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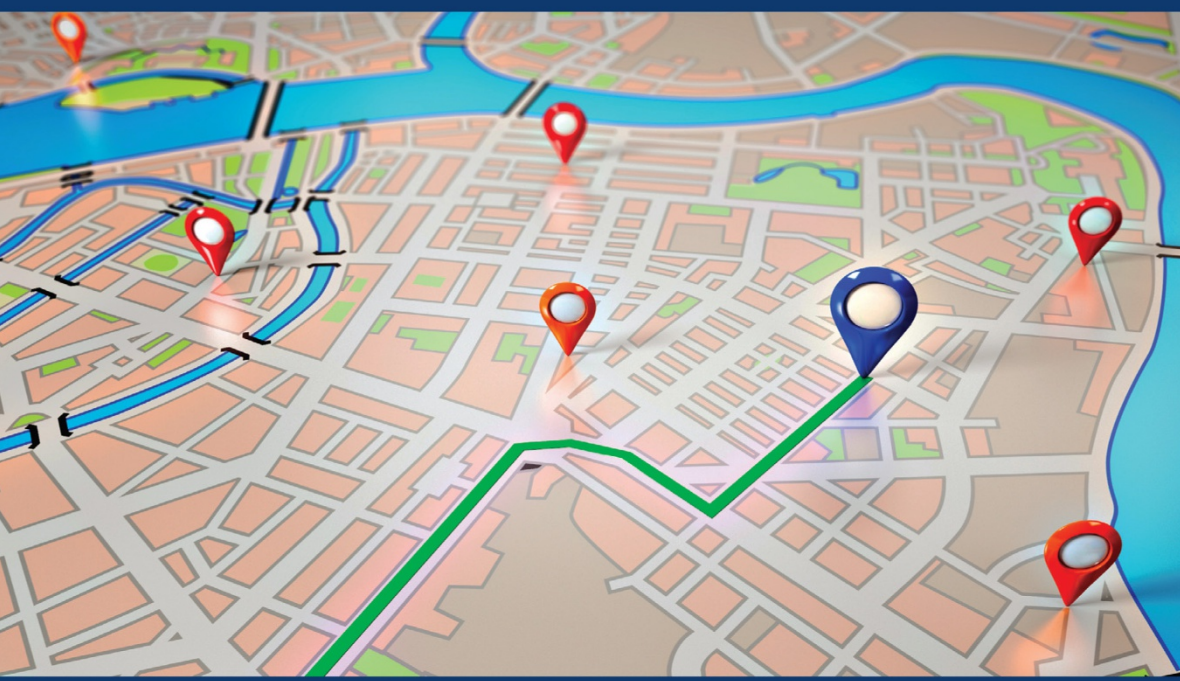
Location-based Marketing

Geomarketing and Geolocation

Gérard Cliquet

with the collaboration of

Jérôme Baray



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Contents

Preface

This book is a follow-up to the book *Geomarketing: Methods and Strategies in Spatial Marketing* published by the publisher ISTE (London) in 2006, then translated into Chinese in 2012 (translation by Pan Yu and Gao Li) under the title 地理营销学, 查看大图(放大) 共享你的图片.

This new opus is no longer a collective work, but the work of a single author who has tried to bring together the main concepts, methods and strategies to implement marketing that takes space into account.

It therefore not only emphasizes the importance of mapping in marketing decision making, but also seeks to highlight the importance of a more spatialized vision of these marketing decisions in order to better reflect the realities of markets, whether local or international.

The technological progress made and more particularly the arrival of mobile tools from information and communication technology (ICT), especially tablets and smartphones, have led the author to take an interest in the specificities of geolocation, to use this pleonastic expression. For a long time, location was reserved for buildings with an economic purpose, such as factories (Weber 1909; Merenne-Schoumaker 2002) or shops (Huff 1964; Applebaum 1966). Now, it is individuals and, with regard to marketing, consumers who can be geolocated and whom it is possible to address directly via email, SMS or even social media, which makes it possible to boost marketing strategies. ICT is disrupting the daily lives of consumers and practitioners, whether retailers or industrialists. Many companies have not yet taken advantage of the opportunities offered by these technologies, and when they have acknowledged them, they are still looking for ways to use them to improve contact with their customers. These developments do not take place without raising legal issues of privacy concerns, which will also be mentioned, as the academic community has been addressing these risks very early on.

This book offers a synthesis of knowledge concerning consumer behavior, the elements of the marketing mix with of course store location in a specific section, and therefore these new aspects related to geolocation that the integration of geolocation systems in new ICT tools allows.

The author sincerely thanks Jérôme Baray, Professor at the University of New Caledonia in Nouméa, Dany Vyt, Associate Professor at the IGR-IAE and Pierre-Alain Guillo, Associate Professor at the Faculty of Economics, both at the University of Rennes, for their comments. He is also very grateful to the company Articque for the supply of maps that will found in this book, as well as to Mr. Philippe Latour for the supply of an illustration from his company Spatialist.

Gérard CLIQUET
January 2020

Introduction

This book attempts to take stock of knowledge and applications in an evolving field. It focuses on aspects related to the discipline of marketing, while others provide a broader vision of digital geography applications, using computer science, in management sciences (Caron 2017). Digital geography has also been implemented in many fields such as weather, military strategy and environmental crisis monitoring (Plantin 2014).

Research based on spatial considerations began in economics as early as the 19th Century (von Thünen 1826; Weber 1909). Publications published around the 1930s would leave their mark on the economy (Hotelling 1929) and marketing (Reilly 1931) for a long time, alongside the work of geographers of the time (Christaller 1933; Lösch 1941). But the importance of the "geography of marketing" began to be recognized in the 1960s (Revzan 1968). This evolution also marks the birth of retailing (Scott 1970), that is, the activity of selling goods in stores or on the Internet[1]. Chapter 4 of this book will be entirely devoted to georetailing.

The interest of multidisciplinary research, particularly of course with geography, lies in the possibility of bringing out the determinants and models of store location by linking business units and geographical elements and highlighting their evolution. This takes into account population disparities within regions, changes in the urban economy with spatial interactions within market areas and trading areas, while taking into account competition, commodity flows and geographical barriers. But only store location specialists, retailers, will continue in this direction, with traditional marketing remaining largely aspatial. However, Chapters 2 and 3 will show that all marketing can be impacted by the need to spatialize studies, especially since recent technological advances in mapping.

1 https://dictionary.cambridge.org/fr/dictionnaire/anglais/retailing.

English speakers do not normally use the word geomarketing, instead making a distinction between GIS (geographic information systems), geodemographics, which is the study of people according to their place of residence (Johnson 1997; Gonzàlez-Benito *et al.* 2007), and micromarketing, which is defined as the customization of marketing mix variables at the store level (Montgomery 1997; Swinyard 1997). Finding English language sources for geomarketing is therefore not always easy. This book will help the reader in this respect by providing him or her with a large number of bibliographical references.

In terms of geomarketing considered as a set of techniques to map many social phenomena, as we will see, we could also go back in time and recall the role of the Belgian Gérard de Kreme, known as Gérardus Mercator, who invented mapping in the 16th Century (Horst 2011). In the 18th Century, the first map of the Kingdom of France was drawn by the Cassini family and this work, based on geodesic triangulation, lasted more than 60 years. Today, we still consult Cassini's map for historical works. And, older readers will surely remember the geography courses and maps of Vidal de la Blache (often called Vidal-Lablache).

But while geomarketing is a set of mapping techniques, spatial marketing is above all a much broader field, not only in methodological terms, but also and above all in conceptual and theoretical terms, which should enable private or public organizations to define more precise and appropriate strategies: space is not only geographical, it is also economic, cultural and institutional if we break down the notion of distance according to the Uppsala model (Johanson and Wiedersheim-Paul 1975).

This is why this book talks about spatial marketing, because mapping, which is important and central to the notion of geomarketing, is not the only technique that makes it possible to control space in marketing decisions. Spatial marketing therefore concerns all of the following:

– location issues, including

- points of sale for retailers;

- private institutions (factories, head offices, warehouses, etc.) or public institutions (town halls, administrations, departmental or regional buildings);

– localized marketing, including

- at the local level, micromarketing – marketing applied locally to individuals whose characteristics related to their location are known;

- at the international level, macromarketing – marketing applied at the level of a country taking into account the specificities of its population compared to others;

– geographic information systems applied to marketing;

– mobile marketing based largely on issues of dynamic customer location-based marketing (Palos-Sanchez *et al.* 2018).

Developing spatial marketing requires a clear understanding of two closely related phenomena referred to as location and localization. This book will deal with aspects related to both location and localization and therefore knowledge specific to management sciences, both those related to the geography of territories and those related to intercultural aspects. Social considerations will not be forgotten insofar as space and especially the ability to travel and move around it can be a source of inequality that has serious economic and social consequences (Fourquet 2019). Spatial mobility and the ability to change residence are one of the causes of unemployment.

Most individuals are able to acquire knowledge of space, including locations, distances and directions: we speak of "spatial intelligence" and even "brain GPS" (O'Keefe *et al.* 1998) and "cells that constitute a geoposition system in the brain", a kind of internal GPS. An article in the CNRS journal explains how this brain GPS works (Belaud 2019). This discovery answers the following questions:

> How do we know where we are? How do we find our way from one place to another? And how do we store this information in such a way that we can immediately find the path the next time we take the same route?

There has even been an attempt to model this acquisition process without any real success (Montello 1998). These digital geographic tools and especially GPS can cause some people to lose all or part of their ability to explore new environments, and added to the development of artificial intelligence, may lead them to sink into the "planet of the apes syndrome" (Picq 2019).

Moreover, it is difficult today to separate a firm's functions (namely marketing, information systems and human resources management, logistics, strategy, but also the underlying organizational forms) at local, regional, national and international levels. This is why many of the reflections in this book will focus on aspects other than marketing in the strict sense.

The communications revolution may have led us to believe that distance was "dead" (Cairncross 1997). This is not the case and it is time to rediscover space (Barnes *et al.* 2018). Digital mobility tools, smartphones and tablets are largely based on geolocation systems. Not taking geographical space into account in its decision-making processes could in the long-term lead to the company that refuses

to comply with it becoming "obsolete". It is true that in all markets, there are small firms that survive very well without using "new" technologies at all. But they often work in niches that are inaccessible to larger organizations. The latter explore the possibilities of Big Data in particular by relying on geolocated data, as about 80% of the data relevant to business is linked, in one way or another, to spatial considerations. These firms are developing data mining methodologies to improve their decision-making processes related to customer relationship management (CRM), hence the need to link marketing and information systems management (Goes 2014). In addition, space continues to play an essential role in the location of points of sale. Recent decisions by retail groups to close outlets are a telling example of this, if not perfect (see Chapter 4). We must be aware that today's location strategies concern at least as much the opening of contact points as closures, in other words, network restructuring.

Finally, while this book aims to disseminate theories, concepts and methods, not to mention applications, it is also a call for more research focused on spatial marketing. Decision makers need a theoretical basis to interpret mapping results, better understand the consequences of introducing space into their decision-making process and once again develop finer strategies. This book is divided into five chapters according to the structure of a marketing manual (definitions and research techniques, consumer behavior, marketing mix with a stronger focus on location), with a contribution, in the last chapter, on mobile marketing even if information and communication technologies are present in all the chapters.

Chapter 1 attempts to define spatial marketing as distinct from geomarketing and concepts and techniques to understand how mapping software adapted to geomarketing works.

Chapter 2 summarizes knowledge of the consumer's spatial behavior outside the points of sale as well as in the points of sale, without forgetting the cultural specificities linked to spatial diversity that product globalization has not eliminated. This chapter will mainly deal with shopping in its spatial dimensions.

Chapter 3 focuses on the spatial marketing mix, that is, the combination of the famous 4 Ps (Product, Price, Place, Promotion) (McCarthy 1960) with the spatial diffusion of products, geomerchandising and geopricing, geopublicity, direct marketing, now interactive marketing and sales force management. The third P (*Place*) will be discussed in Chapter 4.

Chapter 4 deals more specifically with georetailing since location methods were the first geomarketing management applications. Retailers are major users of geomarketing techniques, especially for setting up their points of sale, but we will see that other uses are possible.

Chapter 5, after recalling some considerations on e-commerce, covers both mobile shopping on the consumer side and mobile marketing on the business side, as well as m-commerce and mobile ICT applications, that is, smartphones and tablets, with their uses of geolocation in marketing.

1

Spatial Marketing and Geomarketing

The terms "spatial marketing" and "geomarketing" call for the following questions:

– What is space?

– Why introduce space in marketing in an almost systematic, if not systemic way?

– Why expand the already vast field of geomarketing?

What is space? The recent French "yellow vest" crisis has shown how much making decisions without taking into account space or, as we now say, territories, can lead decision-makers to provoke reactions that are then very difficult to manage. Can we say that this "yellow vest" crisis invokes "geography is destiny", as the American thriller writer James Ellroy likes to talk about? Making decisions today, either for private or public institutions without caring deeply about local issues can lead to a profound crisis. Everybody is not supposed to be mobile as expected.

Defining space and quickly understanding the consequences of these decisions on the "territories" for which we are responsible, whether at the level of a State or a company, are today prerequisites for good management of the organization for which we are responsible. However, the principle of subsidiarity (Martini and Spataro 2018) had been defined at the European level in the 1980s: "a central authority can only carry out tasks that cannot be carried out at a lower level" or "the responsibility for public action, when necessary, lies with the competent entity closest to those directly concerned by this action", a recommendation that most companies cannot deny today. This principle has even been associated with the sustainable nature of economic activity in particular (Gussen 2015).

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Why introduce space into marketing in an almost systematic, if not systemic, way? The reason is not only the need to localize all market characteristics (Rigby and Vishwanath 2006): customers, suppliers, points of sale, logistics and many other aspects revealed in this book. Even technological change requires us to take into account geographical space. The almost systematic use of GPS (Global Positioning System) and soon of the European Galileo system, is becoming increasingly present and is forcing all actors, suppliers and demanders as well as market facilitators to introduce spatial considerations into their reasoning, decisions and actions. The term systemic can also be used insofar as, if the company is considered as a system, it must now adapt as well as possible to its environment, whether for economic or environmental, or even social and cultural reasons.

Why expand the already vast field of geomarketing? In fact, this term was coined in France by the professional world when eponymous software spread to companies and local authorities; the technical dimension is therefore strong.

Wikipedia gives this definition: "Geomarketing is the branch of marketing that consists of analyzing the behavior of economic individuals taking into account the notions of space."[1] And the same source confirms this technical side:

> Geomarketing is present in various applications, such as studies of trading areas, store location studies, potential studies, sectorization, optimization of direct marketing resources (phoning, ISA, direct mail, etc.), network optimization, etc. Geomarketing frequently uses Geographic Information Systems (GIS) to process geographic data using computer tools.

Wikipedia also reports that

> English speakers use the term Location Business Intelligence (or geo-business intelligence), which is more appropriate when the approach concerns marketing; but the discipline also applies to territory development in the context of socio-economic studies.

In local authorities, geomarketing has become an essential tool for the development of their territorial marketing for the management of public spaces from a social, economic or tourist perspective. But reducing geomarketing to location choices undoubtedly limits what will be the common thread of this book: the introduction of space into marketing decisions regardless of the sector of activity.

1 https://fr.wikipedia.org/wiki/Géomarketing.

The objective of this book is therefore to broaden this field in a strategic perspective while addressing the main technical aspects of geomarketing in relation to the elements of the marketing mix for all companies. It will therefore take into account the specificities of sectors such as retailing, services and technology.

While mapping is certainly helpful, it is not the only means available to decision makers. The accelerated development of mobile marketing thanks to the rapid spread of smartphones reinforces the need to expand the field of geomarketing; indeed, can we imagine a smartphone without GPS? And even if the geolocation of smartphone owners poses legal problems, it is essential and many techniques have been developed to refine the accuracy of its geographical location.

Tracing a future perspective on the use of space in marketing decisions requires studying the historical trajectory of this idea. And even if it is possible to go even further back in the history of thought, as we will see, authors such as von Thünen, Hotelling, Reilly, Christaller, etc., in the 19th Century and in the first half of the 20th Century, whether economists or geographers, were able to trigger "spatial reflection". This chapter, after a few definitions, traces the consideration of space in order to understand where the fields of geomarketing and spatial marketing come from before better understanding them.

1.1. Defining space

Space has long been reduced to a mathematical notion: "a geometric concept, that of an empty environment" (Fischer 1981). Today we talk about social space, and the space treated here is in fact the market. But before coming to this notion, it is important to clearly identify all the variants of this concept of space. We talk a lot about territory, about countries (within a country in the sense of a nation) and about "spatial surface". A space can be defined both in geographical terms and in relational terms (Duan *et al.* 2018), or even in historical or political terms (Paquot 2011). We then have a better understanding of the polysemy surrounding the notion of space. Space would be "a place, a reference point, more or less delimited, where something can be located, where an event can occur and where an activity can take place" (Fischer 1981), but to which it would be appropriate, in order to conceptualize it, to associate all the spatial practices of individuals (Lefebvre 2000) thus showing the close relationship between individuals and space (Fischer 1997). However, this relationship is currently undergoing major upheavals due on the one hand to societal changes (Levy 1996; Oliveau 2011) and on the other hand to extremely rapid technological change.

The territory has received several definitions resulting from two different meanings: a first one defines a territory as a place where a population resides, while a second one, more precise and legal, not to say more political, considers the

territory as a place where power is exercised that can be justly political or judicial (Paquot 2011).

From these two meanings, definitions will be added that are increasingly out of step with each other. This drift may also explain some misunderstandings, with the State preferring to put forward the second meaning, favoring time over geographical space in order to establish its domination, when the people understand the first one which prefers living space over the time of power. It is then easier to understand why historians and geographers do not necessarily speak the same language when describing territories.

A country is a French administrative category defined by the law of February 4, 1995, on guidance for spatial planning and development (LOADT), known as the Pasqua law, and reinforced by the LOADDT (known as the Voynet law) of June 25, 1999. But it is now prohibited to create new countries (article 51 of law no. 2010-1563 of December 16, 2010, on the reform of local authorities). A country is defined as follows:

> A territory that presents a geographical, economic, cultural or social cohesion, on the scale of a living or employment area in order to express the community of economic, cultural and social interests of its members and to allow the study and implementation of development projects.

Although considered as an administrative category, a country is neither a local authority, nor a canton, nor an EPCI (*Établissement public de coopération intercommunale*) and therefore does not have its own tax system. A large part of France is thus composed of "countries" resulting from contracts concluded between municipalities; this is of particular interest to rural areas.

The spatial surface is in fact a rather vague concept, but it expresses the difficulties resulting from the spatial heterogeneity encountered in certain spaces, due to discontinuities resulting from irregular borders, for example between regions, peninsulas or real inner holes. This heterogeneity can make the valuation of house prices very complex. This idea was applied to define house prices in the Aveiro region of the Ílhavo district (Portugal) (Bhattacharjee *et al.* 2017).

1.2. From geomarketing to spatial marketing

After describing the evolution of spatial marketing and placing it in the midst of other disciplines, it will be necessary to define this field, then to specify its differences from geomarketing, before identifying its content.

1.2.1. *Spatial marketing: between economics and geography*

It all starts with the development of the location theory of economic activities. Thomas More defended, as early as 1516 in his book *Utopia*, the need to divide the city into districts to accommodate each a market (Dupuis 1986). In his economic writings, Turgot (1768) posits three principles of the theory of store location:

– the centrality of the points of sale;

– the demographic threshold for the establishment of businesses, the existence of a sufficient market;

– the grouping of purchases.

On a more methodological level, von Thünen (von Thünen 1826), considered as the "father of location theories" (Ponsard 1988), then explains that "the optimal locations of agricultural activities are such that in every part of the space the land rent is maximized". He thus founded the spatial economic analysis which he would later rely on to design his industrial location models at the beginning of the 20th Century (Weber 1909), which in turn would be used to model the expansion or spatial development of retail chains (Achabal *et al.* 1982). We can thus see how, in terms of the use of space in economic and managerial theories, progress has taken time.

Another economist (and also a leading statistician), Hotelling (Hotelling 1929), described in a celebrated article the consequences of location changes using a simple example and thus defined the principle of minimal differentiation, often referred to as the Hotelling rule (Martimort *et al.* 2018) or the Hotelling law (Russell 2013). Hotelling developed the idea that competition between producers tends to reduce the difference between their products. His theory is still being discussed today and is still the basis for much research. It has thus been possible to demonstrate in a theoretical way the contribution of advertising in order to allow companies to bypass this principle of minimal differentiation (Bloch and Manceau 1999). Geographers then developed the concept of central squares (Christaller 1933) from which the hierarchy of cities and the hexagonal shape of the geographical segments surrounding the squares (cities, towns, villages) were deduced (see Figure 1.1).

