing levels of distribution services. A second implication for productivity is easy to see from an analysis based on distribution services, namely, the functional shifting implemented by changing the level of distribution services can render the usual positive association between increases in productivity and increases in welfare dubious or misleading if not erroneous.

We illustrate this with an example. Suppose that, over a given time period, the number of establishments entering the retail sector is half the number of establishments exiting the retail sector and that entrants are located twice as far as the exiters from the median, modal or mean patron. Suppose, further, that each entering establishment carries twice the number of items as each exiting establishment and employs twice the number of workers.[11] Productivity has not changed, according to the usual measures used in manufacturing, but if store patrons value their time traveling to and from the store their welfare is substantially decreased.

Accessibility of location is a distribution service that can be shifted between the retailer and the customer, and its value to customers is not captured in the national income accounts. If the same example arises between a wholesaler and a retailer, welfare is not affected. A possible way of incorporating this issue in the analysis of productivity would be through time use data that is increasingly available, for example, the American Time of Use Survey (ATUS) data sponsored by the Bureau of Labor Statistics since 2003. To my knowledge, this source of potential divergence between measured productivity improvements and consumer welfare in retailing has not been addressed in either the marketing or the economics literature.

3 DISTRIBUTION SERVICES AND RETAILING IN THE NOT SO EARLY TWENTY-FIRST CENTURY

In this section we bring out an essential difference between the retailing of goods and the retailing of services and relate this difference to a characteristic of the provision of distribution services that is fundamentally affected by technological change associated with the Internet. We also discuss the impact on retailing of a particular type of contract, relational contracts, that has been emphasized in the twenty-first century literature on organizational economics (Gibbons and Roberts, 2013).[12]

Specifying the Profit Equation for Goods and for Services

One way of thinking about the differences between the retailing of goods and the retailing of services is in terms of how demand and supply are brought together in the specification of the profit equation. In the retailing of goods one has a choice between separating the costs of production from the costs of distribution or lumping them together. In the retailing of services it is often perceived as impossible to separate the costs of production from the costs of distribution.

When retailing goods it is straightforward, frequent and convenient to specify profits for a store, for example, as follows:

$$\Pi = \mathbf{p_R} * Q - C_R(\mathbf{v}, D, Q) - p_W * Q \qquad (4.4)$$

where Q is a vector of the quantities demanded of goods from the store, which are assumed to equal the quantities supplied, C_R is a retailing cost function, and D is a vector of distribution services supplied by the store. The equation has two price vectors, $\mathbf{p_R}$ for retail prices and $\mathbf{p_W}$ for the corresponding wholesale prices, which may be those of the retailer acting as a supplier of its own private label. The term $p_W * Q$ is often referred to as the cost of goods sold, and $\mathbf{v}$ is a vector of the prices of inputs used in generating the services of retailing leading to the cost function in equation (4.4).

Specification of the profit equation with respect to the retailing of services for a store is normally done, however, in terms of the following equation:

$$\Pi = \mathbf{p_R} * Q - C_S(\mathbf{v^*}, D, Q) \qquad (4.5)$$

where Q is, as before, a vector of the quantities of core services demanded from the store, C_S is now a cost function that captures the activity levels associated with providing the distribution services of retailing, D, jointly with those of producing the quantities of core services demanded. Core services are the ones the customer pays for explicitly. Now $\mathbf{v^*}$ is a vector of prices of inputs that includes those required to produce distribution services, just as before, and the ones needed to produce the core services.

Why the difference? One reason is the frequent assumption in the services literature that it is impossible to separate the production and consumption of services in space and time. If services have to be produced and consumed simultaneously in space and time, when retailing services one can implement (4.5) by looking at distribution and production as one activity. In the context of (4.4) the concept of costs of goods sold becomes

costs of services sold, which is difficult to measure. Thus, in the provision of restaurant meals or haircuts consumption takes place where and when the service is produced and a separate role for distribution or direct measurement of the costs of core services sold is eliminated. The marketing literature tends to emphasize this assumption (for example, Zeithalm and Bitner 1996).

Betancourt and Gautschi (2001) challenged this standard assumption and pointed out that modern ICT allowed the separation of production, distribution and consumption of many core services as well as of aspects of distribution services from the core services. For instance, teleconferencing allows separation of the production, distribution and consumption of core services such as a lecture (and other types of information provision) across space and time. Keh and Pang (2010) relied on these ideas to provide experimental evidence that spatial separation matters to customers. More precisely, they show that it matters differently for different types of core services entailing different levels of tangibility, for example, restaurant meals are more tangible than medical services.