Each economic actor maximizes its utility (consumer) or its profit (firm) in a homogeneous space where prices are fixed and where the cost of transport depends on distance. The hexagonal shape of Figure 1.1 theoretically facilitates a perfect interlocking of these segments around the squares that form a network as shown in southern Germany (Christaller 1933), southwestern Iowa, northeastern South Dakota and the Rapid City area of the United States (Berry 1967). In these great plains of

the United States, a diamond-shaped network of central squares was observed; this is called a rhomboidal grid. This network of markets, with regular hexagonal outlines, suggests, on the one hand, the existence of a single equilibrium configuration with a given number of firms on the market, and on the other hand, the domination of this network with free market entry (Lösch 1941). This author formalizes the central place theory using a micro-economic approach. It is also based on the actual price of a good defined from its factory price plus the cost of transport. As the latter increases with distance, the quantity requested will be reduced accordingly, thus allowing the construction of space demand cones by integrating the function linking quantities requested, on the one hand, and price and distance in transport costs, on the other hand. Lösch then defines a profitable location as one whose sales amount, as determined by the spatial demand cone, provides the appropriate rate of return. This concept would correspond well to the markets for industrial goods (Böventer 1962). This design will be challenged, because this hexagonal network is not the only equilibrium configuration (see above the rhomboidal grid) and free market entry does not necessarily lead to hexagonal shapes of market segments (Eaton and Lipsey 1976). In any case, it is possible to retain from this work the idea of centrality with the objective of reducing distance for the greatest number of people and thus facilitating access to goods and services.

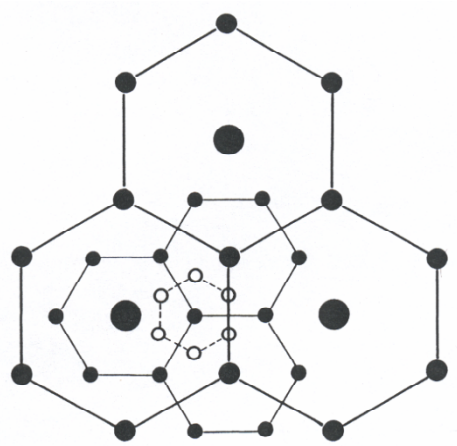

Figure 1.1. *Theoretical and schematic representation of central place theory (source: after (Christaller 1933))*

Shortly before, another geographer (Reilly 1931), a consultant to his state, had proposed a law of retail gravitation, often called Reilly's law, based on the notion of gravitation by analogy with Newton's theory applied here to retail activities. This law was for a long time the basis for many academic and professional projects, for

example to set up supermarkets in rural areas or malls. Based on this pioneering work, researchers have proposed models to better understand consumer spatial behavior and, above all, to predict the future level of city activity or store sales (Converse 1949; Huff 1964; White 1971) until these attraction models become widespread, whether spatial or not (Nakanishi and Cooper 1974).

Pioneering work in space marketing as early as the 1970s and based on time series data, long before geomarketing software appeared, showed that it was important to study market shares according to sales territories in order to understand how buyers react and to better predict these sales (Wittink 1977). It can be concluded that advertising, which is supposed to increase sales if adapted to the territories, can improve price sensitivity.

However, a few years later, based on previous work (Ohlin 1931), it became apparent that marketing researchers were not interested in spatial or regional issues (Grether 1983). It could not be said today that much has changed. Even store location issues are no longer of much interest to researchers, probably because it is mistakenly believed that the Internet has definitively removed the tyranny of distance. However, most of the pure players, those businesses that are only present on the Internet, are starting to open brick and mortar stores that are either physical or "hard": Amazon has acquired the Whole Foods Market network of organic stores in the United States.

Moreover, the very rapid development of applications (apps) on smartphones may change the situation by creating on the one hand a real mobile commerce and on the other hand a new kind of spatial consumer behavior favoring mobility (or rather ubiquity), comparisons of products, services, prices, etc.

1.2.2. *Definition of spatial marketing and geomarketing*

Spatial marketing is a broader and more conceptual field than geomarketing, which remains more oriented towards mapping techniques.

1.2.2.1. *Definition of spatial marketing*

Spatial marketing can be defined as anything related to the introduction of space into marketing from a conceptual, methodological and of course strategic point of view (Cliquet 2006, 2003). This implies taking into account not only issues related to the local or regional environment at the microeconomic level (Grether 1983), but also in relation to territorial coverage in the geographical sense. This concept does not necessarily imply that territories correspond to political division and/or interculturality at a more socio-cultural scale at the macroeconomic level, in other

words in relation to national and international frameworks (Ohlin 1931; Hofstede *et al.* 2002).

The many issues developed in this book concern not only marketing in the strict sense of the term, but also other management disciplines such as information systems management and human resources, strategy, logistics, organization at local, regional, national or international level. Spatial marketing is useful in the management of organizations insofar as it makes it possible to specify and strengthen proximity with the customer and therefore customer relations depending on where the customer is located. It authorizes the link between this geolocation and the customer's personal data. The verb "authorize" is used intentionally, because the risk of breaking the boundaries of individual privacy is real; it is an important societal issue as is the installation of video cameras in public places for security reasons. Surveys on personal data protection (privacy) show that consumers are aware of possible abuses, but this does not prevent them from using smartphones and tablets (Cliquet *et al.* 2018), and the Absher application that Saudi Arabian men use to track their wives does not help.

1.2.2.2. *Definition of geomarketing*

Geomarketing is based on digital geography using computer science, that is, computerized cartography and therefore geography on the one hand and marketing on the other. It is a term coined in France by practitioners in the 1980s. Strangely enough, this word is almost unknown in North America 30 years later. On the other hand, we hear about micro-marketing, geodemographics, GIS or Location Business Intelligence in the United States, even though people are familiar with geomarketing in Quebec. It has subsequently spread to the European continent: there is research on the openly displayed theme of geomarketing in Belgium (Gijsbrechts *et al.* 2003), and above all specialized works, often short and technical, for example in Germany (Schüssler 2006; Tapper 2006; Grasekamp *et al.* 2007; Herter and Mühlbauer 2007; Trespe 2007; Menne 2009; Kehl 2010; Kroll 2010), Spain (Chasco and Fernandez-Avilez 2009; Alcaide *et al.* 2012) and Italy (Galante and Preda 2009; Cardinali 2010; Amaduzzi 2011). In France, there are books by consultants that generally present, in a clear manner, the possibilities offered by their firm (Marzloff and Bellanger 1996; Latour 2001) and academic books either oriented towards business studies (Douard 2002; Douard and Heitz 2004) or methodology (Barabel *et al.* 2010) or concept and strategy (Cliquet 2006). Some books on digital geography also deal with geomarketing (Miller *et al.* 2010).

There are of course many definitions of geomarketing. However, most of these books agree at least on the objective of geomarketing, which aims to introduce spatial data into marketing analyses that are often totally lacking. However, "about

80% of all business-relevant information within a company has a relation to spatial data" (Menne 2009), in other words, 80% of the information related to a company's business is linked to spatial data.

Some will argue that the dramatic increase in online data tends to reduce the importance of spatial data. In fact, the opposite is true since a very large part of this online data is geolocated.

Geomarketing can simply be defined as a field involving disciplines such as digital geography and marketing, but also social sciences such as economics, sociology, psychology or anthropology, because geomarketing makes it possible to understand much more precisely the behavior of economic actors and the environments in which they operate. These behaviors and environments are changing increasingly rapidly as a result of demographic pressure and climate change. All these developments cannot be ignored by strategists in both private and public organizations.

1.2.3. *Content of spatial marketing and geomarketing*

Introducing space into management and marketing decisions in particular means resolving a dilemma that is driven by *a priori* oppositions such as local *versus* global or adaptation *versus* standardization.

1.2.3.1. *Local versus global*

The local level is often overlooked by strategists, while it can sometimes be realized that *a priori* remarkable strategies on paper are simply inapplicable on the ground, a fact that many politicians would do well to consider. Neglecting the field has sometimes cost even the largest multinational firms that thought the world would adapt to their strategies and genius: the major American firms have long thought so like General Motors CEO Charles Erwin Wilson, who said in 1953, "What is good for General Motors is good for the United States and what is good for the United States is good for the world." Today, things have progressed on this front and everyone is aware that globalization is more a myth than a reality (Douglas and Wind 1986). But in the face of this dilemma, a question arises: should we first globalize and then localize in a top-down decision-making process or localize before globalizing in a bottom-up approach? Some believe that it is better to use a "glocalization" process (Svensson 2001; Kjeldgaard and Askegaard 2006; Cliquet and Burt 2011) by trying to show that it is appropriate to globalize your business strategy and at the same time localize your marketing strategy in the broad sense (Rigby and Vishwanath 2006) in order to attract customers very quickly, hence the need for located databases (Douard *et al.* 2015). We were able to show how Walmart had to change its marketing methods, and thus its so-called organic growth,

when this major American distributor bought Asda in the United Kingdom in 1999 (Matusitz and Leanza 2011).

The purpose of introducing space into decision-making processes is both strategic and tactical: strategic, because a strategy must also be able to express itself in terms of territorial gains and not only in terms of turnover or market share, which are too global concepts; tactical, because the company will need to know its local markets well to implement its strategies efficiently and not only effectively.

1.2.3.2. *Standardization* versus *adaptation*

The second way of presenting the dilemma refers to the presumed opposition between, on the one hand, standardization (in other words, total standardization) and on the other hand, adaptation, which involves taking into account the local environment. This apparent conflict is frequent, particularly in the definition of retail and service outlet network strategies. The elements at the heart of the strategy are commonly distinguished from the elements at the periphery, which can be described as secondary (Kaufmann and Eroglu 1998). The elements at the heart of the strategy must never be adapted, as they are essential for brand recognition at any time and in any place by real and potential customers. On the other hand, it must be possible to adapt the peripheral elements when necessary in order to satisfy customers as much as possible regarding their tastes, consumption habits and even traditions. This problem is especially specific to the marketing of franchise networks, even if it is found in many sectors from the moment that activities are relocated or spatially distributed (Cox and Mason 2007). Indeed, while chains tend to want to simplify their offers, including geographically in order to benefit from better productivity and therefore lower costs, their customers increasingly want product customization. The idea of mass-customization then emerged as necessary (Pine 1993; Piller and Müller 2004). Indeed, in franchising, the brand is, with the know-how, one of the two fundamental concepts in the very definition of the network's activities.

Let us take a concrete and very significant example of this problem, the bakery chain under the Great Harvest brand (Streed and Cliquet 2007). The first bakery was opened in 1976 in Great Falls, Montana (United States), the second in Kalispell, also in Montana. But the objective was not to distribute exactly the same type of bakeries everywhere. Freedom has been left to the franchises to manage their bakery (the "front office" in front of the customers) as they see fit, knowing that the "back office", the making of bread in particular, is maintained by the chain. In fact, the founders, Pete and Laura Wakeman, created the first "freedom franchise", which they define as follows:

> We provide an alternative with some of the advantages of a traditional franchise and some of the fun of a "let's-do-it-all-ourselves" start-up.

> Our philosophy is simple: let's create unique neighborhood bakery cafes that are a reflection of the Great Harvest brand *and* the bakery cafe owner. We are no cookie cutter franchise. We are a freedom-based, healthy franchise that encourages excellence and individuality (not to mention a spirit of fun and generosity). [2]

There are now more than 200 Great Harvest franchises in the United States (including Hawaii and Alaska). And every franchised bakery must be *the* bakery in the city: we immediately see the importance of localization and the need for highly targeted spatial marketing.

But often, the franchisee's freedom is more restricted and the peripheral components of the franchise are more limited, thus reducing the possibilities of adaptation. However, even large chains such as McDonald's have realized that excessive standardization can lead to rapid consumer fatigue as consumers become increasingly eager to personalize the service and the products that go with it. The orientation towards "glocalization", a process already mentioned above, is now effective at McDonald's (Crawford 2015), including in their desire to attract so-called "ethnic" customers: we understand the importance of spatial marketing based on geodemographics, GIS (Geographic Information System) and micromarketing in order to identify these targets and define an appropriate advertising strategy (Puzakova *et al.* 2015).

1.2.3.3. *The fields of spatial marketing*

Once these dilemmas have been established, the content of spatial marketing is presented according to the usual areas of marketing:

– the buyer's behavior (consumer in B2C, business to consumer, or business in B2B, business to business), this book focusing on the consumer;

– marketing research concerning market studies in the broadest sense;

– strategic marketing and marketing management.

Introducing space in these areas involves many changes, sometimes even upheavals, because it is now a question of thinking and acting differently.

1.2.3.3.1. The consumer's spatial behavior

Consumer behavior can no longer be considered in the same way once space is taken into account. Too little marketing research has considered this spatial

2 https://www.greatharvest.com/company/franchise-business-philosophy.

dimension in consumer behavior and this requires a revisit to geography (Golledge and Stimson 1997; Golledge 1999).

A few articles have been able to advance knowledge in this area. Work based on reference dependence theory (Tversky and Kahneman 1991; Tversky and Simonson 1993) has led to a better understanding of consumer shopping trips (Brooks *et al.* 2004; Brewer 2007) (see Chapter 2).

Older work has been carried out on the basis of gravity and/or spatial interaction models (Reilly 1931; Huff 1964; Nakanishi and Cooper 1974).

Increased consumer mobility, their ability to use so-called mobile technologies (smartphones and tablets) and changes in retail offers, physical or virtual stores on the Internet, are accelerating ubiquitous purchasing processes. This evolution makes gravity-based models less efficient even if they are far from useless, if only in the definition of certain geofencing applications, that is, the determination of the attraction or trading area. This technique is described as an extreme form of marketing location and is increasingly used to send promotional offers in the form of coupons to consumers who are either in the store or near the point of sale using SMS on their smartphone (Mattioli and Bustillo 2012). In other words, the issue here is how far away should current or potential customers of promotional offers be alerted, on their smartphone or tablet, when they pass "near" the store or more generally on opportunities that may interest them. Chapter 5 will deal with geofencing.

Consumers are increasingly capable of mobility without it increasing overall: retailers and traders must adapt to it (Vizard 2013). Sometimes it is quite easy. For example, a distributor near the Massachusetts-New Hampshire border found that residents of New Hampshire may not pay the vehicle taxes required in Massachusetts (Banos *et al.* 2015). He therefore placed an order with a company specializing in geofencing to include all potential customers in New Hampshire in his database. But this is again a gravity-type attraction (Reilly 1931; Huff 1964; Cliquet 1988).

When we want to attract customers who pass near a point of sale, otherwise known as taking advantage of the flows of the temporary attraction (Cliquet 1997a), the operation is more delicate. Indeed, how can this proximity be evaluated? This concept of proximity has become central to the thinking of major retailers, for example. For many years now, people have been wondering about the future of these "shoe boxes", known as hypermarkets, a store format invented in France in 1963 by Carrefour and copied in many countries, including the United States in the 1990s (Europe can also sometimes be a little ahead). But hypermarkets are increasingly neglected, especially the largest ones, because they no longer meet the needs of customers seeking both purchasing power and another way of life that is

less consumer-oriented. Will smartphones and geo-fencing (Streed *et al.* 2013) be able to save them?

1.2.3.3.2. Spatial marketing studies

The introduction of space in marketing studies implies taking distance into account. Just because we regularly talk about the digital economy, which no longer has a border, does not mean that there is no longer any distance or that everything has been globalized, thus eliminating any local specificity. On the contrary, we are witnessing a real resurgence of the local.

On a more methodological level, distance is a complex variable. A distinction is made between geographical distance and temporal distance: the law of gravity of retail trade uses geographical distance when Huff's model favors temporal distance. However, the geographical distance is difficult to manipulate. Purely metric distance is only rarely considered, especially in the behavior of out-of-store consumers. Since they travel with their vehicles, or by public transport, the temporal distance (Brunner and Mason 1968) is preferred by researchers and analysts. But it is no more satisfactory, because consumers, like all decision-makers, make their decisions not according to reality, but according to their perception of it. This can probably be partly attributed to bounded rationality (Simon 1955). Under these conditions, the perceived distance should be preferred despite methodological problems (Cliquet 1990, 1995).

With regard to internationalization, companies are not immune to problems related to culture, among other things. The so-called Uppsala model (Johanson and Wiedersheim-Paul 1975) underlines the influence of psychological distance to explain the difficulties of export companies. This psychological distance is broken down into geographical, economic, cultural and institutional distances (see Chapter 2).

1.2.3.3.3. Strategy and spatial marketing

Once potential targets have been identified by the spatial study of behavior, the marketing strategy can be defined. Taking the environment into account can lead to the dilemma already mentioned: local *versus* global. This contextualization can be troublesome, and has been for a long time, because it can lead to conflicting options that can damage the brand image. However, digital mobility tools can partly solve this dilemma by improving customer contact. This evolution implies a better consideration of the link between production and distribution, in other words, logistics. In order to solve the problem of the optimal compromise between quality and cost (and therefore price), effective coordination becomes essential, and only flawless logistics can make this possible. However, logistics also has a cost, and reducing it requires a rigorous control of space by controlling the distribution of products and therefore thanks to a good spatial distribution of sales outlets. We will

see that this spatial dissemination of customer contact points implies a different way of thinking about the spatial strategies for setting up sales units, stores, restaurants, hotels, etc., through, for example, the application of percolation theory (Cliquet and Guillo 2013).

This problem of spatial coverage of point of sale networks does not only affect retailing. It is also of interest to manufacturers; some of them have found that traditional media no longer allow contact with the consumer as effectively as before. As the American firm Procter & Gamble has found, individuals now have technical possibilities to bypass advertising on their TV sets or to avoid spam in their mailboxes (Arzoumanian 2005). However, points of sale are now a safer medium: in 2005, Procter & Gamble observed that in the United States, 100,000,000 customers visited Walmart stores every week, 22,000,000 visited Home Depot stores and 42,000,000 visited 7-Eleven convenience stores. Under these conditions, the best located chains are better media than TV or Internet advertising. Moreover, Zara, the Spanish clothing company, has never advertized in the traditional sense and uses its own stores as promotional media. Procter & Gamble had even thought of launching its own chain of stores selling all the company's products, but had to give it up: P&G is primarily a manufacturing company, and retailing is a quite different job.

1.2.3.3.4. Spatial marketing management

The marketing strategy must then be implemented by a marketing management team that also includes the introduction of space into operational decisions. This marketing management involves the definition of a marketing mix that refers to the 4Ps (McCarthy 1960) for Product, Price, Place and Promotion. Chapter 3 of this book shows that the 4P "rule" has been challenged (Van Watershoot and Van der Bulte 1992), and that it is possible to "geolocate" the elements of the marketing mix.

1.3. Spatial marketing and geomarketing applications

The applications of spatial marketing and geomarketing concern both practitioners and researchers. However, it must be noted that, while practitioners have been able to use geomarketing tools to identify sites where to set up points of sale, broadcast an advertising campaign in the regions or practice direct marketing (Ozimec *et al.* 2010), they suffer from a lack of conceptual models allowing them to better interpret the data. However, it must be admitted that the number of scientific publications in spatial marketing, except those concerning location issues, is limited to say the least.

The beginning of the new millennium was approached like the beginning of the digital age. But we could already regret the "tide" of advertisements received by

everyone without too much differentiation (Preston 2000): the spam emails we all receive every day show that 20 years later, things have not really changed. The customer orientation of European distribution companies seems insufficient despite the amount of local information they have in their possession thanks to loyalty cards (Ziliani and Bellini 2004). The mass of data resulting from these cards should make it possible to identify consumers' needs and desires and thus to offer them appropriate promotional offers: this is one of the purposes of Big Data (Nguyen and Cao 2015) which constitute one of the major challenges of the now-joint research, on the one hand, in marketing, and on the other hand, in management of information systems (Goes 2014).

1.3.1. *Applications in retail and mass distribution*

Retailing was among the first sectors to be interested in geomarketing techniques. The applications focus on problems related to the analysis of trading areas and the location of points of sale. As far as trading areas are concerned, professional methods were once often based on the determination of primary, secondary and tertiary (or marginal) areas, known as the analog method (Applebaum 1966). This more or less circular representation around the point of sale has been called into question with the appearance of geomarketing software and the possibility of geolocating store customers from their addresses obtained by questioning the customer at the checkout and then thanks to loyalty cards now dematerialized in most stores. The trading areas of the stores no longer have anything to do with concentric circles: we are in fact dealing with "archipelagos" (Viard 1994).

Concerning location problems, articles in scientific journals were mainly published in the 1980s (Ghosh and McLafferty 1982; Ghosh and Craig 1983; Ghosh 1984; Ghosh 1986; Ghosh and Craig 1986; Ghosh and Craig 1991) and based on location models, such as MCI (Multiplicative Competitive Interaction) (Nakanishi and Cooper 1974), useful both for understanding consumer spatial behavior (see Chapter 2) and georetailing with point of sale location (see Chapter 4).