Online Retailing and its Economic Impact

Awareness of the potential impact of ICT in terms of the Internet and associated technological developments on retailing has been increasing rapidly in the early twenty-first century. An important reason is a realization of the extent of its potential economic impact owing to its substantial growth rate. For instance, in 1999 e-commerce amounted to 0.5 percent of retail sales and in 2009 it had grown to 4 percent, according to US Bureau of the Census (2001, table 1038; 2011, table 1055).[13] While the growth rates of over 20 percent of the first decade of the twenty-first century are impossible to maintain, the expected growth rates over the second decade are still substantial. For instance, Forrester research estimates that by 2017 Internet sales will be 10.3 percent of total US retail sales, which implies a continued double-digit growth rate, and 60 percent of total retail sales will involve the Internet in some way (Dusto 2013).

In addition, the impact of ICT on retailing is underestimated by those figures, since they only refer to the retail trade. Yet a substantial amount of retailing activity is included in other sectors and the Internet is also penetrating these sectors, for example, retail banking. Even sectors not normally associated with retailing are sensitive to the impact of the Internet on the retailing of their services. For instance, The National Association of Realtors was taken to court by the Justice Department for limiting the information available through their Multiple Listing Service that could be obtained through the Internet. The case was settled in 2008 (Setzer, 2008).

Online retailing also leads to greater variety of organizational forms in both brick-and-mortar retailing and non-store retailing. These different forms affect different retail sub-sectors in economically important manners. For instance, a very well-known example is in the retailing of books where online retailing made feasible by ICT has generated retail forms that have altered dramatically competitive boundaries. That is, ICT has generated new formats operating exclusively as online retailers, for example, Amazon. It has led standard formats to become multichannel retailers that include online channels and expand product offerings, for example, Barnes & Noble. Finally, it has also led to the disappearance of large firms as exclusive brick-and-mortar channels, for example, Borders. A wide variety of similar processes have taken place in other retail subsectors.[14]

Separability of Distribution Services in Retailing

One common feature to all forms of online retailing, however, has not been explicitly noticed until recently, namely, online retailing allows separability of production, distribution and consumption of all distribution services across space and time (Betancourt et al. 2015). Perhaps the best way to illustrate this feature is in terms of an example. Consider a retailer distributing one type of product that falls into the category of goods, for example, books, over a certain geographical area such as a country. It can do so offline through brick-and-mortar stores or it can do so online or in combination. To keep matters simple in the comparison, let us consider an exclusively offline system to be compared with an exclusively online system. Again for simplicity's sake let us focus initially on spatial separability. Under both alternatives, the same five broad types of distribution services mentioned in the previous section have to be provided; what will differ is the manner in which they are provided.

Accessibility of location for acquiring the product in the offline case requires the retailer to place stores near subsets of customers so they can patronize them at reasonable individual transportation costs to acquire the product. The production of this distribution service takes place at each store jointly with its distribution when the product is available, and jointly with consumption of the service at the time the consumer patronizes the store to acquire the product. In the online case, consumption of accessibility of location usually takes place at the customer's home when the product is delivered. Distribution of accessibility of location for any good is completed by the retailer and takes place wherever the purchase activity and the logistics of delivery are set in motion. Production of accessibility of location takes place wherever the logistics system is designed for the particular type of good in question.

From the point of view of potential separability across space the production distribution and consumption of assortment, assurance of product delivery and ambience are the same for the brick-and-mortar store. That is, production of these three distribution services occurs wherever the store is designed but distribution takes place at whatever sites the stores are built and consumption of these distribution services must also take place at these sites. In the online case, production of these three services also takes place where the system is designed, but distribution takes place wherever the products are made available in cyberspace through the launching of the website and consumption takes place wherever the customer is located when it patronizes the website.

Information, except that provided through advertising, is usually produced, distributed and consumed jointly in space for brick-and-mortar stores. For instance, in-store information through sales personnel is generated by the sales person at the store where it is distributed to the customer and also consumed by the customer. By contrast information about a good in the online channel is produced wherever the website is designed. It is distributed wherever the latter is placed in cyberspace; and it is consumed wherever the consumer is located when patronizing the website. Advertising is an exception because it has been feasible to separate the production, distribution and consumption of the information generated in this way prior to the development of modern ICT. For instance, the production, distribution and consumption of television advertisements can take place separately in space (or time).

Finally, there is no difference in terms of separability in time between offline and online provision of distribution services except for in-store information. It is usually feasible to separate the production, distribution and consumption of these distribution services in time. In-store information, however, usually must be produced, distributed and consumed jointly in time, especially in the case of its provision by sales personnel. Nonetheless, even in this case, exceptions can be found. For instance, if the sales person provides information in the form of a pamphlet, this can break the jointness of production, distribution and consumption of information (through the pamphlet) in both space and time.

Two Important Economic Consequences of Separability

Two important characteristics of distribution services in the case of brick-and-mortar stores are, first, that usually all five services are provided in a bundle at whatever levels the retailer chooses for all customers who patronize a given store and, second, that none of these services are explicitly priced. A key feature of online retailing is that accessibility of location is unbundled from the rest of the distribution services provided by the retailer and this distribution service is usually explicitly priced. Another way of putting it is that online retailing allows both the level at which this particular distribution service is provided and the price of the service to be customized at the individual level.

Customers find the higher level of accessibility of location provided by online channels to be an attractive feature but it depends on price (Lewis et al. 2006). Online retailers benefit from the ability to reach geographic market segments not previously available, especially since customers in these segments are now paying an explicit price for the costs of accessing the retailer (for example, shipping costs). While it may be that some market areas are sufficiently remote and inaccessible not to be served, any single retailer can serve a bigger market area than before ICT made feasible the separability of production, distribution and consumption of this distribution service across space through online retailing.

In the previous section we noted that expansion of a common distribution service (that applied to all items) usually made more profitable the expansion of other common distribution services. In the online setting this manifests itself very powerfully with respect to assortment. For example, in the case of books, Brynjolfsson and Smith (2000) note that a Barnes & Noble superstore has an assortment of 175 000 titles but online they have an assortment of 3 million titles. This example reflects a far more general phenomenon than what happens in one retail industry. This phenomenon can be illustrated easily using the cost function for the distribution of goods in equation (4.4) as our starting point.[15]

Suppose a retailer has 1000 stores in a geographical area and to keep matters simple assume it requires ten distribution centers or warehouses to supply these stores. That is, the assortments provided in each of these stores, whatever their level, require a number of warehouses to supply them. The ratio of one warehouse per 100 stores is within the range of 50–125 given for Walmart (Inland Empire Warehouses, 2015). We can write the cost function for the brick-and-mortar retailer as:

$$C_{B\&MR} = \sum_i C_i(v, D, Q) + \sum_j WC_j(\tilde{v}, \tilde{D}, \tilde{Q}) \qquad (4.6)$$

where $i = 1, \ldots, 1000$ indexes stores, $j = 1, \ldots, 10$ indexes warehouses, C is the cost function for a store and WC represents the cost function for a warehouse. The corresponding equation for the online retailer would be:

$$C_{OR} = \sum_j WC_j(\hat{v}, \hat{D}, \hat{Q}) + C(online\ retailing) \qquad (4.7)$$

Simply put, online retailing eliminates the costs associated with providing a given level of assortment and other distribution services for each of 1000 stores at the expense of adding the mainly fixed costs of setting up the online channel. At the same level of assortment and turnover the enormous cost savings from eliminating 1000 stores provides a tremendous cost advantage for the exclusively online channel relative to the brick-and-mortar channel. Not surprisingly, this also provides a powerful incentive to expand assortments in terms of depth and/or breadth while leaving more than enough room to cover the new costs associated with the online channels and accommodating the increases in costs at the warehouse level from additional types of products and turnover to reach more customers.

While there might be economies in other distribution services associated with the online channel, those on assortment are extremely powerful in providing incentives for a higher level of the service, because the expansion of assortment impacts directly all other existing items by the mere introduction of a new product. For other distribution services, their expansion would usually impact directly only a particular item or type of item. For example, the expansion of information on characteristics of one item is specific to that item. Thus, even if made cheaper by online retailing, it has no direct impact on demand for other items. This role of assortment as a common distribution service makes it particularly attractive to illustrate how the tendency for expansion in one common distribution service (accessibility of location) brought about by online retailing provides incentives for expansion in another common distribution service.

Distribution Services, Franchises and the Retailing of Services

Franchises are organizational forms where agents operate in between the vertical integration features of within-firm incentives and the arm's length features of between-firms incentives associated with markets. Distribution services also play an important role in franchises. This role is not always understood for a variety of reasons. For instance, sometimes the existence of two very different types of franchise organizational forms – product trade name franchises and business format franchises – is ignored. At other times the existence of very different types of contracts in these organizational forms is ignored.

In product trade name franchises a physical good is one of the primary products transacted between the franchiser and the franchisee for distribution to consumers. In business format franchises a process or way of doing things is one of the basic products transacted between the franchiser and the franchisee for the distribution usually but not always of a service to consumers. The contracts within and between both types of franchises differ in various ways, an important one being that some differences are directly related to which agent, the franchiser or the franchisee, is providing a relevant distribution service to consumers.[16]

For instance, when a franchiser provides a distribution service to consumers which

increases demand for franchisees, Lal (1990) shows that a royalty fee becomes necessary as a mechanism to ensure channel coordination. It assures the franchisee of profits by providing incentives for the franchiser to continue to invest in the brand name, for example, by providing information on attractive qualities of the product or the brand. For this reason, royalty fees are common in lessee–dealer contracts for gas stations but none of the other incentive features in contracts, such as fixed initial investments, are.