1.3.2. *Applications in services*

Banks were the first service companies to take an interest in geomarketing in order to better understand the trading areas of their branches and to refine their location decisions. Hotels and restaurants are also aware of this, at least the largest companies. These two sectors offer an originality in terms of attracting customers: while restaurants attract both local and visiting customers, hotels only receive visiting customers. The gravity or polar side of the attraction, as found in most retail

outlets, is therefore much less prominent than the so-called transient attraction (Cliquet 1997a).

1.3.3. *Applications in marketing and utility management*

Public marketing, or rather the marketing of public services, is developing more as a growing number of these services have become fee based. It is therefore now necessary to attract customers in order to make these services profitable or at least to reduce their costs. It has been possible to apply geomarketing as a territorial information system for Italian public administrations (e.g. Amaduzzi 2011). A methodology using spatial models has been developed to optimize the maternity network in France (Baray and Cliquet, 2013). The development of territorial marketing is inspired by a spatial marketing approach without always relying on geomarketing in the traditional sense of the term, namely with the use of software, but increasingly on smartphones applications (apps) (Barabel *et al.* 2010). In the health sector, the cost/proximity dilemma leads to an attempt to optimize the location of health services. Two applications have been published in the United States to make these services more geographically efficient. One of them proposes to redefine the regions of this country in order to improve the efficiency of liver transplantation (Kong *et al.* 2010): the size of the country, the rapid deterioration of transplants and the crucial lack of donors require such a redefinition.

1.3.4. *Other applications*

Tourism is obviously a very suitable receptacle for the application of spatial marketing. However, only organizational issues such as those of companies seeking to promote their tourism services and local authorities wishing to attract tourists, and not tourism as a general activity, will be addressed. Many cities now want to interest potential customers by offering them websites (Parker 2007) and even map-based apps designed to admire the beauty of the sites offered, thus developing mobile or m-tourism (Bourliataux-Lajoinie and Rivière 2013).

Geomarketing has also been used to explain the strategies implemented by French basketball clubs (Durand *et al.* 2005). Many other applications could be mentioned and we are probably only at the beginning of a new era in which space, thanks to technological aids, will no longer be a constraint either for humans or for organizations. For their part, geomarketing techniques could be of great help in better understanding the phenomena studied and in presenting the results well in order to facilitate their reading with the help of maps, which would give additional credibility. Some have understood the interest and do not hesitate to use maps to

strengthen their demonstration, as was the case with the expansion of large networked companies (Laulajainen 1987).

1.4. Geomarketing, techniques and software

Certainly, without technical pretension, this book, which is more oriented towards decision making and strategy, must quickly review geomarketing techniques and the software available. Geomarketing techniques are based on GIS (Geographic Information Systems), in other words, the combination of geography and computer science to develop computer mapping. These digital geographic techniques are used by organizations in a wide variety of sectors. What was available through complex and often expensive software is now available on the Internet in the form of increasingly sophisticated websites as well as free and sometimes open-source software.

1.4.1. *Uses of geomarketing software*

The commercial location of stores, bank branches or other points of contact with customers was the first application of geomarketing with direct marketing. Geomarketing software is also used to measure the performance of points of sale within their trading area, to trace these trading areas in the form of isochrons, to study the socio-demographic characteristics, movements and behaviors of consumers, to monitor a delivery fleet or sales representatives' tours, etc. They can also be used to set up points of sale within a network of retail or service points of sale, optimize these locations and evaluate their territorial coverage, etc. All these applications, whether they concern consumer spatial behavior, the marketing mix of companies or the georetailing of retail companies, not to mention mobile spatial marketing, will be covered in this book.

1.4.2. *Geomarketing techniques*

Digital geography has developed considerably since the 1980s. The basis of this rapidly expanding discipline lies in the design and implementation within GIS organizations and tends to integrate methodologies from artificial intelligence such as multi-agent systems.

1.4.2.1. *Geographic information systems, technical bases of geomarketing*

A GIS is used to collect spatial data, store it, process it in map form, analyze it with known and available spatial analysis methods (Pornon 2015) and manage it so

that it can be reused for other applications (Sleight 2004). GIS applies to many areas, including the following:

– public bodies (official institutes of statistics, of geography or of weather forecasts, the armed forces, etc.);

– public policies and in particular spatial planning, transport and telecommunications infrastructure management;

– business, to enable companies and organizations in general to manage transport and logistics networks and, more specifically, marketing.

GIS is used to collect, manage, combine and analyze spatial data for a specified region (Widaningrum 2015). A geographic information system is represented by several components:

– a geocoding system;

– a spatial database (Servigne and Libourel 2006) including elements of the geographical environment to map the studied region (cities, rivers, mountains, etc.);

– a database of the actors studied (consumers, companies, monuments, etc.);

– a mapping system that allows the maps to appear on the screen and be printed.

Mapping software is sometimes distinguished from GIS, which can render geographic information in a different form than the map. More generally, we talk about visual business intelligence. GIS often integrates spatial information processing tools (geostatistics, geodata mining, etc.). It has been possible to warn against the risk of conflict when implementing GIS, as the type of organizational structure must be taken into account (Pornon 1998). A more global concept was then proposed, that of a spatially referenced information system (SRS) (Servigne and Libourel 2006), because the installation of geospatial technologies is not neutral in organizations insofar as they can constitute a competitive advantage (Caron 2017).

All geomarketing work generally begins with a geographical breakdown of the area to be studied, composed of cells to define a domain of space that allows a continuous view (Servigne and Libourel 2006). This division requires a knowledge of the rules in this area. In France, the C*ommission nationale de l'informatique et des libertés* (CNIL) supervises work based on geographical breakdowns, as the breakdown cells must contain at least 2,000 inhabitants (such as the IRIS defined by INSEE, French national institute of statistics). Since 2016, municipal map collections at IRIS level have been available from the IGN (*Institut géographique national*) and since March 2018, it is also possible to download various INSEE geographical breakdown files:

– administrative breakdown: regions, departments, districts, etc.;

– breakdown of study areas: employment areas, urban areas, urban units, living areas, etc;

– intercommunality: the basis of EPCIs (*Établissements publics commerciaux et industriels*, state-owned commercial and industrial establishments) with their own taxation;

– municipal breakdown: table of geographical distribution of the municipalities;

– sub-municipal breakdown: IRIS (*Îlots regroupés pour l'information statistique*, grouped islands for statistical information), the equivalent of U.S. ZIP codes.

The division into IRIS is possible for all municipalities with more than 10,000 inhabitants and many municipalities with 5 to 10,000 inhabitants, which corresponds to 1,900 municipalities out of a total number of municipalities with more than 35,000: but everyone knows that the French State reduces this number each year in a very homeopathic way. Each IRIS is homogeneous from a habitat point of view. Indeed, the location of individuals' housing responds to sociological imperatives and it can be seen that sociologically similar individuals tend to choose nearby dwellings (Filser 1994). There are a total of 15,500 IRISs. Each municipality with a population of less than 5,000 is considered an IRIS. INSEE also offers interactive maps with grids to "analyze the spatial distribution of georeferenced data in order to better understand the territorial dynamics at work in France".

Maps are of course essential tools in geomarketing and they are now becoming more and more interactive, allowing decision makers to simulate situations. It has been shown that GIS-based geomarketing software can play a role in managers' decision-making processes, especially in terms of location, because using such a tool saves time and therefore allows faster decisions with fewer errors (Crossland 1995). Such software can thus constitute a real decision support system. The integration of a GIS into a decision support system can help to solve the famous "last mile" problem (Scheibe *et al.* 2006). The grid applied by the INSEE, which breaks it down geographically into small cells, makes it possible to visualize certain characteristics in a very precise way (Fourquet 2019). This requires compliance with the constraints imposed by the CNIL (French national committee ensuring data privacy laws are adhered to) on the use of IRIS. This notion of geographical division will be used again when studying gravity models (see Chapter 4).

The choice of visualization tools, circles, bars or shadows, available in geomarketing software, is not totally neutral (Monmonier 2018). Indeed, their choice can influence the outcome of the decision (Ozimec *et al.* 2010). For example, the use of gradient circles is more justified when thematic maps are used, and is effective in decision making. The authors also explain that the use of these tools is

independent of the personal characteristics of decision makers, such as the ability to manipulate maps and the experience they can provide. Using GIS does require cognitive skills, particularly with regard to map overlay (Albert and Golledge 1999).

GIS enables companies to increase their relational capital by systematically providing information on the location of their activities to their current or potential customers (Baños 2016). GIS are therefore no longer only marketing analysis tools, but are increasingly becoming a means of creating contact with customers through the use of the web; this is all the more true with the development of smartphones.

1.4.2.2. *Some statistical tools for geomarketing*

Marketing uses traditional statistical tools, like most other social science disciplines. Spatial marketing is no exception to this rule, but this discipline must submit to the specificities of spatial study, and adopt particular statistical tools; other disciplines such as spatial economics or anthropology also use these tools. As this book is not intended to develop sophisticated mathematical and statistical methods, it is nevertheless necessary to review a few tools in order to get the most out of the often tedious mapping work. It would be a pity to miss some conclusions because of a lack of knowledge of these tools. To do this, it is important to be familiar with spatial autocorrelation and related indices: Moran index, Geary index. Less specific to spatial analysis, however, the Gini coefficient (Gini 1921) is used in particular to show income inequalities by location as was done for the city of Athens (Panori and Psycharis 2018).

Autocorrelation expresses the correlation of a variable with itself. This correlation can be measured either over time by comparing successive values of the variable (temporal autocorrelation) or over time by measuring the variable in different locations (spatial autocorrelation) (Oliveau 2017).

Spatial data are characterized by their great heterogeneity, which is systematic, while temporal data encounter this type of difficulty less frequently (Jayet 2001).

A distinction is made between heterogeneity of size (geographical entities such as cities, regions or countries are very diverse in size), heterogeneity of shape (regions do not have the same contours), heterogeneity of position (a northern region and a southern region of the same size and shape are not comparable), heterogeneity of structure in terms of qualification, economic activity or the size of establishments (Jayet 2001). It is therefore appropriate to use certain tools such as autocorrelation measurements to measure this heterogeneity.

Moran's I (Moran 1950) and Geary's C (Geary 1954), also known as Geary's contiguity ratio, are the main tools for measuring autocorrelation and the following

formulations have been rewritten (Cliff and Ord 1973). Here is Moran's I index (Oliveau 2017):

$$I = {}^{n}/_{m} * \frac{\sum_i \sum_j w_{ij}(z_i - \bar{z})\left(z_j - \bar{z}\right)}{\sum_i (z_i - \bar{z})^2}$$

where

– z_i and z_j are the coordinates of geographical entities;

– z_i is the value of the variable for entity i, its mean being $\bar{z}$;

– i is the geographical entity;

– j is the neighbor of entity i;

– n is the total number of geographical entities in the sample;

– m is the total number of pairs of neighbors;

– w is the weighting matrix, the elements of which take, for example, the value 1 for the neighboring i, j and 0 otherwise.

Moran's I formula compares the difference between the ratio of the value of a variable concerning an individual to the mean of these values, to the ratio of the value of the same variable for neighboring individuals to the same mean. This I index takes these values between –1 (negative spatial autocorrelation) and +1 (positive spatial autocorrelation). But the value of I can exceed 1 or be less than –1 (Oliveau 2011). A non-zero measure of this index shows a contiguous effect between close spaces:

– if I > 0, the contiguous spaces have similar measures of the variable;

– if I < 0, it means the absence of the significant variation or disparate values;

– if I is close to 0, there is no negative or positive spatial autocorrelation.

But the measurement of this index I is not without criticism and may not clearly reflect spatial structures. There are three limitations to the measurement of Moran's I (Oliveau 2011):

– the measurement of spatial autocorrelation obtained from Moran's I is global unlike Geary's C which provides a local measurement of spatial autocorrelation. This global character of Moran's I can lead not to a precise spatial structure, but to two different spatial configurations:

- a configuration highlighting a central pole;
- the presence of two peripheral poles;

– Moran's I considers the deviation from the mean without looking at neighboring individuals, but also with values close to the mean;

– Moran's I is sensitive, on the one hand, to the level of observation, and on the other hand, to the mode of neighborhood chosen.

Moran's I measured the spatial coherence of a chain of stores with a measure of the network's territorial coverage by relative entropy (Rulence 2003). The influence of time on spatial dependence has been estimated by data on property prices (Devaux and Dubé 2016).

Once again, Moran's I has the disadvantage of being too global when looking at spatial structures over small areas (Brunet and Dollfus 1990), which requires the use of Geary's C index. The Geary C index (Geary 1954) is also used to measure spatial autocorrelation and is presented as follows (Oliveau 2017) following a rewrite (Cliff and Ord 1973):

$$C = (n-1)/_{2m} * \frac{\sum_i \sum_j w_{ij}(z_i - z_j)^2}{\sum_j (z_i - \bar{z})^2}$$

where

– z_i and z_j are the coordinates of geographical entities;

– z_i is the value of the variable for entity i, its mean being $\bar{z}$;

– i is the geographical entity;

– j is the neighbor of entity i;

– n is the total number of geographical entities in the sample;

– m is the total number of pairs of neighbors;

– w is the weighting matrix, the elements of which take, for example, the value 1 for the neighboring i, j and 0 otherwise.

Unlike Moran's I, Geary's C value can indicate a positive autocorrelation if it is less than 1 (the minimum being 0), a negative autocorrelation with a value greater than 1 (the maximum being 2), or the absence of autocorrelation if it takes the value 1. Moran's I's and Geary's C's were used, for example, to examine the spatial distribution of employment in public services in 124 European regions (Rodriguez and Camacho 2008). Frequent use of these indices has shown that Moran's I is more powerful than Geary's C (Jayet 2001) and, for this reason, is the most widely used. However, the objective of the research must be considered and if it is more focused on the discovery of small spatial structures, Geary's C will be more appropriate.

These indices are primarily used as tests to assess the presence or absence of spatial autocorrelation, which have only an asymptotic value, meaning that they can only be used with a large amount of data (Jayet 2001).

The Gini coefficient (Gini 1921), or Gini concentration index, measures the distribution of income and wealth in a given population. It is widely used in research work and has undergone many changes (Giorgi and Gigliarano 2017). It is sometimes attached to work measuring autocorrelation when considering the population studied in a given space. The Gini coefficient actually measures wage inequality and varies from 0, a situation where there is perfect equality between all wages and 1 situation as unequal as possible, in other words, where all wages are zero except one. The higher the Gini coefficient, the more inequality there is in the distribution of wages[3].

1.4.2.3. *Simulation systems*

Spatial simulations based on multi-agent systems (MAS) or agent-based models (ABMs) (Amblard and Phan 2006; Banos *et al.* 2015) are based on artificial intelligence (AI) and artificial life. AI simulates intelligence using machines and software (Minsky 1986). Artificial life (Heudin 1997) is based on biomimicry, that is, the reproduction of biological phenomena with neural networks, genetic algorithms, cellular automatons represented by regular grids and used to define urban space simulation models (Langlois and Phipps 1997). Multi-agent systems (MAS) have been widely used in logistics management in connection with retail activities (Li and Sheng 2011; He *et al.* 2013; Heppenstall *et al.* 2013). An application of multi-agent systems has made it possible to develop a system called the Multi-agent System for Traders (MAST) to facilitate the consumer purchasing process and in particular the payment process (Rosaci and Sarne 2014).

1.4.3. *Software and websites*

Digital geography is evolving at an ever-increasing rate and the following is not intended to provide a vision of the software market and geomarketing sites, as there are far too many of them. According to the geographers themselves, this evolution is becoming increasingly uncontrollable and is beginning to raise real ethical issues (Joliveau 2011).

3 INSEE, https://www.insee.fr/fr/metadonnees/definition/c1551.

1.4.3.1. *Geomarketing software and services*

The importance of spatial marketing can also be measured by trying to count the companies that offer software and services called geomarketing. All the proposals from specialized companies can be found on the Internet. But one may wonder how to choose a software or a geomarketing "solution". Several selection criteria govern this decision[4]:

– a geomarketing software must have a "user-friendly and intuitive back office" with understandable options;

– importance of an option to integrate external data in order to be able to deal with company-specific problems;

– possibility of frequent software updates;

– presence of modules allowing the study of consumer behavior, but also, for example, of real estate prospecting;

– of course, the cost: you can choose a flexible rate or a package depending on what you want to do with the software.

For example, these software applications allow customer spatial analyses to be carried out in order to help sales representatives control their tours and prospecting activities, or to help them identify store customers. To do this, these analyses are carried out in four stages:

– the geocoding of customers' addresses according to the number in the street where they live. There may also be the step of processing or pre-processing the data. These GIS integrate in particular spatial clustering functions or models (Huff – see Chapters 2 and 4 – on Geoconcept, add-on resolution of location-allocation models on *ArcGis*, etc.), R software functions on QGIS, etc.;

– the preparation of the map, in other words, all the layers necessary to produce the map according to the desired level of detail:

- physically geographical obstacles: rivers, mountains, forests, etc.;
- road and rail infrastructure;
- large locations: airports, military camps, universities, hospitals, etc.;

– represent on the map, prepared for this purpose, the geocoded addresses of customers to see if they are grouped or scattered;

4 https://www.appvizer.fr/marketing/geomarketing.

– choose a scale so that the map is sufficiently clear in its reading and that the identification of customers is immediate.

On the map in Figure 1.2., we can see the presence of a store (blue star) and customers (red triangles). It is quite easy to distinguish the edges of the strongest customer area. The analysis then involves dividing the market area studied into cells: cells of 10 miles are suggested for a local study and 100 miles for a national study.

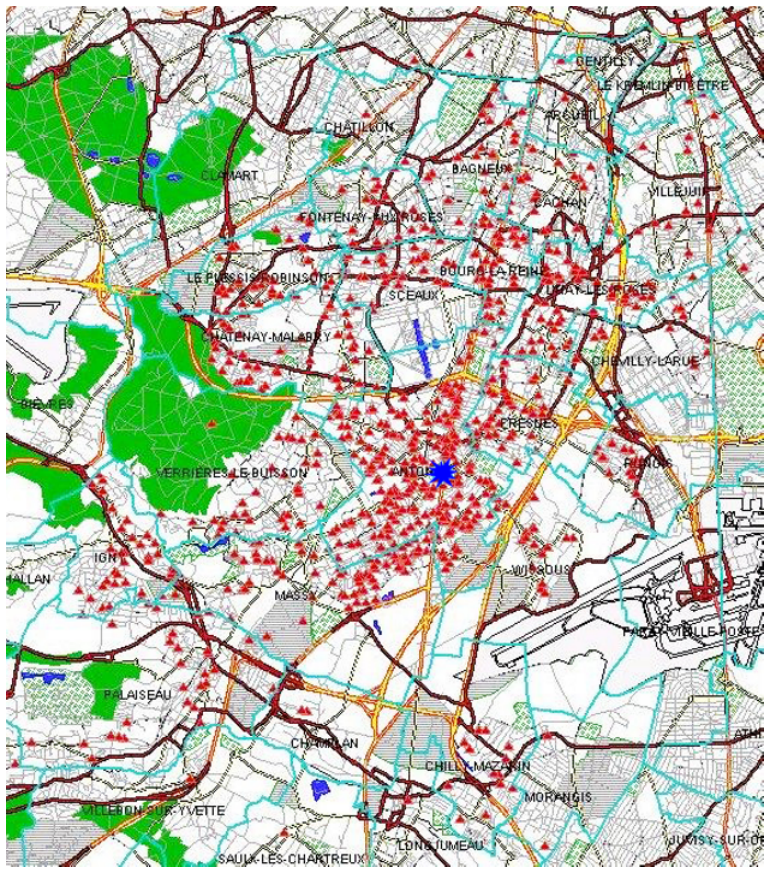

Figure 1.2. *Map of the addresses of the clients (triangles) of a firm located south of Paris (source: Spatialist)*[5] *. For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

5 http://www.spatialist.fr/ with the kind permission of Philippe Latour.

1.4.3.2. *Websites and geomarketing platforms*

The rapid dissemination of mapping techniques and the increasingly intensive use of the Web have led to the creation of two concepts that form so many neologisms: on the one hand, "neo-geography" and on the other hand "geoweb" (Joliveau 2011). As a result, very large amounts of uncontrolled geospatial data have been produced. "Neo-geography" represents the production of these data by "amateurs" and no longer only by professional geographers. The "geoweb" is an "organization by the information space on the Internet through direct or indirect geo-referencing on the Earth's surface" (Joliveau 2011).

Websites, often free of charge, now allow you to practice geomarketing. But there are also quite complete and equally free software that flourishes on the Web. Some are online and come in the form of platforms:

> SaaS management allows a company to no longer install applications on its own servers, but to subscribe to online software and pay a price that will vary according to their actual use.[6]

The disadvantage lies in:

– dependence on the service provider;

– the difficulty in changing service providers and transferring data;

– cost when the same applications are often used by the company.

There are also free software on the net with the major disadvantage of having limited functionality to carry out a large project.