By contrast royalty fees are absent in automobile dealer contracts, which is also an example of a product trade name franchise.[17] What is a common feature of the contract in this industry is the requirement of a significant initial investments by the franchisee in inventory, showrooms and repair facilities. These investments assure the manufacturer or franchisor that the franchisee will provide a high level of assurance of product delivery in both the short run and the long run, which helps maintain the brand name. When we turn to business format franchise contracts, however, we find royalty fees, a substantial initial investment in the franchise and a franchise fee as the three most common incentive features in contracts. They are included in 80 percent of business format contracts (International Franchise Association 2000). Thus, incentives for the provision of distribution services by the franchisor (royalty rates) or the franchisee (substantial initial investments) are important features of 80 percent of business format franchise contracts.[18]

Finally, the incentive features of franchise contracts are revealing about the differences between the retailing of goods and the retailing of services noted at the beginning of this section in connection with profit equations (4.4) and (4.5). Dnes's (1992) case studies identified three business format franchises that were distributing a physical product rather than a service and five that required a specialized input provided by the franchiser. In both of these settings the franchiser has an additional instrument (the wholesale price or the specialized input price) to obtain optimal levels of a distribution service that needs to be provided by a franchisee. Rao and Srinivasan (1995) found that franchises retailing services to customers charged higher royalty rates than those retailing goods, which raises the question of whether high royalty rates are sufficient to attain an optimal level of provision of the distribution service by the franchisee. An alternative is that it is a second-best strategy resorted to because of the measurement limitations in retailing services as a core product and the lack of an additional instrument.

Business Format Franchises and Relational Contracts

One way of approaching the issue just raised is by asking the question, to what extent should the contracts underlying business format franchises be viewed as relational contracts? Relational contracts are informal agreements and unwritten codes of conduct that powerfully affect behavior within and between firms (Baker et al. 2002). This is certainly the situation for franchises which are based on long-term contracts.

Enforcement costs may be high in franchise contracts owing to the existence of high monitoring costs or the inability to observe effort of franchisees or franchisers in providing distribution services at optimal levels from the point of view of the franchise system. Sertsios (2015) provides evidence that these features matter and are important in franchising. He examines the use of initial investments in franchise contracts as a bonding mechanism to sustain relations between business partners, namely, to sustain what amounts to a relational contract between franchiser and franchisees. An essential feature

of his contribution is that the use of the initial investment as a bonding mechanism should depend on the magnitude of the investment as a key variable. For, it would affect the loss in value if the relation is terminated. This feature makes feasible the empirical testing of the initial investment as a bonding mechanism hypothesis.

The actual test of the hypothesis relies on data on franchise contracts and the need for the franchisees to provide a certain level of the distribution service assurance of product delivery through what he calls 'sales effort' in order to preserve the franchiser's brand value. This effort is non-contractible. If initial investments play a role as a bonding mechanism, franchisers should ask franchisees to invest more, thus providing a higher level of the distribution service, when the franchisees have weaker incentives to do so. Using data on contract terms from the *Handbook of Franchise Opportunities* during a period where laws on good cause termination were passed in several states, Sertsios applied the differences in differences empirical methodology.

Sertsios (2015) establishes that in states where the laws were passed, thus weakening incentives to exert effort by lowering termination costs, the amount of initial investments in the contract terms were raised. He provides robustness checks and considers alternative explanations. Both of these support his original interpretation. The latter suggests that franchise contracts operate as relational contracts by providing incentives for franchisees to provide a level of distribution services consistent with the expectations of the franchiser.

Dietz (2015) argues that the Internet, contrary to expectations, makes relational contracting more viable. He develops the hypothesis inductively from a survey of software companies working across national boundaries. He reports statements indicating that variations in legal systems render contract enforcement across countries illusory, which provides a rationale for demanding relational contracts due to their self-fulfilling nature through the incentives provided. The feasibility of these contracts is enhanced through the Internet via two mechanisms. First, the enhanced ability to communicate information allows firms to monitor two distribution services – in our terminology, assurance of product delivery at the desired time and in the desired form – far more efficiently than before across national borders. Second, the Internet enhances the role of reputational networks, since performance evaluations travel far more quickly and reach more efficiently those in need of the information.

Business format franchises operate across international borders and the use of ICT across different franchise sectors varies. This provides a setting where it might be possible to provide evidence on the general validity of Dietz's argument at a relatively simple level. The preceding discussion would suggest an increased penetration of business format franchises internationally as a result of the spread of the Internet. With access to suitable data in different franchise sectors one can observe whether there is an acceleration of expansion across international borders relative to within border expansion as a result of the adoption of ICT technologies in different franchise sectors.

4 CONCLUDING REMARKS

Reliance on the Internet and associated ICT allows the separation of production, distribution and consumption of distribution services across space and time. This separability

provides a basis for a variety of novel developments in organizational forms that will continue to characterize the evolution of retailing and distribution in the twenty-first century. Understanding these developments is facilitated by thinking in terms of distribution services as outputs of retailing and as fixed inputs into the household production functions of consumers; ignoring these features of distribution services can impede our understanding of these developments.

For instance, the dynamic evolution of firms made feasible by modern technological change and the drive to pursue new profit opportunities generates organizational forms very different from the original organizational forms. For example, Amazon started as a book distribution company and we have emphasized its features as such in our discussion in the previous sections. Nonetheless, in its search for profit opportunities it has evolved into a multidimensional producer of a variety of services, ranging from speedy delivery through Prime Now to producer of television series. Furthermore, Amazon is not the only firm that starts as a specialized retail firm online and evolves into a multidimensional provider of a wide variety of services.

One of the new strictly online organizational forms that has emerged early in the twenty-first century are private sales clubs, which are also referred to as online flash sales or event sales. From our perspective, private sales clubs can be described as providing assurance of product delivery in the desired form, which entails attractive brands or services at discounted prices, in exchange for forgoing timeliness in fashion and/or in delivery time.[19] While some continue to operate in a manner quite similar to the original format, others have evolved substantially beyond the original format in response to profit opportunities.

These clubs arose as strictly online versions of specialized brick-and-mortar sales sites. The French firm credited with introducing the format (Vente Priveé) was founded in 2001. Its main characteristics initially were the provision of off-season apparel items at heavily discounted prices to club members through an auction mechanism, reminiscent of e-Bay's, where the information on availability was provided via email (for example, Martinez and Kim, 2012). In 2007 the format emerged in the US, that is, Gilt Groupe (Gilt 2015). Nevertheless, it quickly expanded into a different variant of this format. In a number of ways it has extended and adapted the format range from providing items and services beyond discounted apparel to providing its own version of prestige brands for some services all over the world.

More recently, with the development of mobile technologies, new firms have come into existence exploiting separability to provide assurance of product delivery in the desired form in new ways that bypass established formats, for example, Uber taxi services, or addressing more subtle dimensions of distribution services. For instance, in the case of same-day delivery the Chief Executive Officer of Deliv, Daphne Carmell, pointed out that what customers demanded was not necessarily speed but convenience of time and place at which to receive the delivery service (Halzack, 2014). From our perspective, this is a combination of assurance of product delivery at the desired time of day jointly with accessibility of location, which is not necessarily delivery to the home. Thus, another reason it is difficult to understand the common role of separability in generating these developments is the different and subtle dimensions in which particular distribution services, by themselves or in combination with other distribution services, impact choices by suppliers and customers.

I conclude the discussion by relating a consequence for retailing of the separability of distribution services across space generated by modern technology through the Internet to a general consequence of modern technology emphasized in the literature on the marketing of services. The latter strand of literature stresses the importance for marketing services of the role of information technologies defined to include information, communication, mobile and networking (Huang and Rust 2013). These technologies can be viewed as a mechanism for providing customization quality. Early contributions in this literature suggested that standardization quality is more relevant for goods while customization quality is more relevant for services (Anderson et al. 1997).

Since retailing in particular and distribution in general are viewed as service sectors, it is reasonable to ask, what does one mean by customization quality in retailing? An important aspect of the answer is the provision of maximum levels of the distribution service accessibility of location. Spatial separability in the production, distribution and consumption of distribution services made feasible by the Internet is critical in providing customization quality to consumers at very high levels in the retailing of both goods and services. It is what allows maximum customization quality in the form of accessibility of location to be feasible. Moreover, it also illustrates a related feature of the impact of technical change in general as it applies to retailing.

In general the consequences of technical change at a particular point in time are dependent on other factors. In the case of retailing, improvements in the nature of relational contracts for delivery services and in transportation infrastructures are critical in determining the actual level of the customization quality through accessibility of location that can be provided by retailers to customers. The case of retailing also illustrates that for some distribution services, for example, assurance of product delivery in the desired form for sensory dependent items, the actual level of customization quality that can be provided through the new technology, by itself, may be lower than what could have been provided by the old technology.