1.5. Conclusion

Geomarketing is based on mapping techniques derived from digital geography. It has become an indispensable area in many marketing decisions. A very large number of companies have adopted it and not only retailers, because it can also help industrial firms to better understand their markets. It provides unparalleled precision to adapt the offer to the characteristics of current and potential customers. An increasing number of companies and sites are offering "solutions" related to geomarketing.

Access to free online software, although not as complete as market software, allows smaller companies to acquire skills and improve their understanding of local,

6 https://www.lecoindesentrepreneurs.fr/le-mode-saas/.

regional and national markets compared to others and thus to make market and market area choices, not to mention much more relevant sites. These developments are both technical, thanks to advances in digital geography, but also theoretical and have led to the emergence of spatial marketing that transcends geomarketing and takes it to new horizons in mobile marketing.

However, interpreting maps is an operation that requires knowledge that has been validated in scientific work, and this is the purpose of the following chapters.

2

The Consumer's Spatial Behavior

Any marketing approach must be preceded by an analysis of buyer behavior, which is the main driver of marketing systems (Alderson 1965). But this type of analysis too often remains "aspatial". Introducing space into this approach is increasingly necessary in order to capture the consumer *en route* and thus make geomarketing more dynamic, because it is often too static and descriptive. This is all the more useful as changes in behavior in our societies impose new rules of the game (Levy 1996). It is therefore necessary to focus more on trajectories than territories (Golledge and Stimson 1997). After having defined and clarified the main concepts related to the consumer's spatial behavior, Chapter 2 addresses the first "spatial" phase of this behavior (i.e. his movement to the point of sale or behavior outside the store), then the second phase (in this case, his or her movement within the point of sale or behavior in the store).

2.1. The main concepts of out-of-store spatial behavior

A spatial marketing approach must therefore also begin with an understanding of the spatial behavior of buyers and more specifically of consumers, this book being more focused on consumer marketing. Marketing researchers have focused on understanding why people buy (e.g. the famous article "Why do people shop?", Tauber 1972), and how they buy. The "how they move to and through the point of sale" has been neglected, although it can help to answer at least part of these two questions. Geographers have explored these questions in more depth on travel in general without focusing on the act of purchase. They analyzed individuals' approaches based on work in environmental cognition, thus developing behavioral geography (Golledge and Stimson 1997; Golledge 1999). They have also modeled

Location-based Marketing: Geomarketing and Geolocation,
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these behaviors (Fotheringham 1983). They have thus constituted both conceptual and methodological sources of interest for spatial marketing.

The consumer's spatial behavior is explained by a number of common concepts such as attraction, gravitation, spatial interaction, distance and mobility. None of these concepts are really easy to understand, and even distance can cause such distortions that behavior is sometimes very poorly understood.

2.1.1. *Attraction, gravitation and spatial interaction*

Studying store attraction, a strategic element of retail marketing (Jallais *et al.* 1994), is all the more difficult in an urbanized environment. Figure 2.1 shows that E. Leclerc hypermarkets can, in rural areas, have a trading area, in other words an attraction, quite simple to represent on a map, whereas in urban areas where several E. Leclerc stores coexist, the delimitation of these areas and therefore the understanding of the attraction is more complex.

The consumer's spatial behavior requires an understanding that is all the more precise as he or she is increasingly mobile. Attraction is a concept that can be treated spatially or otherwise. Psychosociologists consider it as a first evaluation of a person or object following contact. This evaluation is based on two basic dimensions: the ability and willingness to facilitate the needs and goals of the person who perceives this attraction (Montoya and Horton 2014). Psychoanalysts, on the other hand, prefer to speak of the attraction that objects or places can exert on individuals, of attraction for people and of attraction for what is often inaccessible (Pontalis 1990).

Geomarketing requires us to consider attraction in its spatial dimension. Physics helps to better understand this concept. Newton was the first to model attraction, called gravitation at the time, on the planets and its famous formula gave birth much later to models used in marketing and especially in geomarketing. Gravitation comes from an old French word, *grave*, which refers to an object with sufficient mass to attract others. Einstein challenged this theory in 1905 by showing, from the theory of limited relativity, that the gravitational relationship is curvilinear. But the work on the gravitation of retail stores remains valid, because the distances are very small compared to those of astronomy.

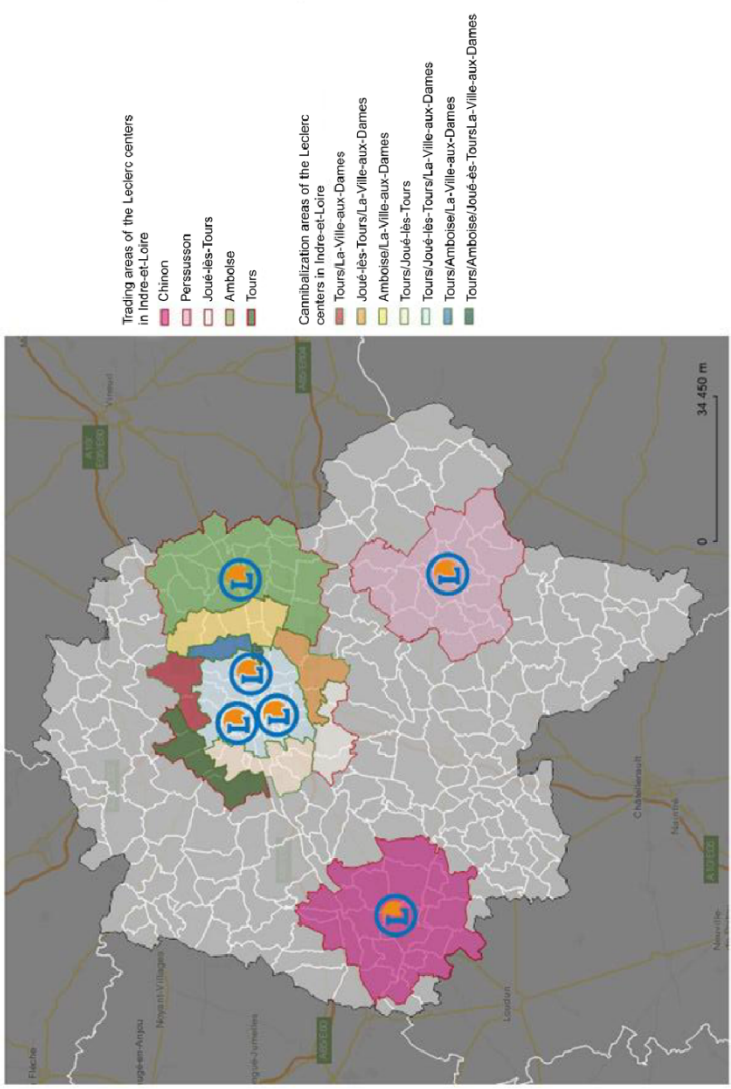

Figure 2.1. *The attraction of the E. Leclerc hypermarkets in Indre-et-Loire (37) (source: with the kind permission of Articque). For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

Models have been developed to explain and predict consumer spatial behavior. Some of these models are conceptually based on the idea of attraction, which can be expressed in gravitation and/or spatial interaction. "Spatial interaction is a broad term encompassing any movement over space that results from a human process" (Haynes and Fotheringham 1984). Gravity models are the most commonly used spatial interaction models in geomarketing. They make it possible to integrate absolute distances measured in space or time and distances relative to the fixed points studied: two points A and B, cities or stores, can be located at the same metric or temporal distance as two other points C and D, other cities or stores; but points A, B, C and D are generally very different and gravity models are able to take this relativity into account through the consideration of their respective masses.

This attraction can be explained by three structural factors (Cliquet 1992):

– the classification of goods and services;

– the principle of least effort;

– distance.

Knowing that distance is perceived as an effort (Proffitt *et al.* 2003), promotions are also attraction factors and can change a consumer's itinerary, but, unless the customer switches permanently from one point of sale to another (which is what all store managers are looking for), this attraction phenomenon generally remains temporary (Cliquet 1992, 2002a).

The classification of goods refers to the central place theory (Christaller 1933). This classification was developed as early as 1923 in the first issue of the *Harvard Business Review*. The proposed typology (Copeland 1923) distinguishes three categories of goods:

– commodity goods: purchased routinely and effortlessly;

– shopping goods: requesting a collection of information;

– specialty goods: chosen according to the importance of the brand.

It is immediately apparent that each product category will generate different types of movement and therefore spatial behavior for consumers. Commodity goods require little effort because their purchase is routine. Speciality goods mainly involve identifying the stores that sell the desired brand. *A priori*, commodity and speciality goods can be modelled using gravity-based models. On the other hand, shopping goods require data collection that may require consumers to visit various stores before making a decision, although the use of the smartphone may help them in their collection, this being true for all goods.

Traditional consumer behavior models are most often based on the essential role played by the brand, thus focusing efforts on speciality goods: but these models are essentially "aspatial", because they do not take into account geographical space in favor of the virtual space of brands. However, retailers have developed real brand strategies with their private labels and above all brand strategies that enable them to build customer loyalty (Filser 1994) in a given geographical area. Moreover, consumers do not always have the leisure or the means to chase after brands: they are increasingly receptive to retailers' strategies to the point that it is often the fascia's attractiveness that prevails over that of the brand. It should be noted that, on the one hand, the increasing mobility of consumers and, on the other hand, the use of the Internet to purchase an ever-increasing number of goods can help transform the content of the three goods categories (commodity, shopping and speciality).

The principle of least effort is well known to psychologists (Zipf 1949). It is associated with the distance or travel time that humans, like animals (Tsai 1932), seek to minimize. Loyalty to the brand is often explained by the principle of least effort: we speak of reactive loyalty. However, consumer loyalty is increasingly hampered by the desire for variety research (Lancaster 1990; Aurier 1991; Kemperman *et al.* 2000; Siriex 2000), which is reinforced by retailers' differentiation strategies (Cliquet *et al.* 2018).

It is clear that behind, on the one hand, the classification of products and its impact on the way consumers move, and on the other hand, the principle of less effort during these moves, lies distance. This has been the subject of numerous studies and paradoxically remains the variable that is often the most difficult to capture.

2.1.2. *Distance*

The concept of distance can be qualified in different ways in the context of organizations and some authors distinguish between geographical, cognitive or social distances (Douard *et al.* 2015). Studying consumer spatial behavior has long been reduced to analyzing the geographical distances travelled between home and the point of sale. The law of retail gravitation (Reilly 1931) imposed this constraint, because gravity is defined by distance and mass (here, the point of sale).

The extraordinary development in number and especially in size of the modern retailing formats in the 1960s quickly imposed a new vision of this distance. Indeed, and to use Braudel's (Braudel 1986) words: "The true measure of distance" is "the speed at which people move". In other words, it is the travel time rather than the distance of the journey that matters. Research then sought to better understand these travel times in general by tracing isochrones (Chabot 1938), then applying them to

marketing issues (Brunner and Masson 1968). Thus, it is easy to obtain maps broken down according to this "time distance" between home and point of sale of all the main residential areas around a store (Cliquet *et al.* 2006).

Distance can also appear as a variable that can be measured from one point to another using an apparatus: it is the absolute distance (Haynes and Fotheringham 1984). But it also has a relative value that depends on the nature or position of the extreme points, hence the notion of spatial interaction. Its use in models to predict consumer behavior then becomes much more difficult to control. Indeed, distance in the absolute or metric sense of the term has been the subject of much work since the law of retail gravitation (Reilly 1931) that Converse (Converse 1949) was able to formalize. And even if this law was used for a long time to locate malls (McKenzie 1989) or supermarkets in rural areas (Giraud 1960), the notion of temporal distance (Huff 1964) was gradually preferred to correspond to the movement of consumers by car.

2.1.2.1. *Geographical and temporal distance*

Geographical or metric distance is used when considering the respective situation of points of sale within a network, particularly when it is composed of franchisees (Darr *et al.* 1995; Darr and Kurtzberg 2000). Time distance is also often disappointing as an explanatory factor for spatial behavior. There is a perceptual bias that differentiates us from our contemporaries and requires us to evaluate time and many other things specific to our personality, culture, mood, etc., and consumers do not all have the same perception of time (Bergadaà 1988, 1989). In fact, decisions are not made according to reality, but according to the subject's perception of it, particularly in spatial matters (Brunet 1974). However, this perception of distance can be very different from one individual to another, whether in its metric or temporal measure (Croizean and Vyt 2015). A subjective measure of perceived distance gives much better results than an objective measure and allows for the measurement of a much larger number of variables (Cliquet 1990). And as we have seen, depending on the type of products sought by the consumer, the understanding of distance in his behavior will be different: commodity goods are more sensitive to distance whatever its measure, but especially its perceived measure. On the other hand, shopping goods, which require several trips to different points of sale, are marked by a distance-related threshold effect (Malhotra 1983) in that consumers agree to visit stores within such a long radius (perceived), but beyond that, they do not move as in the furniture market (Cliquet 1990). Finally, so-called speciality products, such as luxury or very strong branded products, may lead buyers to no longer take distance into account. It has been suggested that ICT would limit travel, but it has been found that cyber shoppers spend as much time traveling for their purchases as before (Allemand 2001).

2.1.2.2. *Distance in psychosociology*

But distance is not only measured geographically or temporally. It also plays a role in the psychology of human relations and is often referred to as cultural distances (Benabdallah and Jolibert 2013). A distinction is made between social or sociospatial distance (Hall 1966), psychological distance (Mulder 1958) and psychic distance (Johanson and Wiedersheim-Paul 1975). Social or sociospatial distance has been defined as characterizing human relationships and as one of the components of "proxemics" (Hall 1968). Psychological distance is related to power relations between individuals (Poitou 1966) and is often confused with psychic distance. It has been shown, during an experiment in a restaurant in France, that there is a preference for a greater distance from other customers and staff, especially when customers are part of a group (Clauzel and Riché 2015).

2.1.2.2.1. Social or sociospatial distance

Social or sociospatial distance has been studied under the concept of "proxemics" (Hall 1968) defined as "the interrelated observations and theories of humans use of space as a specialized elaboration of culture" (Hall 1966). Proxemics is more about the "how" than the "why", the structure than the content. It reveals a distinction related to social distance that can be summarized from work done in the United States (Hall 1966):

– intimate distance: less than 46 cm, less than 18 inches;

– personal distance: from 46 cm to 122cm, 1.5 to 4 feet;

– social distance: from 120 cm to 370cm, 4 to 12 feet;

– public distance: over 700 cm, 25 feet or more.

Depending on the country where you are and the dominant culture, these social distances can be very different, for example between China and Japan, between North and South Europe. Ignoring these differences can lead to misunderstandings or even mistakes.

2.1.2.2.2. Psychological distance

Psychological distance (Mulder 1958) aims to explain the hierarchy in power relations. The desire for power drives individuals to want to reduce psychological distance from supervisors and increase psychological distance from subordinates, especially in cases where promotions within the organization are made difficult or even impossible (Poitou 1966).

2.1.2.2.3. Cultural distance

Cultural distance requires overcoming differences in appreciation among consumers, employees or partners in the target country. The literature provides many examples and international comparisons (Usunier and Lee 2013; Meyer 2015). One model may have shown that cultural distance is an antecedent of psychological distance (see below) (Souza and Bradley 2006). The analysis of cultural distances is of real importance in the internationalization process (Beugelsdijk *et al.* 2018):

– both in the pre-decision phase:

- the choice of locations;

- the choice of ownership levels (company-owned units, franchised units or joint ventures);

- the organization of expansion in foreign countries, in other words the choice of entry mode and expansion mode (Picot-Coupey *et al.* 2014);

– and in the expansion phase itself:

- the integration of the subsidiary (or of the joint venture or of the franchised unit) into the organization (transfer of practices);

- the measurement of the performance effects of cultural distance both at the level of the subsidiary (or of the franchised unit) and the organization as a whole.

From this research, it appears that, if a company is less inclined to invest in countries where the cultural distance is large compared to its own, it does not give up making investments of a completely new type in these countries. Moreover, cultural distance does not act negatively or positively over time, but depends on how it is treated (Beugelsdijk *et al.* 2018).

2.1.2.2.4. Psychic distance

Psychic distance must also curiously awaken the geomarketer's interest. Indeed, some companies have experienced many export difficulties due to a lack of knowledge of this complex aspect. Psychic distance has been highlighted in what is now known as the Uppsala model (Johanson and Vahlne 1977). This psychic distance can be measured using an index rather than a scale (Brewer 2007). It has been shown that psychic distance explains the performance of some major international retailers, particularly in terms of financial and strategic efficiency (Evans and Mavondo 2002) and that it is of crucial importance in alliance strategies for research and development in industries with high levels of knowledge management (Choi and Contractor 2016).

2.1.2.2.5. Institutional distance

Finally, institutional distance can constitute an obstacle in some countries insofar as the international exporting firm is caught between the need for performance and the reality of social acceptance, in other words, its legitimacy in a country that is not its own and where habits, if only contractual, are not the same as in the country of origin: governance choices can then prove crucial (Yang *et al.* 2012).

2.1.3. *The notion of shopping trips*

It is important not to confuse the shopping trip with path-to-purchase. In what follows, the shopping trip involves a strong spatial dimension (Frisbie 1980) while path-to-purchase contains a spatial part, the shopping trip. Path-to-purchase begins, according to consumer behavior theories, with stimulus and motivation, and continues with the formation of attitude and intention before the actual purchase (Engel and Blackwell 1982), followed by product consumption, redemption and recommendation (Shankar *et al.* 2011). All this can now be done via the Internet without leaving home. The purchasing behavior cycle includes information seeking, evaluation, goods category and/or brand decision, store selection, in-store journey, purchase and post-purchase (Shankar *et al.* 2011) to which the out-of-store journey should be added before the choice of the latter.

Among the non-store routes, we can distinguish multi-object paths that aim to take advantage of an outing to visit several stores, and single-object paths that consist of going to a single store. Traditionally, several attributes are supposed to guide the consumer in his spatial shopping choices for his multi-object tours (Timmermans 1980):

- parking facilities;
- obstacles due to traffic;
- distances between stores;
- the availability of specialized brand stores;
- the presence of large retailers;
- product prices;
- the quality of the products;
- the choice among the products;
- the quality of services;

– the windows;

– the number of stores.

Most of the consumer's spatial behavior models focus on the single-object path. A Logit-based model shows the value of integrating multi-object pathways to better understand the competitive structure of markets (Popkowski Leszczyc *et al.* 2004) and to develop more refined strategies for attracting consumers.

Now, with the possibilities offered to consumers to use tablets and smartphones, the routes are more complex to analyze. And at this stage, it is necessary to open a parenthesis about "multichannel". Marketing channels have increased in recent years. In addition to the store, consumers can use their laptop, smartphone or tablet to access the Internet or social networks, while the traditional telephone or mail is losing momentum. These channels allow the consumer, thanks to these new technologies, to stay connected and move from one channel to another without losing information very quickly ("omnichannel" approach). All this is done anytime and anywhere according to the acronym ATAWAD (anytime, anywhere, any device) presented by Xavier Dalloz in 2002 and completed in the form ATAWADAC (anytime, anywhere, any device, any content) developed by Mick Levy in his blog[1]. Companies must therefore adapt to this new situation.

For a while, the firms simply managed these various channels into as many silos, each silo living its life more or less independently of the other channels. However, not only is this management expensive, but it does not attract the customer. In order to overcome this inefficiency, firms have connected these channels in a movement of "interchannel" way that must be made profitable this time by developing a crosschannel approach. Firms, whether producers or distributors, must now respond with their "crosschannel" approach to the "omnichannel" approach of consumers.

That being said, let us come back to the notion of shopping trips. This route has evolved considerably in recent times and it is possible to define shopping trips by distinguishing between traditional and omnichannel routes. Consider a new product (clothing, small appliances or electronic product). The traditional route may be as follows:

– information (press, radio, television);

– physical research of possible points of sale;

– price comparison in stores;

1 https://fr.blog.businessdecision.com/bigdata/2015/09/atawadac-cri-de-guerre-digital/.

– choice of store;

– purchase of the product.

So, what about the "omnichannel" path?

2.1.3.1. *The omnichannel path*

In reality, the omnichannel path may be as follows (*omnichannel path 1*):

– information (press, radio, television and especially tablet or smartphone);

– search for points of sale on tablets or smartphones;

– price comparison on tablet or smartphone in stores;

– choice of store;

– purchase of the product in the store;

– providing an opinion on a social network;

– response to a customer satisfaction survey proposed by the store.

This omnichannel path could also take other forms (*omnichannel path 2*):

– information (press, radio, television and especially tablet or smartphone);

– search for points of sale on tablets or smartphones;

– price comparison in tablet or smartphone stores;

– choice of store;

– product testing in the store;

– purchasing the product on the Internet at home or in any other place;

– providing an opinion on a social network;

– response to a customer satisfaction survey proposed by the store.

Or (*omnichannel path 3*):

– visit to a store;

– discovery of an interesting product;

– price comparison in competing stores on tablets or smartphones;

– choice of store;

– purchase of the product in the store;

– providing an opinion on a social network;

– response to a customer satisfaction survey proposed by the store.

Or why not (*omnichannel path 4*):

– visit to a store A;

– discovery of an interesting product;

– price comparison in competing stores on tablets or smartphones;

– choice of store;

– purchase of the product thanks to the smartphone in store B;

– providing an opinion on a social network;

– response to a customer satisfaction survey proposed by store B.

We can see that a growing number of consumers are adopting shopping and browsing paths involving all points of contact, whether physical or virtual, at their disposal in order to follow the evolution of their retailers and brands without having to travel except when the need arises (Cliquet *et al.* 2018). This is referred to as omnichannel behavior, which must be fluid, frictionless and seamless (Brynjolfsson *et al.* 2013), hence the need to enrich these new routes (Picot-Coupey *et al.* 2016) to increase their value for the customer (Hunneman *et al.* 2017). In any case, firms must adapt to multichannel competition by making it easier for their customers to access the different channels they use through the most efficient crosschannel strategy (Picot-Coupey *et al.* 2016).

2.1.3.2. *The ROBO or ROPO path*

We could thus conceive many other paths under the acronyms ROBO (Research Online Buy Offline or Research Offline Buy Online) or ROPO (Research Online Purchase Offline or Research Offline Purchase Online) (Kalyanam and Tsay 2013) that could lead to showrooming, a situation in which the store is only used to display products, purchases being made on the Internet. And with regard to the multichannel 4 path, some brands have been able to develop store concepts in which the customer can use the product, then buy it on the Internet, as the store does not have any stock and may offer interactive terminals to order the product to be delivered at home (e.g. this is the case with Decathlon stores). And we understand the logistical challenge of the "last mile" (Durand *et al.* 2013) or how to deliver as quickly as possible so that the customer can enjoy the product when he gets home: some people no longer talk about the "last mile", but rather about the "last hour" or even the "last minute" when the buyer is in a hurry and in this case, the price is higher, as the mobile pump

operator Gaston[2], who delivers fuel to the home, practices in Paris. Here again, we see the importance of distance, whether it is metric or temporal and beyond the control of space: the trade war that is starting in Paris, between Carrefour and Casino on the one hand and the newcomers Amazon and E. Leclerc on the other, for the fastest and cheapest delivery will illustrate this.

We can see how much understanding of consumer spatial behavior, both in physical and virtual space, can be a determining factor for retailers and ultimately also for all firms, some of which sell their products directly on the Internet (Collin-Lachaud and Vanheems 2016). We can also see the growing importance of logistics (Huré *et al.* 2012), which has become the very heart of companies like Amazon. However, the consequences of these new spatial behaviors on store management must be qualified. The major trips have long been distinguished from filler trips (McKay 1973; Frisbie 1980; Kahn and Schmittlein 1989; Kahn and Schmittlein 1992). It has thus been shown that the type of shopping trip has an influence on unplanned or impulse purchases (Kollat and Willett 1967). The presentation of the product can still be a factor of attraction for the customer without him/her being informed about competing offers.

2.1.4. *The notion of mobility*

In the early 2000s, it could still be said that the mobility of individuals was increasing sharply (Moati 2001). The French traveled an average of 14,300 kilometers per year (compared to about 9,000 kilometers in the early 1980s), slightly more than the European average, but half as much as in the United States, with most traveling within an 80-kilometer radius from home. The French traveled an average of 23 kilometers per day during the week (excluding long-distance travel), a third more than 25 years earlier (Orfeuil 2001), even though travel times remained more or less stable thanks to advances in both individual and public transport, as well as the number of trips (Lauer 1998). While commuting accounted for the bulk of these trips, it was still observed in the early 2000s that the share of commuting tended to decline in the face of purchasing or leisure-related mobility (Marzloff and Le Carpentier 1999). Indeed, from 1982 to 1994, the number of trips per person per day for business purposes decreased by 20% while those for leisure increased by 33%; trade accounted for 20% of weekday trips and 25% on weekends (Desse 2001). The time spent on transport remained stable. Since travel was no longer concentrated at certain times of the day and week, it tended to spread over time, making off-peak and rush hour concepts irrelevant. The "tyranny of distance" (Leo and Philippe 2000) tended to be reduced in consumer behavior.

2 https://www.gaston-services.com/.

2.1.4.1. *Complex mobility*

We now speak of complex mobility with less "pendular" paths, no longer being simple round trips, the spatial norm of movement is no longer radial, but with loops (Viard 1994). The intensification and complexity of mobility is also due to social transformations, with the arrival of women on the labor market and new organizations (flexible working hours, continuous working day, telecommuting, 35-hour work week). Peregrination is becoming the dominant mode of operation: shopping trips are part of more complex chains where distance can play a role in assessing consumer values (Brooks *et al.* 2004) with consequences on the location of points of sale and prices (Popkowski Leszczyc *et al.* 2004).

This peregrination is the result of the crossover of urban space use strategies by households and an increasingly fragmented supply of shops and services throughout the urban region. Depending on the workplace, the mode of transport, but also more individual variables (age, household composition, etc.), the intensity of peregrinations can vary (Desse 2001). We can therefore distinguish an "insular" mobility, characterized by a routine journey and timetable from a mobility of "archipelagos" or "networks", characterized by paths less concentrated in space and time (Allemand 2001). Semiotics has been used as a tool to understand, for example, mobility within tourist behavior (Graillot 2001). As early as the 1980s, firms had understood the importance of mobility in their segmentations (Sevosi and Troiani 1987).

What is the situation today? The INSEE survey on the evolution of mobility carried out among 20,200 households and 18,600 individuals in 2007–2008 (Hubert 2009) compared to the 1993–1994 survey shows that daily mobility is decreasing in 79 points of urban areas with more than 100,000 inhabitants at the 1999 census; the next survey is 2018–2019. But, on the contrary, it continues to increase in rural or poorly urbanized areas. In these latter areas, where households will move to escape high rents and housing prices, access to shops has increased by 5%, as has the number of cars in these rural and peri-urban households. On the other hand, in many large urban areas where transport has improved, consumers are increasingly preferring local shops for time saving reasons (Gahinet 2014). Mobility is expected to drive an explosion in services by 2030, according to a PricewaterhouseCoopers (PwC) study (Bourassi 2019).

An increasing number of urban-area hypercenters have been able to organize themselves around pedestrian sites and dedicated tramway-type public transport. It can therefore be said that city dwellers change their behavior in order to travel lesser distances. People are becoming aware of the futility of some travel (Amar 2010) and are seeking to be more productive in their travels, especially in terms of relationships or "reliance". There is undoubtedly an awareness among city dwellers of the pollution and the extent of carbon footprints (Heitz *et al.* 2010). But, even for

the inhabitants of peri-urban areas, it has been observed for several years that "Fordian" transport, that is, the same for all at the same time, is no longer conceivable (Ascher 2000). The choice of a store is more based on opportunities: consumers shop in a supermarket because it is on their route, and because they have time to stop there at that particular moment (Desse 2001). These mobility times are therefore now at the heart of the new rationales for setting up shops (Gasnier 2007).

Mobility studies are often based on transversal work or photos at a given moment without any follow-up of these mobilities. In order to fill this gap, recent research (Louail *et al.* 2014) has relied on data from mobile digital media, such as smartphones, messages and geolocated photos from Twitter or Foursquare. Based on credit card transactions in the Barcelona and Madrid regions and socio-demographic data, it has been shown that types of mobility vary according to age, gender and activity (Lenormand *et al.* 2015).

2.1.4.2. *Inequalities in mobility*

There are inequalities in mobility. In order to better understand its sources, sociology has proposed the concept of "motility", defined in biology as "the ability of living beings to produce movement" (Kaufmann *et al.* 2015, p. 21). As transport and communications accelerate, it is clear that spatial mobility and social fluidity are not always in line with each other. Motility is then defined "at the individual level [...] as the way in which an actor appropriates the field of mobility possibilities and uses it to develop personal projects" (Kaufmann 2011). Motility can be broken down into several concepts: access, knowledge, skills and appropriation (Kaufmann *et al.* 2015). We can then try to bring this idea closer to that of capability (Sen 1985), defined as the individual's freedom of choice, and put forward the idea of spatial capability in relation to the social inequalities linked to the difficulties encountered by individuals who lack the motility necessary to develop their projects. This makes one more aware of the futility of certain public policies that do not take into account the motility of individuals facing, for example, unemployment.

2.1.5. *Ubiquity*

Ubiquity, from the Latin *ubique* meaning "everywhere", is today a concept at the very heart of the activity of mobile commerce (or m-commerce) and its issues. Ubiquity can be defined as the ability to be everywhere at the same time. This definition shows to what extent space and time are intimately linked, including in the behavior of individuals. It also indicates that ubiquity can be interpreted as an "antimobility": indeed, there is no need to move, the ubiquitous individual, we refer to as the "ubinaut" (Badot and Lemoine 2013), is endowed with the power to be everywhere at once and instruments such as tablets or smartphones allow him to act

in a kind of "dynamic immobility". The smartphone makes it possible to buy products when you want, as with the computer and especially where you want, hence the term ubiquitous consumption (Cox 2004). As early as 2002, five years before the emergence of smartphones, the idea of uber-commerce (or u-commerce) appeared (Watson *et al.* 2002) (see Chapter 5), which would correspond to a kind of "overtrade" that would encompass and go beyond traditional commerce, providing all the necessary information, thus pushing the limits of rationality (Simon 1957). Ubiquity, a synthesis between time and space, can also be analyzed as a combination of time and spatial convenience, notions that have been used to understand the intention to use mobile phones to access financial services (Kleijnen *et al.* 2007), or smartphones to shop (Cliquet *et al.* 2013). Ubiquity can also be perceived as the main characteristic of mobile services (smartphone, tablet, etc.) and can be broken down into (1) continuity in the ability to maintain the quality of access to services without interruption, thus allowing simultaneous tasks; (2) immediacy through the speed of data transmission; (3) portability or ease of transporting mobility instruments; and (4) the ability to optimize searchability in an information system (Okazaki and Mendez 2013).

2.1.6. *Other concepts related to the consumer's spatial behavior*

The study of the consumer's spatial behavior implies the presence of other concepts: market area, trading area and isochrones, spatial area of indifference, sales leakage, market saturation, notions of customer stock and customer flows as well as peregrinations.

2.1.6.1. *The market area*

The market area, or local market, represents a geographical commercial entity, generally located around a city, whose size depends on its population and which is delineated according to the distance from other local markets. These markets are frequented by local consumers and constitute a meeting point, a centrality, that facilitates shopping (Berry 1967). This notion of market area or local market can be compared to that of area of influence (Noin 1989) in commercial matters. The work of a company specializing in geomarketing, Astérop, had served as the basis for an article in the newspaper Le Monde (Brafman 2008) in which it was shown that there were 629 local markets in France. At a time when there were fears of renewed inflation, the aim was to show that this inflation had local structural causes, that is, around 60% of local markets were under the influence of a single retailer, 25% under the influence of two retailers and the rest was experiencing real competition.

2.1.6.2. *Store trading area and consumer supply area*

The trading area refers to the territory from which the customers of a point of sale originate (Applebaum and Cohen 1961; Huff 1964). The trading areas of the points of sale were long considered to be formed by three concentric circles in order to estimate potential sales (Applebaum 1966):

– the primary area, where approximately 60 to 70% of the clientele is concentrated;

– the secondary area, with between 15 and 25% of the clientele;

– the tertiary or marginal area, with the rest of the clientele.

These primary, secondary and tertiary areas were quickly measured in terms of time (Brunner and Masson 1968) giving rise to the isochrones. But with the advent of geomarketing, the actual shape of trading areas has changed considerably (see Figure 2.2).

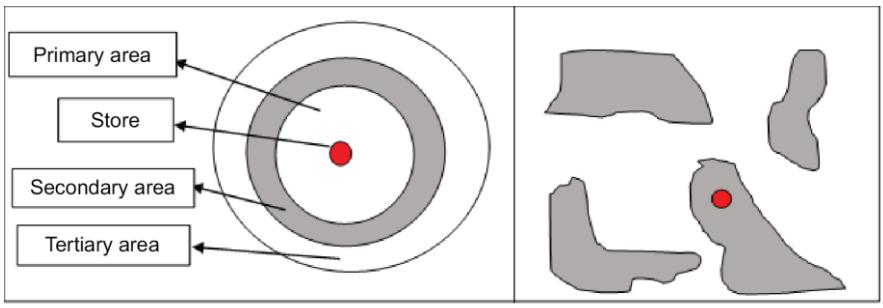

Figure 2.2. *Theoretical and actual trading areas. For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

In the left part of Figure 2.2, the theoretical trading area is represented by concentric circles with the primary, secondary and tertiary areas according to a well-known method, while the right side of Figure 2.2 shows a fully exploded real trading area. Indeed, by using geomarketing software and geocoding customer addresses using loyalty cards, it was discovered that the trading areas were composed of "pieces" representing an archipelago and not concentric circles. The trading areas are still often represented in theory.

In Figure 2.3, we see that the decomposition of the market area studied into geographical cells, which can be IRIS or cantons, allows the borders of the trading area to be refined very quickly using an address file and geomarketing software. It is

also possible to take into account the sales surface area of the points of sale and to nuance the strength of attraction with the help of colors.

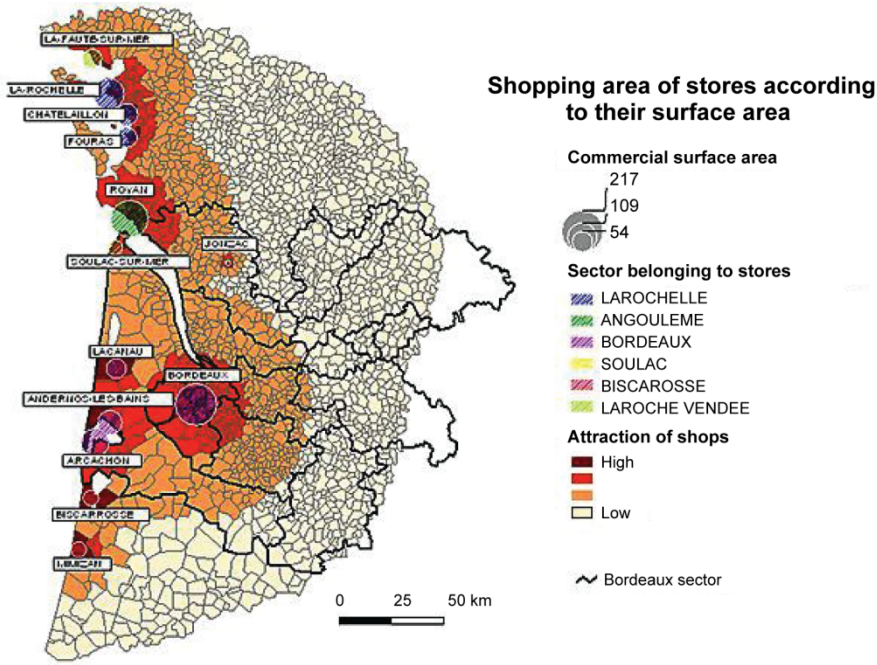

Figure 2.3. *Shopping area of stores according to their surface area (source: with the kind permission of Articque). For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

These representations may take time. The representation of these "pieces" of trading area can be accelerated by using filtering and convolution techniques (Baray 2003a) (see Chapter 4).

Faced with the store's trading area, a customer travel area can be defined as a consumer supply area (Bellanger and Marzloff 1996; Michaud-Trevinal and Cliquet 2002; Moati 2011). This radius varies according to the goods category. It can be linear in the case of commodity goods, if the traditional classification of goods (Copeland 1923) is used, whereas it will be considered as a threshold (Malhotra 1983) beyond which the consumer will refuse to seek information in the case of shopping goods. There is a linear function with speciality goods as long as they are not out of stock (Campo 2000b).

2.1.6.3. *The principle of spatial indifference*

Derived from the expression "just noticeable distance" used in psychophysics according to Weber's law, the principle of spatial indifference postulates that the consumer does not necessarily choose the nearest store, but rather that there is a spatial zone of indifference. It is an area in which the marginal cost of reaching another store is considered minimal (Nystuen 1967), and where the consumer is required to make several trips in order to minimize his total shopping cost (Keane 1989) either by purchasing complementary products or by visiting several points of sale to find goods (Craig *et al.* 1984) as within the furniture market (Cliquet 1990).

The spatial area of indifference corresponds to threshold effects (Malhotra 1983), because the client does not accept moving beyond a certain distance. From now on, supermarkets are suffering from the shrinking size of this area and have difficulty attracting customers: their trading area is being reduced in favor of convenience stores located in the consumer's supply area, which means that consumers can better manage their time (*chronos*), go whenever they want (*kaïros*) (Gahinet and Cliquet 2018) and control their space (*choros*).

2.1.6.4. *Market saturation and sales leakage*

Retail leakage refers to the fact that consumers prefer to shop in a local market other than the one closest to their home. It can also affect national markets: Singaporeans sometimes prefer to shop in Malaysia (Piron 2001). There are many reasons for this. The first reason is probably the saturation of the market (Duke 1991). To counter this saturation, merchants should differentiate themselves according to the type of customers they are missing. To do this, we can rely on a leakage analysis (Ohmae 1982) which consists of studying different client segments (Duke 1991): the clientele that the firm cannot target, the one that it can target but without success, the one that it has managed to win and the one that is loyal to it. In terms of spatial marketing, this means analyzing the trading areas, that of the trader involved and those of his competitors. It may then be that by offering, for example, a product not yet available in the market in question, promotional campaigns and better adapted pricing and quality policies, that the attraction will work again.

A second reason is the lack of supply. Some local markets are often mainly occupied by businesses belonging to a single retail group: this has an impact on local prices (Gullstrand and Jörgensen 2012) and can encourage consumers to "look elsewhere". A third more recent but increasingly important reason is undoubtedly the increased mobility of consumers to both their workplace and their leisure space, which forces stores to attract not only consumers from their trading area, but also those who pass near the point of sale. We then come to deal with the notions of customer stock and customer flow (Cliquet 1997a). All these aspects not only affect

retailers but also have a strong influence on local public policies in terms of retail attraction within cities and regions.

2.1.6.5. *Customer stock and customer flows*

The business model of a point of sale is most often based on attracting and capturing a stock of customers residing in a specific geographical area: the trading area. This model is changing significantly as consumers become more mobile. And many businesses must not only manage their trading area, but also capture the "flows" of customers passing through their commercial space and take an interest in the movements of consumers. However, even if what follows can be challenged by the Internet, few sectors are strictly "stock" (insurance, driving schools, etc.) or "flows" (hotels) (Cliquet 1997a). "Flows" related to commercial and service activities tend to increase with consumer mobility. Before dealing with these new mobilities, it is important to be familiar with the traditional approaches that have led to the modeling of consumer behavior.

2.2. Models and theories of spatial consumer behavior outside the store

There are now huge, so-called massive or Big Data, databases available, which can provide opportunities that are still under-exploited to better understand the evolution of market areas. Retailers who scan customer purchases every day in their stores at each checkout are at the forefront of billions of data points and thus possess a considerable amount of information. It is necessary on the one hand to know how to process and analyze these huge amounts of data and on the other hand to have the necessary conceptual background to take advantage of these analyses. The results of such work should improve decision-making, whether in terms of store location (see Chapter 4) for retailers, or for most other B2C (Business to Consumer) companies in terms of managing the elements of the marketing mix: distribution of new products, pricing, advertising or direct marketing campaigns, merchandising, sales force (see Chapter 3). The use of geomarketing software (i.e. digital maps) is not enough to understand and predict the spatial behavior of consumers outside the store (i.e. between home and the store) not to mention workplaces or leisure areas.

In marketing, the approaches to understanding the movements of individuals related to the store selection process are varied, both methodologically and in terms of applications. They are based both on the work of geographers who have drawn heavily on analogies with physics (gravity models, entropy models), as well as on psycho-sociological observations and studies, not to mention the contribution of economists, if only through the idea of maximizing utility and the theory of revealed

preferences (Samuelson 1938), although this is still the subject of debate (Hands 2014). The division of the trading area into concentric circles was modeled (Maillet 1967) and segmented according to access times (Brunner and Masson 1968). Some methods are sometimes still relevant in the work of practitioners and in particular in studies prior to the establishment of a new point of sale, because they are mandatory in the French CDAC (*Commissions départementales d'aménagement commercial*, or local retail planning committees). Other approaches aim to model the consumer's spatial behavior. Thus, models of consumer spatial behavior have been enriched: new variables and estimation algorithms have been introduced. They have greatly improved the understanding of consumers' spatial behavior. While some of these models have provided encouraging results, it can be noted that the applications are limited to a few sectors of activity and specific spatial configurations (Cliquet 1997b). But above all, these models are based on a static geography. They are similar to a capture of customer stock residing in a given geographical area and do not make it possible to integrate the parameters related to the mobility of consumers who move quickly, according to complex trajectories. Even if it is difficult to model, mobility has become an essential variable to adjust the borders of a retail territory (Marzloff and Bellanger 1996) and define new implementation strategies (Gasnier 2007).