NOTES

*   I would like to thank the editor, Emek Basker, for stepping well beyond the bounds of normal editorial efforts in providing comments that substantially increased the clarity of this chapter. Any remaining obscurities are solely the author's responsibility.
1. A recent contribution notes that distribution or transaction costs also lead to differentiation among offline/online channels and it analyzes their impact on channel choice for selected items in various product categories from the same chain of grocery stores in Spain (Chintagunta et al. 2012).
2. The number of stores increased for both categories during this period although the increase in the broader product variety category took place at a much faster rate. For a discussion of these and other trends in supermarkets, see Ellickson, in Chapter 15 in this volume; for a discussion of trends among general-merchandise retailers and their impact on food retailing, see also Chapter 17, by Carden and Courtemanche, also in this volume.
3. Assortment depth varies dramatically across stores, even within a single chain. Hickman and Mortimer, in Chapter 13 of this volume, discuss the implications of assortment variation for demand estimation.
4. The capacity cost function suggested here is adapted from one used for pipelines (Chenery 1952). More generally, the sources of economies of scale described in these two paragraphs illustrate why the term economies of massed reserves is sometimes applied to retailing (Oi 1992).
5. Holmes argues (2011, p. 257), 'An economy of density is kind of an economy of scale'. It captures a difference between economic incentives for a firm adding more stores in new markets, previously unserved by the firm, and adding more stores in markets where there is some overlap with the firm's existing stores.

6. It follows from simple profit maximization at the store level that expansion of a common distribution service provides incentives for expansion of other common distribution services (Betancourt 2004: prop. 5.4).
7. The previously mentioned results in Betancourt and Malanoski (1999) also provide evidence of decreasing marginal costs with respect to the number of items even though distribution services are the major source of economies of scale at the store level. In terms of equation (4.2), estimates of β range from .96 to .98 while estimates of γ range from .46 to .58.
8. Assurance of product delivery also has other dimensions that will be discussed in the next section emphasizing the Internet, for example, at the desired time. This usually means the ability of a customer to acquire an item at the time of purchase. It generates an intrinsic difference between brick-and-mortar sales and online sales, since immediate acquisition is usually impossible online.
9. All the effects are statistically significant at the 5 percent level. Other estimates in the paper suggest that apples from the rest of the US as well as bananas and oranges are substitutes for Washington apples.
10. For a discussion of other special features of gas stations, see Chapter 16 in this volume, by Noel.
11. This is intended only as a thought experiment. The number of retail establishments has, in fact, increased rather than declined, as shown by Foster et al. in Chapter 1 of this volume. Of course, in some retail subsectors, for example, traditional supermarkets, the number of establishments has decreased substantially since the 1980s.
12. Smith and Zentner discuss some of the same issues I raise here from a different perspective in a chapter devoted to e-commerce later in this volume (Chapter 18).
13. We are ignoring wholesaling for simplicity, but ICT's impact on wholesaling started before its impact on retailers, for example, by 1999 e-commerce already represented 5.3 percent of total retail sales by merchant wholesalers (US Bureau of the Census, 2001, table 1039). Incidentally, e-commerce is usually defined to include the Internet, extranet, electronic data interchange (EDI) or other online systems.
14. Incidentally, online retailing takes place through a variety of devices, including tablets and mobile phones as well as computers. Our arguments apply regardless of the device used to connect to the Internet. Conceptually, the mobility associated with some of the newer devices simply strengthens our argument in the next subsection.
15. Incidentally, the inability to separate the costs of distribution from the costs of production in the typical specification for services, equation (4.2), would render the illustration impossible.
16. A more detailed discussion of the general issues is available in Betancourt (2004, ch. 9).
17. For a discussion of franchising in the context of automobile dealerships, see also Chapter 14 in this volume, by Murry and Schneider.
18. Franchise fees are viewed by both franchisers and franchisees in Dnes's case studies (1992) as covering initial set-up costs. This is also the interpretation provided by Lafontaine (1992) to explain the lack of an empirical relationship between the franchise fee and the royalty rate.
19. An interesting example of a novel strictly online organizational form in the wholesale sector that can be similarly described is Mercachef (Cruz Roche 2012). The latter is a virtual wholesaler in Spain designed to attract high-quality restaurants by providing assurance of product delivery in the desired form (in terms of freshness in this case) not feasible through brick-and-mortar wholesale sites.

REFERENCES

Anderson, E.W., C. Fornell and R. Rust (1997), 'Customer satisfaction, productivity and profitability: differences between goods and services', *Marketing Science*, **16** (2), 129–45.

Baker, G., R. Gibbons and K.J. Murphy (2002), 'Relational contracts and the theory of the firm', *Quarterly Journal of Economics*, **117** (1), 39–84.

Basker, E., S. Klimek and P.H. Van (2012), 'Supersize it: the growth of retail chains and the rise of the big-box store', *Journal of Economics & Management Strategy*, **21** (3), 541–82.