The models that will be presented are linked to the attraction of the point of sale; they are therefore based on the capture of customer "stocks". They do not take into account the consumer's supply areas (Cliquet *et al.* 2018, p. 97). We will thus try to lay the foundations for a more dynamic geomarketing approach, based on customer flows in order to take into account the mobility described above.

2.2.1. *Gravity modeling or customer stock management*

The mathematical formulations of these models will be presented in Chapter 4. The law of retail gravitation (Reilly 1931), developed by analogy with universal attraction, was the first attempt to model consumer spatial behavior, but at the city level. Other models were then proposed which are now integrated into geomarketing software. They attempt to measure the capture of a stock of customers residing in a market area (Dion and Cliquet 2006). Two approaches are opposed: one is deterministic and the other probabilistic, the first having given rise to the second.

2.2.1.1. *The deterministic approach*

The deterministic design is the basis for the simplest store selection model based on the assumption of the nearest mall. This premise, which underlies the law of retail gravitation (Reilly 1931) (see Chapter 4), which is more useful for setting up a point of sale than for understanding the consumer's spatial behavior, is linked to the

central place theory (Christaller 1933) and the principle of least effort (Zipf 1949). This view states that an individual goes to the nearest town to provide him with the products he wants in a store he is supposed to be faithful to, provided that the products correspond to his needs in terms of utility. It is then necessary to remember the warning that the product, in this case the store, does not provide any utility, but has characteristics (Lancaster 1966).

This deterministic concept, which only takes into account distance to explain consumer spatial behavior, has only been empirically validated in the case of a limited number of outlets in sparsely populated market areas with poorly developed means of transport: this is particularly the case in rural areas (Guido 1971) or in developing countries (Mexico, India or Kenya) (Hubbard 1978). But the presence in the model of only one variable, distance, reduces any real possibility of prediction. From this observation of impotence, an idea emerged: that of spatial indifference. We no longer speak of absolute distance, but relative between different possibilities of choice, in this case points of sale (Craig *et al.* 1984); but the application of this concept is difficult in reality even if we find it slightly in line with the idea of threshold (Malhotra 1983) or maximum distance beyond which the customer no longer moves to find the "ideal" point of sale that corresponds to his wishes.

Moreover, the desire to optimize distance is reflected, for the consumer, in the need to carry out multi-purpose shopping trips (Popkowski Leszczyc *et al.* 2004), which means that the central place theory (Ghosh 1986), a well-known phenomenon (Lösch 1941), must be revisited. This "multi-store" behavior by consumers can lead them to frequent malls further away than stores close to their homes: they no longer seek to optimize the utility of a single product to be purchased in a single point of sale by reducing transport time and cost, as stipulated in the central place theory (Christaller 1933), but the combined utility (Lancaster 1966) of the characteristics of several points of sale. A model incorporating this evolution has been proposed (O'Kelly 1981), which concerns a large number of consumer trips, even if these malls are no longer as successful due to traffic difficulties and time wasted, to the benefit of convenience stores (Gahinet 2018).

Other authors have attempted to integrate multiple-purpose travel, either in a very limited way without taking into account the topography of the site (Eaton and Lipsey 1982; Kohsaka 1984), or by taking into consideration the total cost of the shopping operation (Ghosh and Craig 1986), or by using a probabilistic gravity model (Popkowski Leszczyc *et al.* 2004), or by implementing a specific methodology called conjoint analysis (Dellaert *et al.* 1998). But multistores mean less travel and more product stocking. This probably explains the situation in Japan where driving is very difficult. Consumers prefer to walk to convenience stores: retailers such as Carrefour or Walmart should have understood this phenomenon when they set up

large stores unsuccessfully in this country, probably forgetting the globalization *versus* localization dilemma (Aoyama 2007).

Consumers must therefore optimize transport and stocking costs, without forgetting to minimize product prices. A model makes it possible to qualify the frequency and nature of journeys with many empirical validations (Ghosh and Craig 1986). We can see how much the modeling of consumers' spatial behavior has evolved from the use of a single point of sale to buy a single product to the use of a set of points of sale to acquire many products. But the urban context and increasing consumer mobility will force people to seek less restrictive models based, among other things, on probability theory (Wong and Yang 1999).

2.2.1.2. *The probabilistic approach*

The modeling of consumers' spatial behavior requires the consideration of spatial and non-spatial elements through the use of a utility function. We then speak of spatial choice models, the general formula of which is as follows:

$$U_{ij} = A_j^{\alpha} D_{ij}^{-\beta}$$

where

– U_{ij} is the utility of a store j for a consumer i;

– A_j is a measure of a store's attractiveness j;

– D_{ij} measures the distance between a store j and a consumer i;

– α and β are parameters reflecting, respectively and at the same time, the consumer's sensitivity to the attractiveness of the store and to distance.

It is important to be aware that attraction studies are always difficult to conduct at the product level. Concerning the nature of the products, Lancaster (1966) noted that:

– the product does not provide any utility to the consumer, but it has characteristics that generate utility;

– a product has several characteristics that are also present in other products;

– products combined with each other may have characteristics, and therefore a utility, different from the characteristics of the products taken separately.

Consequently, it will not always be easy to study the attraction of a particular product, hence the importance of focusing on points of sale.

Unlike deterministic models, probabilistic spatial choice models are defined at the individual level according to revealed preference theory (Samuelson 1938). Moreover, the preferences that condition consumer spatial behavior concern places, in this case points of sale, and are not assessed in terms of allocation (Golledge *et al.* 1997).

2.2.1.2.1. Huff's model

Based on the basic gravity model (Reilly 1931), the store's attractiveness was defined by its sales surface (Huff 1964). According to this theory, a store with a large sales surface offering a deeper and wider assortment will be more attractive to the customer, who will be willing to extend his radius of action by agreeing to cover a greater distance to satisfy his needs and desires. The consumer is in the position of choosing between, on the one hand, a smaller distance and store size and therefore a narrower assortment, and on the other hand, a larger distance and store size and therefore a more attractive assortment. In Huff's model, distance is measured by access time (transport costs can also be used). In addition, we consider the probability that a consumer will visit a store, which means that this individual is likely to frequent several different points of sale unlike the deterministic model: he will choose according to the sales surface of this store and the distance in time to travel. The probability that he or she will be a customer of a point of sale will therefore be equal to the ratio between the utility of this store and the sum of the utilities of the other points of sale. This choice can be expressed by the following formula, which links probability and utility:

$$P_{ij} = \frac{U_{ij}}{\sum_{j=1}^{m} U_{ij}}$$

Many empirical studies have been and still are based on Huff's model. Geomarketing software is not to be outdone and offers a simple or sometimes more complete application by adding variables other than mass (sales surface) and time distance. Details are provided in Chapter 4.

A large number of studies use the Huff model with its two variables (sales surface and distance) to validate the attraction of stores in a market area. But in fact, there are often more variables that can explain consumers' spatial behavior. Some of these variables are store-related and can be integrated into an attraction model (see section 2.2.1.2.2, the MCI model) and others are situational, environmental and individual (Granbois 1984) and can possibly be taken into account when geographically dividing the market area. This division into cells can be simplified by making a typology of these cells according to variables of these types (Cliquet 1990, 1995).

Some geomarketing software has integrated Huff-type models by adding other variables; in this case, are the rather drastic conditions of use of this model always respected? Specifically for the Huff model, since this model is not linear, estimation of coefficients related to store size and distance is not possible with conventional econometric techniques (Huff and Batsell 1975; see Chapter 4).

2.2.1.2.2. The MCI model

The MCI (Multiplicative Competitive Interaction) model (Nakanishi and Cooper 1974; Cliquet 1990) integrates variables other than distance and store sales surface. It is based not only on Huff's model in its design, but also on other previous work (Hlavac Jr. and Little 1966; Urban 1969; Kotler 1991). The MCI model can be a spatial or "aspatial" model. Table 2.1 provides a list of variables already integrated by researchers into MCI-type models for four different types of outlets.

Malls (Weisbrod *et al.* 1984)	**Supermarkets (Jain and Mahajan 1979)**	**Banking branches (Hansen and Weinberg 1979)**	**Furniture stores (Cliquet 1990, 1995)**
Number of vehicles owned by the household. Travel time from home to the store. Total transit time. Cost of the trip per $1,000 of income. Total number of employees of stores. Presence of general goods and clothing. Other products of comparison. Shops for low-income people. Planned mall.	Image of the store (product quality, prices, staff reception, etc.). Store layout (sales area, number of boxes, etc.). Appearance (external and internal). Accessibility (location at an intersection). Services (credit cards, cheque acceptance, butcher's department, deli department). Employee breakdown (black/white).	Location. ATM. Pedestrian counter. Novelty. Bank fascia.	Product quality. Average level of prices. Promotional offers. Service offers. Accessibility of the store. Immediate availability of the goods. Width of the assortment. Reputation of the store. Interior decoration. Credit facilities. Competencies of the salesmen. Distance beyond a certain threshold.

Table 2.1. *Variables used to validate MCI-type models (source: Cliquet 1997b)*

Table 2.1 shows that many variables have been introduced into spatial MCI models, as this model can also be used in an "aspatial" way as an attraction model for promotions (Nakanishi 1972) or in political science (Nakanishi *et al.* 1974). One of these variables was found to be very important for understanding the attractiveness of the outlet: the store image (Stanley and Sewal 1976; Jain and Mahajan 1979; Nevin and Houston 1980), as it attracts consumers located at distances further away than expected by deterministic models. This image can concern both quality and prices, the services offered, the means of payment, the number of cash registers or the number of employees (Jain and Mahajan 1979). And like Huff's model, the MCI model is a so-called disaggregation model because the probability it provides concerns only one consumer. But it is easily possible to obtain aggregated results on a large number of individuals by simply multiplying them according to the number of consumers located in each homogeneous cell and also by taking into account their socio-demographic characteristics (Cliquet 1990, 1995) to partly respond to comments on the need to introduce variables external to the stores (Granbois 1984). We then obtain market shares with the advantage of a real logical consistency, because their sum is equal to 1 (or 100%) (Naert and Bultez 1973) which was not always the case for other models (Weiss 1968; Lambin 1970; Wildt 1974). The MCI model also emphasizes the importance of competitive interactions, because "marketing effectiveness depends on what competitors do" (Kotler and Dubois 1981).

Other disaggregation models, such as discrete choice models for example, the MultiNomial Logit (MNL) model, which is similar in structure to the MCI (Cooper and Nakanishi 1988), have been used to show that supermarket choice behaviors are fairly stable over time (over 4 years) and over space (Canada, United States and Norway) (Severin et *al.* 2001).

2.2.1.3. *Subjective approach and attraction models*

The previous models, the Huff and MCI models, have been presented as providing a probability that an individual will choose an object, a store, but it could be a product or a politician in an election (Nakanishi *et al.* 1974), based on elements totally external to the person making the choice: all these elements are measured in an "objective" way, in other words not subject to opinions or in more technical terms measured on ratio scales. Indeed, a store sales surface is measured in square meters (or square feet) and the distance in kilometers (miles) or minutes: no "subjectivity" is involved. However, the individual does not make his choices according to the reality of things, but according to the way he or she perceives them. It has been shown through neuroscience how much feelings and emotions are involved in decision-making (Damasio 1994): "[...], in some ways, the ability to express and feel emotions is essential to the implementation of rational behaviors." To simplify, we perceive a reality that can lead to the occurrence of an emotion that

triggers a decision in the form of a choice. Perception is a sensory input that can be a prerequisite for action (or the decision to act), but not always essential for decision-making, since dreams can lead to the same phenomenon (Brémond 2002).

With regard specifically to the choice of a point of sale, the Huff and MCI models do not include any perception variables, but only "real" variables without it being clear whether the latter have a direct impact on the individual's choices. In addition, these models often result in relatively low explanation rates. The process of choosing a store has been studied using a model of exploring the information flows that an individual must manage before visiting a store (Monroe and Guiltinan 1975) and it shows the importance of perceptions.

2.2.1.3.1. The MCI or subjective MICS model

Several attempts have been made to introduce psychological variables into point-of-sale choice models (Aaker and Jones 1971; Fressin 1975), but without convincing results. The test was nevertheless interesting insofar as it made it possible to highlight the idea that retailers could also play on the image of their fascia(s). Perceptions of either distance or travel time were then turned to realize that they were as important as objective data on these same variables (McKay and Olshavsky 1975). It has been found that models incorporating subjective variables, perceptions, give better results (Cadwallader 1981). Perceptions of distance, whether geographical or temporal, may be totally different from reality (Croizean and Vyt 2015): two people living in the same building may not estimate distance, in kilometers or minutes, in the same way and the difference may be twofold. These differences in perception may be due to the time of day at which the journey is made, the personal ability to assess, the number of obstacles encountered (bends, intersections), the context, etc. (McKay and Olshavsky 1975; Raghubir and Krishna 1996), not to mention the possible interaction effects between these variables (Cadwallader 1995).

The subjective MCI makes it possible to avoid the constraints imposed by objective models. The latter, like all gravity models, assume that the consumer is rational in his choices and in his relationship to space (Golledge and Stimson 1997) and that his or her preferences are fixed and transitive, in other words, if an individual prefers store A to store B and prefers store B to store C, he or she will always prefer store B to store C. However, the reality is much more complex and there is no evidence that the consumer optimizes his or her store choices explained by the theory of bounded rationality (Simon 1957). The study of cognitive biases in judgments in uncertain situations (Tversky and Kahneman 1974) had challenged these assumptions, particularly in cases where there are many options. Our perception, and therefore the decision-making process and judgment, can be disrupted by environmental pressures (Fotheringham 1985). This difficulty has led

some researchers to develop hierarchical models implementing the theory of information integration.

2.2.1.3.2. The theory of information integration

Given the limits of rationality of individuals (Simon 1957) and thus their ability to process the environmental data around them and make optimal choice decisions, choice has been addressed as a process rather than an end: this is the subject of information integration theory. This takes into account the learning process in terms of data processing by an individual (Miller 1996), especially when data are numerous, hence the so-called functional measurement approach, which allows the selection of essential attributes during a selection process. In the presence of too much data, the individual can apply a hierarchical process, hence the name of hierarchical models, allowing him to make a first selection of similar choice possibilities, in order to facilitate his choice (Recker and Schuler 1981; Fotheringham 1988; Golledge *et al.* 1997). But the implementation of this theory is difficult and a large number of options have been compared with a trout stream (Louvière 1974): which one to choose? The diffusion of the use of smartphones and tablets can allow individuals to make this selection and then their choice.

But all these models correspond only to customer stock management and are absolutely not adapted to "customer flow" management (Cliquet 1997a). These flows tend to increase with the growing mobility of individuals and the opportunities offered by mobile technologies.

2.2.1.4. *Customer flows*

The mobility of individuals has become one of the most striking phenomena in societies, whatever their level of development. Many economists, geographers, sociologists and psychosociologists have studied this phenomenon (Gasnier 2007; Hubert 2009; Amar 2010; Kaufmann 2011; Viard 2011; Kaufmann *et al.* 2015; Lenormand *et al.* 2015). With regard to trade, this mobility induces "flows" of customers who behave very differently from customers located in trading areas that practitioners know how to identify and that theoretists have been able to capture using methodologies based on both maps and more or less sophisticated models. Insofar as this phenomenon is growing and the proportion of customer stocks tends to decrease in proportion to customer "flows", it is becoming necessary for retailers to change their strategies for locating points of sale in order to adapt to this new situation.

2.2.1.4.1. Consumer mobility and "temporary" attraction

Insofar as consumer mobility imposes a new dynamic in the understanding and prediction of consumer behavior, it is necessary to evolve geomarketing in its usual

definition linked to digital mapping towards spatial marketing encompassing methodologies that are often yet to be invented and made operational: the development of dynamic maps in software is an important first step. From a more strategic point of view, this evolution requires us to revisit the traditional logics that govern decisions to set up points of sale. Gravity attraction has not disappeared, but it tends to give way to other forms of attraction resulting from people's movements towards their workplace, their children's school or their leisure places. These transhumances can be either regular in a pendulum movement (Viard 1994), or more episodic based on a desire to "browsing" to spend time on a business trip or to discover a city during a holiday stay. In a country like France, which welcomes well over 80 million visitors per year as the world's leading tourist destination, neglecting such flows is unthinkable. For a long time now, the strategies of Parisian department stores have been targeting foreign visitors, who represent about 60% of their customers. But apart from the flows of foreigners, the internal flows of residents on French territory are increasingly important. And the use of mobile technologies further accentuates this phenomenon.

Market areas are no longer just places where we live, but also places that we cross and capturing these customer flows becomes a major challenge for retailers. The major difficulty in analyzing and predicting these flows lies in their great heterogeneity. Retail stores could be classified according to the proportions of stocks and customer flows (Cliquet 1997a). These proportions between stocks and customer flows can vary according to the time of day, the days of the week and the periods of the year (holidays or *journées de RTT* in France). The gravity phenomenon is not the only cause, because, for example, for speciality goods according to the classification of goods (Copeland 1923), the consumer will be more attracted by the fascia than by distance: gravity and attraction are therefore more or less mixed and this is why we prefer to speak of polarity and polar attraction (Cliquet 1997a). The polar attraction and the temporary attraction can be contrasted, knowing that they may overlap when, for a speciality good, the fascia sought by the consumer is not located in the market area where he resides: this is called retail sales leakage.

2.2.1.4.2. Modeling the temporary attraction for new location strategies

Geographers talk about differential locations: the stock-flow distinction is one of them. If the modeling of gravity and more generally polar phenomena is now operational, one may wonder what the situation is with the modeling of the transient attraction. Only the geography and economics of tourism (Sheldon and Var 1985; Eymann 1995; Eymann and Ronning 1997) have developed work on transient attraction. The hotel business was also the subject of forecasts for its customer flows. A regression model (Kimes and Fitzsimmons 1990) was validated using data from a hotel chain. A regression revealed the most significant variables and the

model was applied to new locations. But such a methodology is based on the idea that current hotels have ideal characteristics, which remains to be proven, especially if a new concept developed by a competitor appears on the market (Cliquet 1997a). Retail and service activities must also be able to benefit from modeling linked to customer "flows" (Cliquet 2002b). In the meantime, the strategies for locating points of sale are evolving and moving closer to consumers' spatial behavior. Networks like Zara or H&M go so far as to set up three or four stores on the same street. They hope to "capture" their interests as they pass in front of the second, third or even fourth store. Entire chains have set up in high-traffic areas such as stations where ephemeral or pop-up stores are also opened (Picot-Coupey 2014). Even very large malls, such as the West Edmonton Mall in Canada (Andrieu *et al.* 2004) or the Minneapolis megamall in the United States (Hetzel 2002), are integrating this new customer concept. Initially, the Mall of America, designed by Triple Five and opened in August 1992, had a projected trading area of 1,200 km radius (Cliquet 1992). Consumers from Chicago come to spend several days in this huge mall. Foreign tourists, and particularly Japanese tourists, are now part of the temporary clientele of this Mall of America. Auchan has set up its hypermarket, Val d'Europe, near Disneyland Paris. This means that not only small areas are affected by this phenomenon. It can thus be seen that the attraction of flows requires a good control of the attraction for places outside the traveler's habits, and in this case, the minimization of distance or costs is no longer of much interest in a process of modeling the temporary attraction.

Attraction in the gravitational sense is strongly challenged by the consumer's growing freedom of movement and information. Technology, both in transport and in the media, allows consumers to manage their time differently: from the notion of "chronos" to that of "kairos" (Gahinet and Cliquet 2018), in other words from a linear quantitative measurement of time to an approach centered on the opportune circumstance or the idea that "it is the right time", with technology enabling these opportunities to be better seized. Trade will therefore have to "re-enchant" itself by dramatizing the offer in order to make the points of sale more attractive, if not attractive in the gravity sense. This does not mean that the consumer no longer travels or that he or she only travels wisely. Just as his or her curiosity allows him or her to discover new information thanks to the mobile Internet (Cochoy 2011), he or she continues to explore new spaces with more efficient means of transport.

It has been shown that the further away the consumer travels from home, the less sensitive he or she is to time gain or loss (Brooks *et al.* 2004): this result is based on the theory of reference dependence (Tversky and Kahneman 1991). This is reflected in the purchase of their products by the fact that they will be willing to travel a longer distance to buy clothing while they will be more sensitive to the time spent shopping for food (Brafman 2008). GPS, on smartphones or car dashboards, makes

it possible to track consumer progress and this helps to improve, for example, the location of malls (Moiseeva and Timmermans 2010).

Among the most advanced research in flow modeling (Hodgson 1990) are studies on the location of service stations (Kuby and 2005): some are interested in electric vehicles (Tu *et al.* 2016) or even hydrogen (Köhler *et al.* 2010). This research is based on the median (Hakimi 1964), coverage models (Murray 2016), multi-agent systems (MAS) (Nigel and Doran 1994) in which optimization algorithms or metaheuristic methods are integrated (Hansen and Mladenović 1997). These methods will be found in Chapter 4 on location and georetailing.

2.3. The consumer's in-store spatial behavior

Knowing spatial behavior in stores requires studying consumers' in-store shopping trips. However, while the shopping trip has been the subject of much research and has existed for a very long time, the same cannot be said for the in-store experience. However, retail companies have clearly understood the importance of examining these in-store purchasing paths in order to adapt their internal layouts. This is all the more crucial as many points of sale, and in particular larger ones such as hypermarkets, are faced with drastic reductions in their sales area, especially for non-food products: the end of hypermarkets has long been predicted (Cliquet 2000). This perspective is now gaining more and more followers, including from the retailers themselves where, not to mention the "end", we are talking about a necessary drastic evolution of the commercial concept. But the question remains as to how to make this transition. The difficulties of large groups such as Auchan, Carrefour, Casino, Metro or Tesco are clear proof of this.

Consumer satisfaction when shopping in a store is influenced, among other things, by price, service and convenience, but shopping trip is also important: if we use the distinction between major and convenience routes, a major route buyer (coming to refuel) is less interested in service than convenience, with price remaining a determining factor in choice, especially for exceptional occasions, as reported in a study conducted in the Netherlands (Hunneman *et al.* 2017).

The relationship between promotions and in-store shopping trips revealed that promotion at the point of sale had a greater influence on shopping fill-in trips than on major shopping trips, whereas the opposite was true when coupons were used (Kahn and Schmittlein 1992). On the other hand, consumers on these two types of shopping trips are also attracted by price promotions, but "bounty hunters" are much more so (Walters and Jamil 2003).

Further study of in-store trips requires observation, as behavioral models related to the store atmosphere do not consider the layout of the sales area and the way in which the consumer appropriates the space. This space does not always have the same function, and in supermarkets, we distinguish between active entertainment spaces and functional spaces that correspond, for the customer, to two appropriation strategies: an active play strategy and a functional strategy (Bonnin 2003).

A better understanding of the spatial behavior of consumers in stores has often consisted of simulating it using more or less remunerated guinea pigs in laboratory stores, these behaviors being observed by consultants: it is useless to specify the cost of these simulations, the artificial nature and subjectivity of the observations, the impossibility of storing these data and the need to renew them regularly. The methods for monitoring the spatial behavior of consumers in stores have never really given satisfaction to researchers and practitioners. The protocol method has been tested: it is based on information processing theories applied to consumer behavior (Faivre and Palmer 1976). It aims to understand how an individual treats information by asking him, at the time of performing an action, to verbalize aloud (Jolibert and Jourdan 2006) what he is doing, either in a real situation or in a laboratory, in order to reconstruct the internal information processing processes used to make a decision (Evrard *et al.* 2009). This method has been used in supermarkets (Payne and Easton Ragsdale 1978), but it generates scientific bias (Jolibert and Jourdan 2006), as consumers seek to rationalize their choices when they feel they are being monitored; the analysis of the data collected remains subjective; experimentation can take a long time, because the observer must describe what he is doing and what he thinks about the observer, which limits the size of the sample and therefore the scope of the results; research is most often carried out in artificial contexts (laboratory), because in reality, it would be difficult to impose this type of method on consumers shopping and on retailers who run the store.

It was also possible to analyze consumer paths in two stages (Michaud-Trevinal 2013). First, data are collected through direct non-participating observation. Then, the results are analyzed on the one hand using a semiotic square (Floch 1989) to highlight the interactions between shoppers and points of sale and on the other hand by a cluster analysis in dynamic clouds validated by a multiple discriminant analysis. We were able to distinguish four types of paths within a mall (Michaud-Trevinal 2013):

– "passing" path: the shopper crosses the mall and targets a specific destination while remaining insensitive to offers;

– "pragmatic" path: the shopper has a specific store as his or her objective, but he or she can be attracted by offers without wasting too much time;

– "peregrination" path: the shopper follows a complex route, because he or she is looking for either a specific product or new products and almost always leaves with a purchase;

– "appropriation" path: the shopper is not alone most of the time or he or she meets acquaintances and walks around the entire mall.

Information technology has been able to provide a new impetus to the study of in-store shopping trips. The protocol method was combined with wireless audiovisual observation technology (Saarela *et al.* 2013) with a small sample (36 individuals). The study was accelerated and consumer behavior was better integrated into the store context through audiovisual observation, but without resolving the usual biases. In recent years, the technology has made it possible to proceed more systematically and in real time thanks to WIFI, Bluetooth, RFID (Radio Frequency Identification) chips, NFC (Near Field Communication), accelerometers and gyroscopes as a complement to GPS (Yaeli *et al.* 2014). The question of data storage remains.

2.3.1. *Research on the spatial behavior of consumers in stores*

New information technologies now make it possible to track and trace consumer shopping trips much more quickly and to make typologies according to customer groups and periods studied, and thus to design points of sale. These new systems are more sophisticated than simple camera counting, but do not allow for individual customer follow-up. Researchers have tried to develop work in this direction. We are now talking about indoor location-based applications. Four attempts identified in the literature are described here.

2.3.1.1. *The use of RFID*

RFID tags were placed on supermarket carts and a multivariate cluster analysis algorithm processed the data under spatial constraints (Larson *et al.* 2005). This system takes into account the location of aisles and certain areas of the store as well as the time spent during the purchase process. We were able to identify 14 typical courses in a supermarket, thus challenging some preconceived ideas on the subject about the behavior of end-cap displays or the store as a racetrack.

2.3.1.2. *The use of the PDA*

A PDA (Personal Digital Assistant) (Schmitt 2009; Schmitt 2010). Figure 2.4 shows what happens when you follow a consumer shopping. But while this system is inexpensive in *principle*, it relies on one or more observers who must be very

attentive to client paths, which can pose many problems: it takes investigators a lot of time and is not immune to a lack of attention on their part.

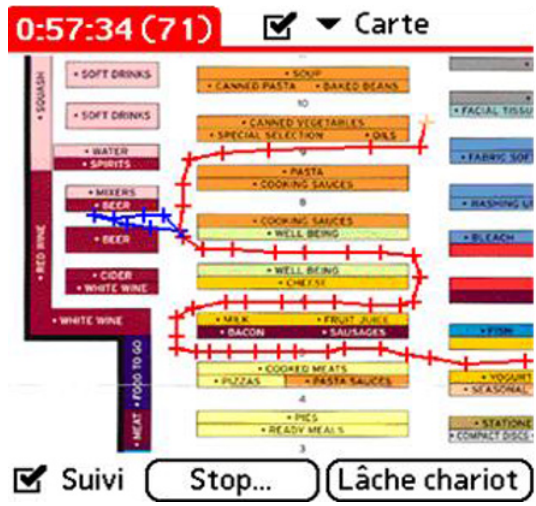

Figure 2.4. *Monitoring a consumer's in-store shopping trip. The figure shows the cart's trajectory around the store (source: Schmitt 2009). For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

This system may offend some customers if they discover that they are being followed, as privacy issues are becoming increasingly important, with the new European Personal Data Protection Act now requiring more cautious behavior in this area: in France, this has resulted in the General Data Protection Regulation (GDPR) which requires organizations to alert all members of their files so that they can access their data and modify them if necessary.

In addition, the system is complex enough to detail the time spent. In addition, the technology and the PDA tool are now considered obsolete.

2.3.1.3. *The use of mobile phones*

IBM software allows data collection based on indoor location transcribed to a mobile phone (Yaeli *et al.* 2014). The objective is to capture the time spent by customers on store shelves, the shopping trip diagram within the store, how they were served, etc., in order to improve knowledge of the consumer's spatial behavior in store. The technique is based on WIFI, smartphones or tablets. It is therefore a question of following the paths of customers in store in a similar manner to tracking browsing behaviors on websites. This allows us to collect the following information:

– the usual visit or first visit and therefore customer or prospect;

– the time of entry and exit from the store and therefore the (average) duration in the store;

– the areas visited in the store (compared to previous visits if applicable);

– the average time per area of the store;

– the total number of visitors to the store;

– the bounce rate used as a marketing indicator to measure the percentage of visitors to a web page who have left the site without visiting other pages. Adapted to the store, this means making the connection between short visits and non-visited areas.

Curiously, the authors of this work distinguish between high value-added customers who know what they want to buy and go directly to the shelves that interest them from low value-added customers who come more to "browse" often without a specific goal with loops in the path. These latter customers can eventually become high value-added customers, especially since they often buy products by impulse with higher margins; moreover, this browsing can serve as a marker for future purchases during a future visit. We know nothing about the customer's agreement or disagreement with this device.

The geolocation of customers can now be done through LiFi (Light Fidelity), a light-based technology that allows Internet broadcasting at a speed 100 times faster than WiFi. LED light bulbs send messages to customers' smartphones who can receive this information, for example about promotions. Those who do not have smartphones can benefit from a tablet on their cart (Lecluse 2016).

2.3.1.4. *The use of an intelligent mechatronic system*

An intelligent mechatronic system, combining mechanics, electronics and IT, called sCREEN (Consumer Retail Experience) (Paolanti *et al.* 2017) is an assistance system for navigation inside a building, in this case a store, intended for customers. It minimizes the need for marking at the point of sale and does not require a plan. This system is based on Ultra Wideband (UWB) and is installed on carts or in baskets, it allows to model and forecast the customer's navigation within the store. The customer indicates the next product he wants to find: the sCREEN system then informs him or her in case of stock shortage and leads him or her to the product using ULB antennas located in the store. The system can then measure the attraction of the store, the time customers spend in front of the brands on the shelves and the number of customers in the store.

2.3.2. *The importance of an indoor spatial information system*

Most major retailers have clearly understood the interest and the challenge of developing an indoor spatial information system to track customer shopping trips, not to "freak them out", but to better understand their needs and desires within the stores. Indeed, understanding these behaviors in stores is of great importance for retailers and malls, but also for the companies that manage stations and terminals, banks, hospitals, etc. Providing a unique shopping experience and service requires a good knowledge of customers' spatial behaviors in order to optimize store layout, improve the quality and speed of operations and increase the sales conversion rate and thus point-of-sale revenue. It is the same work in physical stores as that done by e-commerce firms on their sales website. When a consumer visits an e-commerce site, from the moment he makes himself known through a login, the site operator can learn from his behavior and propose appropriate offers and services.

2.3.2.1. *The configuration of an indoor spatial information system*

It should be noted that the market for these applications in indoor location is estimated at $5 billion in 2018 with a growth rate of 42% (Yaeli *et al.* 2014). To do this, the following is necessary:

– mapping and indoor navigation;

– management and monitoring of physical assets, equipment (stores or hospitals);

– an update of the locations with a verification application;

– triggering and notification systems based on geofencing or virtual fencing within a predefined geographical area for public safety purposes;

– one-click payments in stores;

– promotions according to the location in the store.

The indoor geolocation system must allow objects and individuals to be located inside buildings, something that the GPS system does not allow, because it operates by satellite and cannot penetrate buildings. An indoor geolocation system should be used to develop a database on the spatial behavior of a store's customers, provided that the data collection procedure is well defined from a technical, marketing and legal point of view. This data concerns the consumer's journey through the store and stopping times on the shelves. The database thus collected should facilitate:

– the storage of consumer paths and the development of path typologies;

– the identification of the least frequented radii and the refinement of data on numerical distribution and potential sales;

– the implementation of the two conversions necessary to increase purchases: one consists in transforming the consumer's visit (= wandering at the point of sale) into a shopping operation (= interest in shelves and products); the other aims to transform the shopping operation into a purchasing act;

– understanding the consumer's shopping speed.

2.3.2.2. *Spatial information systems and consumer paths*

In addition to the two systems presented above and described in the literature, several indoor spatial information systems have been designed to track consumer paths. Retailers spent considerable sums of money to have observers examine these behaviors without data storage, which would make it possible to carry out path typologies and analyses of consumer baskets or carts. Indeed, noting that the consumer has stopped for a while in front of a shelf and that he has in the end bought nothing can mean that the shelf poses a problem, especially if the same facts are repeated and thus trigger a reaction in order to improve the attractiveness of the shelf. The interest for the retailer lies in the possibility of carrying out this type of test at regular intervals in order to enrich its spatial database. It can thus detect changes in behavior in the store that will certainly occur, particularly those due to the development of the click and collect system called "drive" in France. A consumer who has used the "drive system" may decide to visit the store, and in this case, his or her behavior will be very different from the one who comes to do all his or her shopping there. For the drive user, the location of impulse buying products is therefore of essential importance. Many consumers do not return to the store after switching to the "drive", as most stores are not ready to receive them: they must therefore be attracted with new services (Vyt *et al.* 2017).

An experiment was carried out in the United States in 2003 by Sorensen Associates and large means, by installing devices on carts and baskets (Sorensen 2003). More than 200,000 routes were examined. Based on work in about 100 stores, the study found that, in a store with a left-hand entrance, consumers tend to walk clockwise – abbreviated as CW – and that, in a store with a right-hand entrance (the most common case), the path is counter-clockwise or CCW. This is not surprising except that CW courses result on average in baskets that are $2 less than those from CCW courses. This difference may seem small, but let us leave it to retailers to measure the long-term consequences.

2.3.2.3. *Store-visit and store-purchase conversions*

Store-visit and store-purchase conversions must be reviewed. Indeed, supermarkets are used to seeing the consumer come to the store, and once in the point of sale, to seeing this consumer come to the product. These processes are

questionable and retailers know this better than anyone else. So how can we ensure that it is the product that goes to the consumer? A first conversion (shopping visit) concerns the fact that a customer instead of passing through must stop and take an interest in the products. If it does not, an indoor geolocation system should allow this behavior to be observed by measuring the stopping time at the precise location. A second conversion (store-purchase) can be measured at the end of the journey, at the checkout, by observing whether the stop in the department has resulted in a purchase. It must be possible to link the study of the route and the receipt. Socio-demographic elements can then be added if the consumer has a store loyalty card. This double conversion (visit, store, purchase) must be the objective assigned to each department. The shelf must be well placed and attractive (Renaudin 2010). We do not only measure simple in-store traffic, but also traffic on the store shelves. There are four product categories:

– the leader categories that attract no matter what happens;

– the high interest categories that often attract;

– niche categories whose specificity is attractive;

– underperforming categories that fail to achieve double conversion.

2.3.2.4. *Consumer shopping speed*

The consumer's shopping speed is also an essential point for the retailer. Purchase time is defined as the number of seconds spent buying a product (Sorensen 2003, p. 34). A longer time spent choosing a product can thus be explained either by the appearance of the new product, or by the confusion resulting from an excessively high number of offers, or by a greater emotional involvement with the product (in the case of wines, baby products or cosmetic products). This means in passing that the most involved products that require a slower shopping speed will have to be found in locations outside the crowd or even in high-traffic aisles in order not to disturb the customer's choice (Sorensen 2003). This will be different for products with a very short storage time. It can also avoid traffic congestion points in the store, with customers taking their time to choose a product that involves them, while in a busy aisle they can block the flow of other consumers. By measuring the time spent buying products, we can also better understand the performance of each of the store's areas. Sorensen thus discovered, with regard to the less involving products which, according to them, represent 85% of supermarket products, that the aisles in the center of the store resulted in a longer buying time than the aisles at the front of the store or those located at the back.

The advantages of a system that makes it possible to know the paths of consumers in points of sale, in this case supermarkets, are therefore clear and it is important to know where consumers go in the store in order to offer them products

that may interest them without them having to "search" everywhere in the point of sale, even if some people appreciate this type of behavior. Costco responds to this logic by placing the most sold products at the entrance of the store.

2.3.3. *The CNIL's vision*

The French CNIL (*Commission nationale de l'informatique et des libertés*, or national computing and freedom committee), established by the law of January 6, 1978, is there to protect citizens against any misuse of private data. However, geolocation can generate a lot of data without the consumer noticing. For example, retailers who track their customers in their stores using mobile phones using WiFi must alert these customers and declare these devices to the CNIL while informing these customers of their rights. Thus, to ensure the protection of consumers' privacy, the law requires that the data thus recovered must be deleted as soon as they leave the store. In addition:

> The anonymization algorithm used must ensure a high collision rate, i.e. a base identifier must correspond to many people. The use of such an algorithm makes it possible to estimate the return rates of people in a store with an error rate that is not detrimental to the merchant while ensuring respect for the privacy of its customers.

An E. Leclerc hypermarket has been given formal permission (Bregeras 2014). Provided that the law is respected, in other words, that customers are informed, data may be analyzed relating to customers' paths, with stopping times and their receipts, in order to

– make typologies of paths according to the shape of these paths, the time spent, the socio-demographic characteristics of the clients;

– compare stops during trips and purchases on receipts to see if customers have spent time buying (or not buying) a given product;

– compare typologies and baskets in terms of amounts, number of products and product categories.

2.4. Conclusion

Consumer behavior has been analyzed for a very long time without considering space. This has been regrettable (Grether 1983) without any real evolution of marketing research work outside the traditional problems associated with store location. As competition intensified, store concepts aged, technology evolved

rapidly, the awareness of the importance of shopping trips outside and in stores became apparent through the need to develop a real location-based marketing that could be said to have favored many companies by allowing them to adapt their offers much better to the customers they serve and therefore to the markets they operate. This location-based marketing must make it possible to define a marketing mix that must also be spatialized: a geomarketing mix or, rather, a spatial marketing mix in a way.

3

The Spatial Marketing Mix

This chapter considers three of the elements of the marketing mix, namely the product, the price and the promotion. This is the famous 4P rule (McCarthy 1960), which has since been somewhat challenged (Van Watershoot and Van der Bulte 1992). Place will be dealt with in Chapter 4, which is mainly dedicated to store location. But before going into the details of the marketing mix, it is first necessary to define the spatial marketing mix, and to do so, to penetrate the field of strategic marketing.

3.1. Spatial marketing and the marketing mix

Ubiquity, already mentioned, becomes the characteristic behavior of consumers who master the use of mobile technologies.

This new behavior requires a more fluid marketing mix (Cox 2004) that needs to be rethought in order to adapt it, on the one hand, to spatial marketing, and on the other hand, and above all, to mobile marketing (see Chapter 5).

3.1.1. *Strategic marketing and space*

Every company faces competition. Knowing where competitors are located, not only in terms of their production and distribution locations, but also in terms of their influence on local markets, is therefore of major interest. However, attacking a competitor head-on often leads to failure. The retail markets provide many examples. Worse still, invading a market *a priori* without local competitors can sometimes turn violent: Walmart (Hunt *et al.* 2018) and Carrefour (Temman 2006) had a bitter experience of this in South Korea, a country they had to leave, because

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their business models had attracted local firms so much that they imitated them, and much better because, being local, their concept is better adapted.

Polemology (war science) specialists define the principles of strategy: "Principles are general rules aimed at avoiding the law of the enemy and ensuring superiority over the chosen point(s) through rapid and determined action" (Coutau-Bégarie 2011). But the method of applying these principles to various environments and disciplines requires geographical as well as realistic, rational, culturalist and even prospective adaptations (Lefebvre 2017). In marketing, too many studies remain virtual without a realistic link to the field where local culture can change the situation. The rational aspects are relativized by the need to question consumers whose rationality is limited, a lack of rationality also existing among many professional decision-makers (Simon 1955). It often leads to fluctuating observations, as behaviors change quickly. However, marketing decision-makers must also take swift and determined action (March and Simon 1958), and the entire organization must follow suit. Geomarketing as well as interactive maps can bring stability to fluctuating data from consumers, competitors and suppliers alike.

Strangely enough, strategic marketing makes little use of spatial considerations. However, the warnings were regular and one of the best known (Grether 1983) was not widely followed. The number of scientific publications dealing with the geography of markets in the marketing discipline has decreased. However, "facts are stubborn things" (quotation attributed sometimes to Mark Twain, sometimes to Lenin, and the author of this book leaves the choice to the reader) and technological evolution pushes us to better control space and to do so in a diversified way, precisely in view of technological changes.

In strategic marketing, and as the Ministery of the Economy, Science and Innovation of Quebec[1] points out, it is now necessary to "[...] weigh differently, bigger, more boldly, but also in a more structured way in order to take advantage of the many business opportunities available to companies". Take into account the need for "audacity", in other words, risk-taking, a notion that seems to have become a dirty word in some management courses. The MBAs (Masters of Business Administration, the flagship product of American business schools) have even been accused of this drift (Mintzberg 2004).

But boldness is not enough. Continuous knowledge of markets and their environment is necessary to define market share objectives and the technical resources of the 4Ps in the marketing mix, and to imagine useful scenarios, hence the importance of strategic intelligence. But the decision maker remains free to

1 https://www.economie.gouv.qc.ca.

choose the option he considers the best and which may not be one of the scenarios imagined, and this is where the boldness comes into play.

Moreover, the marketing strategy is not the only one to be implemented by the company and the scenario defined by the studies is not the only one possible: this is a mistake that has long been denounced (Mintzberg 1994).

But what can strategic spatial marketing bring?