Baumol, W., J. Panzar and R. Willig (1982), *Contestable Markets and the Theory of Industry Structure*, New York: Harcourt, Brace, Jovanovich.

Betancourt, R. (2004), *The Economics of Retailing and Distribution*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.

Betancourt, R. and D. Gautschi (1988), 'The economics of retail firms', *Managerial and Decision Economics*, **9** (2), 133–44.

Betancourt, R. and D. Gautschi (1990), 'Demand complementarities, household production and retail assortments', *Marketing Science*, **9** (1), 146–61.

Betancourt, R. and D. Gautschi (1992), 'The demand for retail products and the household production model:

new views on complementarity and substitutability', *Journal of Economic Behavior and Organization*, **17** (2), 257–75.

Betancourt, R.R. and D.A. Gautschi (2001), 'Product innovation in services: a framework for analysis', in M. Baye and J. Nelson (eds), *Advertising and Differentiated Products. Vol.10 in Advances in Applied Microeconomics*, Oxford: Elsevier Science, pp. 155–83.

Betancourt, R. and M. Malanoski (1999), 'An estimable model of supermarket behavior: prices, distribution services and some effects of competition', *Empirica*, **26** (1), 55–73.

Betancourt, R., R. Chocarro, M. Cortiñas, M. Elorz and J. M. Mugica (2014), 'The impact of market environments on marketing relationships', *International Journal of Marketing Studies*, **6** (1), 45–65.

Betancourt, R., R. Chocarro, M. Cortiñas, M. Elorz and J. M. Mugica (2015), 'Channel choice in the 21st century: the hidden role of distribution services', *Journal of Interactive Marketing*, forthcoming.

Betancourt, R., M. Cortiñas, M. Elorz and J.M. Mugica (2007), 'The demand for and the supply of distribution services: a basis for the analysis of customer satisfaction in retailing', *Quantitative Marketing and Economics*, **5** (3), 293–312.

Bloch, P., N. Ridgeway and S.A. Dawson (1994), 'The shopping mall as consumer habitat', *Journal of Retailing*, **71** (1), 23–42.

Brynjolfsson, E. and M.D. Smith (2000), 'Frictionless commerce? A comparison of internet and conventional retailers', *Management Science*, **46** (4), 563–85.

Chenery, H. (1952), 'Overcapacity and the acceleration principle.' *Econometrica*, **20** (1), 1–28.

Chintagunta, P., J. Chu and J. Cebollada (2012), 'Quantifying transaction costs in online/off-line grocery channel choice', *Marketing Science*, **31** (1), 96–114.

Coase, R. (1937), 'The nature of the firm', *Economica*, **4** (16), 386–405.

Cruz Roche, I. (2012), 'Diseño de una plataforma virtual para el comercio mayorista de alimentos frescos' ('Design of a virtual platform for wholesale distribution of fresh food'), in R. Vázquez, J.A. Trespalacios, E. Estrada, C. González (coordinadores), *Estrategias multicanal en el ámbito de la distribución: fabricante y distribuidor preocupados por ofrecer nuevas experiencias de compra diferenciadas* (*Multichannel Strategies in the Area of Distribution: Manufacturers and Distributors Concerns about Offering New Experiences for Heterogeneous Purchases*), Oviedo: Cátedra Fundación Ramón Areces de Distribución Comercial, pp. 299–312.

Deaton, A. and J. Muellbauer (1980), *Economics and Consumer Behavior*, London: Cambridge University Press.

Dietz, T. (2015), 'Transnational business and relational contracting 2.0', Zentra Working Papers in Transnational Studies, No. 45 (January), Bremen and Oldenburg universities.

Dnes, A.W. (1992), *Franchising: A Case Study Approach*, Aldershot: Ashgate.

Dusto, A. (2013), '60% of US retail sales will involve the Web by 2017', accessed 26 August 2014 at http://www.internetretailer.com/2013/10/30/60-us-retail-sales-will-involve-web-2017.

Feenstra, R. and M. Shapiro (2003), 'High frequency substitution and the measurement of price indexes', in R. Feenstra and M. Shapiro (eds) *Scanner Data and Price Indexes*, Chicago, IL: Chicago University Press, pp. 123–46.

Gibbons, R. and J. Roberts (2013), *The Handbook of Organizational Economics*, Princeton, NJ: Princeton University Press.

Gilt (2015), 'Our story', accessed 20 March 2015 at http://www.gilt.com/company/our_story.

Halzack, S. (2014), 'With Prime Now, Amazon promises goods in 2 hours', *Washington Post*, 19 December, p. A12.

Holmes, T. (2011), 'The diffusion of Wal-Mart and economics of density', *Econometrica*, **79** (1), 253–302.

Huang, M.-H., and R.T. Rust (2013), 'IT-related service: a multi-disciplinary perspective', *Journal of Service Research*, **16** (3), 251–8.

Inland Empire Warehouses (2015), 'Distribution-warehouse', accessed 20 March 2015 at http://www.inlandempirewarehouses.com/distribution-warehouse/.

International Franchise Association (2000), *The Profile of Franchising: A Statistical Abstract of 1998 UFOC Data*, available at http://www.mountpleasantcapital.com/Docs/Profile%2001%20Introduction%20and%20Background.pdf (accessed 14 August 2015).

Keh, H.T., and J. Pang (2010), 'Customer reaction to service separation', *Journal of Marketing*, **74** (2), 55–70.

Kopalle, P., D. Biswas, P. Chintagunta, J. Fan, K. Pauwels, B. Ratchford and J. Sills (2009), 'Retailer pricing and competitive effects.' *Journal of Retailing*, **85** (1), 56–70.

Lafontaine, F. (1992), 'Agency theory and franchising: some empirical results', *RAND Journal of Economics*, **23** (2), 263–83.

Lal, R. (1990), 'Improving channel coordination through franchising.' *Marketing Science*, **10** (4), 299–318.

Leibtag, E. (2002), 'Determinants of retail price margins and quality adjustments of price indices in retail food stores', PhD dissertation, University of Maryland, College Park.

Lewis, M., V. Singh and S. Fay (2006), 'An empirical study of the impact of non-linear shipping and handling fees on purchase incidence and expenditure decisions', *Marketing Science*, **25** (1), 51–64.

Lewis, R. and D. Reiley (2014), 'Online ads and offline sales: measuring the effects of online advertising via a controlled experiment on Yahoo', *Quantitative Marketing and Economics*, **12** (3), 235–66.

Lin, M. (2014), 'Why less choice means more profits for these warehouse-club operators', *Motley Fool*, http://www.fool.com/investing/general/2014/01/24/why-less-choice-means-more-profits-for-these-wareh.aspx (accessed 12 August 2015).

Martinez, B. and S. Kim (2012), 'Predicting purchase intention for private sales sites', *Journal of Fashion Marketing and Management*, **16** (3), 342–65.

MWPVL International (n.d.), 'Direct store delivery vs centralized distribution', accessed 19 March 2015 at http://www.mwpvl.com/html/dsd__vs_central_distribution.html.

Ofer, G. (1973), 'Returns to scale in the retail trade', *Review of Income and Wealth*, **19** (4), 363–84.

Oi, W. (1992), 'Productivity in the distributive trades: the shopper and the economies of massed reserves', in Z. Griliches (ed.), *Output Measurement in the Service Sector*, Chicago, IL: Chicago University Press, pp. 161–93.

Pashigian, B. and E. Gould (1998), 'Internalizing externalities: the pricing of space in shopping malls', *Journal of Law and Economics*, 41 (1), 115–42.

Phillips, A. (2014), '7 reasons why Costco continues to thrive amid retail uncertainty', *Business Review USA*, http://www.fool.com/investing/general/2014/01/24/why-less-choice-means-more-profits-for-these-wareh.aspx (accessed 12 August 2015).

Rao, R.C. and S. Srinivasan (1995), 'Why are royalty rates higher in service-type franchises?', *Journal of Economics and Management Strategy*, **4** (1), 7–31.

Richards, T. ((1999), 'A dynamic model of fresh fruit promotion: a household production approach', *American Journal of Agricultural Economics*, **81** (1), 195–211.

Sertsios, G. (2015), 'Bonding through investments: evidence from franchising', *Journal of Law, Economics & Organizations*, **31** (1), 181–212.

Setzer, G. (2008), 'NAR and DOJ reach 10-year settlement of MLS anti-trust suit', *Mortgage News Daily*, http://www.mortgagenewsdaily.com/5282008_NAR_MLS_Changes.asp (accessed 12 August 2015).

Shaw, S., D. Nisbet and J. Dawson (1989), 'Economies of scale in UK supermarkets: some preliminary findings', *International Journal of Retailing*, **4** (1), 12–26.

US Bureau of the Census (2001), *Statistical Abstract of the United States*, Washington, DC: Department of Commerce.

US Bureau of the Census (2011), *Statistical Abstract of the United States*, Washington, DC: Department of Commerce.

Williamson, O. (1979), 'Transaction-Cost economics: the governance of contractual relations.' *Journal of Law and Economics*, **22** (2), 233–61.

Zeithalm, V.A. and M.J. Bitner (1996), *Services Marketing*, New York: McGraw-Hill.