3.1.2. *Marketing mix and space*

The 4P rule for Product, Price, Place and Promotion (McCarthy 1960) has been challenged, as each P can be linked to other Ps.

Starting from a more functional approach, four generic functions can be distinguished (Van Watershoot and Van der Bulte 1992):

– "configuration of something valued by the prospective exchange party";

– "determination of the compensation and sacrifices to be brought by the prospective exchange party";

– "placing the offer at the disposal of the prospective exchange party";

– "bringing the offer to the attention of the prospective exchange party and influencing its feelings and preferences about it".

This new marketing mix makes it easier to understand the role of each instrument at the disposal of marketers (see Table 3.1, where the strength of this role is represented by Xs).

4P Functions➔	Design	Consideration	Provision	Attraction
Brand name	XXX	XXX	XX	XXX
Product design	XXX	X	XX	XXX
Conditioning	XXX	X	XX	XXX
Prices	X	XXX	X	XXX
Price reductions	0	XXX	XX	XX
Logistics	X	X	XXX	0
Sales promotion	X	XXX	XX	XXX
TV advertising	X	X	X	XXX
Etc.				

Table 3.1. *Generic marketing functions (source: Van Watershoot and Van der Bulte 1992)*

3.1.2.1. *The design of a value proposition*

Concerning the product, the time is long gone when Henry Ford said: “Any customer can have a car painted any color that he wants, so long as it is black.” Since then, the notion of product personalization has become part of consumers’ desires and price, logistics and promotion also play a role in defining the offer. What can be done with a product that is difficult to transport and whose price is higher than the competitors without any real compensation? The design of the offer cannot be done without consideration of the other functions of the marketing mix.

3.1.2.2. *The consideration of the offer*

The consideration may concern both the price for the marketing of the product in the broad sense and the political marketing ballot. Pricing strategies are very different depending on the power of companies in their markets. In the automotive market, manufacturers can impose a price at the national level even if dealers retain a small margin of maneuver provided they justify discounts and other rebates. However, this Law Of One Price (LOOP), while it can be challenged by segmentation strategies, has been strengthened, including at the European level (Gil-Pareja 2003), since the birth of the euro and thus the monetary convergence of member countries, which makes price comparisons easier (Goldberg and Verboven 2004). Some consumers no longer hesitate to cross borders to buy a vehicle at a more attractive price. On the other hand, for products that are both cheaper and less involved, spatial price discrimination is generally the rule. But here again, however, it is important to be cautious, given the increase in consumer mobility, but also the responsiveness of retailers, particularly discounters such as hypermarkets. It should be noted that pricing depends on three elements: the cost of the product, the demand or rather the amount the customer is willing to pay for the product (the consideration) and the pricing policy of competitors.

3.1.2.3. *The provision of the offer*

The provision of the offer is ensured by the distribution to retailers and some of them extremely powerful companies. Geographic space is inherent to the distribution function, on the one hand, because of the need to set up points of sale, and on the other hand, because of the logistics required for proper coordination between manufacturing and retailing. Some firms are experiencing difficulties because they have not taken sufficient account of the territorial coverage of the targeted points of sale (Cliquet 1998), both for retailers during location operations and for producers when choosing the chains to supply. The commercial war between chains of general or specialized retailers is such that it is important not to neglect the speed of implementation within the networks: this is one reason for the success of franchising (Lafontaine 1992) as the speed of intervention was for Napoleon. The reticulation of retail activities is undoubtedly one of the most striking, but not very

noticed, economic and managerial phenomena of the second half of the 20th Century, with firms sometimes owning tens of thousands of points of sale (Cliquet *et al.* 2006). The word chain does not express the same idea as the notion of network. The chain is similar to the integrated capital-intensive enterprise (Fréry 1997) with a top-down power structure, while the network is a rather flexible structure to withstand the turbulence of the environment and not only competition. The organization is then seen as a system interacting with its environment and the network is an organizational form that allows better interaction, because all actors are in relationship which is very important in marketing (Iacobucci and Hopkins 1992) and less true in an integrated structure.

3.1.2.4. *Attraction to the offer*

The attraction to the offer uses all forms of communication: advertising, sales promotion, public relations, sponsorship and patronage, but also everything related to the brand and packaging, often associated only with the product. The use of the Internet, with a laptop, tablet or smartphone, makes it possible to establish much more frequent contact with the customer and to promote and therefore attract people to products as effectively as television (Draganska *et al.* 2014). The geolocation functions of these mobile tools facilitate attraction to points of sale (Moiseeva and Timmermans 2010).

3.1.2.5. *Spatializing the marketing mix*

The entire marketing mix is therefore affected by the introduction of space into decision-making processes, just as they must evolve with the development of digital mobility tools based on geolocation techniques.

A new concept of the marketing mix (Baray and Lestrade 2014) has been proposed in order to integrate into the characteristics of supply and demand the geographical locations linked to it: the aim is to develop a real geomarketing mix using a Spatial principal component analysis (SPCA) and a cluster analysis based on fuzzy logic. Factor mapping of supply and demand and spatial segmentation are directly obtained, allowing the most interesting potential market areas to be targeted. The objective of this methodology is to quickly identify strategic and business opportunities. It is made possible by the geographical identification of market areas and by highlighting the types and prices of products sold in these areas according to the marketing strategy.

3.2. Spatial approach to product management

Product management may appear, *a priori,* to be very far from spatial aspects. However, at least two areas require a specific spatial approach: the diffusion of

product innovations and merchandising. These two fields (spatial diffusion of products and geomerchandising), once "spatialized", are still poorly developed in the marketing literature.

3.2.1. *Spatial diffusion of products*

The diffusion of an innovation (an idea, a product, a technology) is defined as "the process in which an innovation is communicated thorough certain channels over time among the members of a social system" (Rogers 1983). In order to model this process, researchers relied on mimicry or, more generally, on any form of social interaction (Steyer 2005). The Bass model for diffusing new ideas and products (Bass 1969) is based on the distinction of five categories of behaviors towards innovations (Rogers 1962): innovators, early adopters, early majority, late majority and laggards. The Bass model, which can be estimated by maximum likelihood (Schmittlein and Mahajan 1982), is used to distinguish these five categories of adopters (Mahajan *et al.* 1990).

3.2.1.1. *The role of space in the diffusion of products*

Based on new practices in the agricultural world, a Swedish geographer (Hägerstand 1967) considered the diffusion of innovations as a spatial process, because these practices, as with all products, are diffused through the media and personal contacts according to a hierarchy of space. They thought it would be better to focus on maps rather than biological processes and their growth curves. We thus move from a purely chronological approach to a "chorological" approach (from the Greek *khōros* which means space among other things). The spatial diffusion model was satisfactorily applied to the tractor market in the American Midwest (Cliff and Ord 1975) and the authors were able to demonstrate the existence of development poles (De Palma *et al.* 1991).

The diffusion of new products may be more or less rapid, depending on intrinsic, or product-specific, factors and extrinsic factors, such as market conditions. This model is also based on positive word of mouth (Mahajan *et al.* 1979) which allows new products to spread more or less quickly, although sometimes this word of mouth can be negative (Mahajan *et al.* 1984). Improvements were suggested (Mahajan *et al.* 1990) and then made to this model in order to generalize it (Mahajan *et al.* 1995; El Ouardighi and Tapiero, 1997) or to extend the assumption of a maximum threshold on the number of adopters (Mahajan *et al.* 1978; Mahajan *et al.* 1979). Then, word of mouth was varied over time (Easingwood *et al.* 1983), bypassing some of the limitations of the Bass model. Price and advertising (Bass 1994) were added to develop a pricing strategy for new products (Krishnan *et al.* 1999). But the marketing literature deals a-spatially with the diffusion of new products (Gatignon *et al.* 1989). In addition, the Bass model is based on the idea of

random social networks, which is not always the case in marketing. Indeed, the diffusion of certain products requires a spatial diffusion model and is therefore non-random. Products such as smartphones, cars or personal or home equipment are thus likely to be seen and purchased by other customers; the closer the potential customers are, the more effective the diffusion will be, hence a spatial approach (Steyer 2005). Two logics can be distinguished in the spatial diffusion of innovations (De Palma *et al.* 1991):

– a diffusion logic: incremental or geographical diffusion, this is the well-known phenomenon known as the oil stain effect or contagion (Laulajainen 1987);

– a hierarchical diffusion logic according to central place theory (Christaller 1933).

3.2.1.2. *Other product diffusion factors*

However, space is not the only explanatory dimension of product diffusion (Brown 1981). Other factors, such as the role of innovators who seek to adapt products to customers' tastes and financial means, the mediatization of products through advertising and the press, all the contact points that physically distribute the product to which it is now necessary to add the Internet, play an essential role in diffusion. To compensate for the aspatiality of marketing diffusion models, the Bass model has been validated at the international level (Gatignon *et al.* 1989) and spatio-temporal models to explain diffusion during technology substitution (Mahajan and Peterson 1979). An interesting development is a model based on avalanche theory (Steyer 2005) based on both the Hägerstrand and Bass models. The distribution of a new product is carried out within the company and thus constitutes a social network. The Bass model is based on the random nature of this social network. However, this hypothesis amounts to denying the spatial aspect of diffusion: the closer the individuals likely to accept the new product are, the easier the interactions and diffusion are. A random network is based both on the homophily of individuals, their propensity to get closer according to their socio-cultural characteristics, and on geographical distance, a neighborhood effect shown using aerial photos for air conditioners (Whyte 1954). Other approaches have been proposed to model spatial diffusion (Peres *et al.* 2010) based on Markov random fields and percolation structures (David and Foray 1993), or cross-entropy divergence measurements (Garber *et al.* 2004).

3.2.2. *Geomerchandising*

Two definitions are required here: that of assortment and that of merchandising. The assortment is the number of articles in a product category (Levy *et al.* 2018).

The *Institut français du merchandising* (IFM), which ceased operations in 2017, defined merchandising as follows:

> All studies and application techniques implemented, separately or jointly by retailers and manufacturers, with a view to increasing the profitability of the point of sale and the flow of products, by constantly adapting the assortment to market needs and by the appropriate presentation of the goods.

It has also been compared to a "silent salesperson who assists the customer in his or her choice process and encourages him or her to buy" (Fady *et al.* 2007). In the IFM definition, it is noted that there is a need for "continuous adaptation of the product range to market needs". It is necessary to understand the market in its local sense: not all local markets are identical according to the products sold.

Indeed, the store manager, whether he is an employee manager, franchisee, member of a retail group or dealer, provided that he or she is allowed to decide at the local level, knows his or her trading area well, while the manufacturer has the means to take information further at the global level on their development in terms of consumer expectations and the influence of his or her competitors. Hence the existence for years of geomerchandising, which consists in adapting the product range according to geographical criteria that can concern demographic, economic, cultural or even climatic aspects. The objective is to optimize the point of sale's offer in order to increase its performance.

3.2.2.1. *From merchandising to geomerchandising*

Merchandising covers the following functions in a store: offering in the form of an assortment, presenting and managing products on the shelves and animating these shelves through POP (point of purchase) advertising and sales promotions (Wellhoff 2013). Defining the best possible assortment is an essential issue in retailing (McIntyre and Miller 1999). The link between assortment and spatial management is, according to a first theory (Baumol and Ide 1956), a compromise that the buyer must make between the choice of the item he wants and the distance and therefore the cost he must accept to achieve his or her goals. This theory can be supplemented, because depending on the product category, the compromise will not be the same: if we recall the classification of goods (Copeland 1923), commodity goods and shopping goods offer more possibilities of compromise than speciality goods, because the brand is strong and compromises are more difficult. It was then established that consumers' perception of the attractiveness of the assortments is based on the idea that the item is available and that the space allocated to this type of item is sufficient to offer a sufficiently wide assortment to satisfy their choice (Broniarczyk *et al.* 1998), knowing that this choice is essential in the consumer's

choice of stores (Craig *et al.* 1984). We see that there are two opposing logics of choice that eventually come together: one logic emphasizes the importance of the location of the point of sale while the other prefers to favor a management of the internal space of the store that also takes into account the location of the point of sale. The second logic will give rise to models designed to optimize the store space to be allocated to the different product categories (Corstjens 1981; Bultez *et al.* 1989; Urban 1998).

3.2.2.1.1. The implementation of geomerchandising

Geomerchandising brings an important spatial dimension to the management of department stores when they are managed within retail groups, as well as services such as banks. Small businesses or departments stores when they are run by members of a group of retailers or by franchisees depending on the degree of autonomy *vis-à-vis* the franchisor, practice geomerchandising on a daily basis. Geomarketing brings to geomerchandising cartographic techniques that contribute to improving the accuracy of decisions concerning the necessary localization of products, their presentation and the sales promotions that highlight them. E-commerce sites use dynamic geomerchandising that relies on the geolocation of the Internet user's electronic support (microcomputer, tablet or smartphone) to provide a more personalized product offer. A major consequence of the application of geomerchandising concerns the store's information system, which can now benefit from very large and ever finer amounts of data, thus highlighting the heterogeneity of consumers and their store attendance behavior. The analysis of these data can only be done within a strategic framework involving three specific requirements (Volle 2006):

– organizational differentiation: it is no longer enough to apply a single model to all sales units (stores, restaurants, hotels, etc.) within a network, with localization gradually becoming the rule, as "the era of standardization is ending" (Rigby and Vishwanath 2006);

– the attractiveness of the brand: neither should the brand's recognition capacity be compromised by undermining the uniformity of the basic concept (Bradach 1998) by destroying key elements at the heart of this concept (Kaufmann and Eroglu 1998);

– bargaining power with suppliers: improving knowledge of local markets (Minkler 1990) can provide a competitive advantage not only with regard to customers and competitors, but also with regard to suppliers during negotiations.

The heterogeneity of consumers and their behavior when visiting points of sale are due to a wide variety of factors: the standard of living that may differ from one region or city to another; cultural habits; the geographical distribution of activities

with industrialized areas and others that are less so; the quality of the local commercial offer that explains the choice and quality of the products sold, and therefore the assortment offered (Kalyanam and Putler 1997); the price level with price elasticities (Mulhern *et al.* 1998) or highly variable local promotions (Macé 2000a). This heterogeneity is also reflected in the number of points of sale visited according to:

– socio-demographic criteria and this implies that retailers must clearly define the customer profiles (Gonzàlez-Benito 2000) of the trading areas of their stores;

– the assortment offered in the points of sale (Cliquet 1990, 1995; Fotheringham 1993) and which also depends heavily on competitors present in the area (Volle 2006).

For more than 50 years, the relationship between strategy and structure (Lawrence and Lorsch 1967) has been the subject of much debate. Merchandising is no exception to this confrontation and what has just been described with regard to the heterogeneity of consumers and store traffic reinforces the idea of adapting the structure of the organization, in this case the store, by implementing geomerchandising (Vyt 2008). In other words, merchandising should be developed in the best possible way to meet consumer requirements: this is an essential condition for store performance (Grewal *et al.* 1999). This requires not only a particular effort to develop an appropriate offer, but also a supply and therefore logistics that can take this differentiation into account.

3.2.2.1.2. The role of assortment in the attraction of points of sale

The attraction of the point of sale is measured either with gravity models (Huff 1964) found in geomarketing software or with spatial interaction models (Cliquet 1988). But the attraction models do not allow sufficient precision in terms of width and depth of the assortment (Volle 2000). The choice of assortment, in terms of width and depth, is always a delicate matter. While some consumers appreciate the variety of products (Aurier 1991) and like change, not all do, hence the need for spatial studies according to market areas so that retailers are able to offer the best choice according to customers' wishes. One of the retail firm's main roles is to offer a limited choice for reasons of space, but above all, one that is relevant to its image. Space again plays an essential role as it represents one of the retailer's major assets in terms of shelf management capacity (Gomez and Okazaki 2009). An assortment will attract even more customers who will come from further afield, as it offers products, goods or services of a higher level according to the central place theory (Christaller 1933). It is also important to know the distance threshold (Malhotra 1983) that the consumer will refuse to exceed for reasons as diverse as the cost of fuel travel and/or the time or simple fact of leaving his or her usual supply area.

The challenge is therefore clear and "consists of adapting the sales surface to the trading area" (Volle 2002). The importance of geomerchandising then takes on its full meaning and makes it possible to meet a certain number of challenges (Fady *et al.* 2007):

– adapt the assortments to local potential;

– model the potential of the category and assortment;

– introduce a new reference;

– model the potential of the trading area;

– propose recommendations (adapted to the area) for the allocation of shelves;

– reduce the gap between reality and potential;

– control and set merchandising objectives;

– reallocate the sales area;

– provide a competitive advantage.

3.2.2.2. The *application of geomerchandising*

Geomerchandising is now applied in many companies such as Ricard (Renaudin and Vyt 2018). Geomerchandising can be implemented in two ways: on the one hand, tactical geomerchandising and on the other hand, strategic geomerchandising (Volle 2006); or, on the one hand, external geomerchandising and on the other hand, internal geomerchandising. External geomerchandising concerns the adaptation of products to demand whilst the internal geomerchandising specialist has to manage his or her offer by adapting it to the available shelves. However, for many years, retailers have favored a global approach to all their domestic markets (Vyt 2005). This vision is now outdated, and these retailers take into account the heterogeneity of consumers by adapting their product offer and allocating shelf space according to potential sales by category: geomerchandising is thus implemented under "joint pressure from retailers and manufacturers" in line with *category management* (Volle 2006). Five research studies developed in scientific literature in marketing are presented.

3.2.2.2.1. An external and internal geomerchandising application

Research of 27 stores in the United States (Stassen *et al*. 1999) showed that when price and product distributions are known between stores in a market area, the distance between stores and the overlap of assortments (when the intersection between store assortments is not zero) are the variables that explain the shared use between these stores. The authors also show the importance of differentiating assortments to increase attractiveness. We can therefore see the link between the

consumer's spatial behavior and the attraction force of the assortment: gravity gives way to attraction.

3.2.2.2.2. A strictly external geomerchandising application

Campo (2000a) examined the impact of point-of-sale location characteristics on the relative attractiveness of product categories and detailed factors that can influence local performance by distinguishing between internal (store) and external (trading area) characteristics:

– the characteristics of the store:

- its image and that of the chain to which it belongs;
- its format;
- its strategy as to the depth of its assortment;
- the level of quality and service offered;
- its prices and promotions;
- its size;

– the characteristics of the trading area:

- competition with the presence of large retail stores exercising a strong attraction power and a strong competition;
- socio-demographic categories such as average age, level of education, employment and income, social status, family size and composition, degree of ethnicity, degree of urbanization;
- passenger consumers in the study area defined as shoppers working in the area but not living in the area.

The allocation of shelves to products is based here on the modeling of asymmetric competition (Carpenter *et al.* 1988) applied to assortments (Bultez *et al.* 1989). It is in fact an MCI model that calculates the attraction exerted by a store. It is used in this case to quantify the effects of location factors on the attractiveness of product categories. This allocation is also based on the rule of the allocation of the shelf space for the benefit of retailers developed under the acronym SHARP (Shelf Allocation for Retailer Profit; Bultez and Naert 1988).

The objective is to predict the retailer's profit, according to a first model, by product category according to the allocation of the shelf space, then with a second model, the total profit by aggregation of profits by category. For each category, the models measure their impact on the attraction of the store on the one hand, and on customer spending on complementary and substitutable products on the other. This

research confirms the relative attractiveness of the categories according to the size of the store, the socio-demographic profiles of both resident and mobile customers and generalist or specialised competitors. These local differences appear to be even more pronounced for clothing and luxury products. All these results validate the relevance of micromarketing and geomarketing associated with the choice of assortments.

3.2.2.2.3. External geomerchandising and environment

A third application related to external geomerchandising is to consider the "environmental characteristics" of the point of sale in order to "determine an individual sales potential by category" (Vyt 2005). This work was carried out within the framework of a French network of supermarkets. In fact, it is a question here of implementing both site marketing, which is therefore specific to each of the points of sale of a network, and internal benchmarking. Site marketing, an expression used more by practitioners, belongs to micromarketing, a term adopted more by academia (Macé 2000a; Volle 2006); however, the expression "site marketing" takes on its full meaning here. Combining site marketing and internal benchmarking consists in collecting data on the demographic, geographical, cultural and socio-economic context, without forgetting local purchasing habits, in other words, behavioral data on past purchases as well as attitudinal data on predispositions towards brands and products that may have an influence on future purchases. This approach is part of a network of points of sale that must maintain its image. Indeed, applying geomerchandising must not call into question the uniformity of the concept within the network of points of sale (Bradach 1997).

3.2.2.2.4. From geomerchandising to retail managerial benchmarking

External geomerchandising requires data specific to the market area in which the store operates (Fady *et al.* 2007) and which concern the intensity of competition and its intratype (e.g. between supermarkets) or intertype (e.g. between supermarkets and convenience stores), data on the level of urbanization, local traditions, socio-demographic characteristics and available infrastructure. This data can be obtained within the point of sale itself or from geomarketing companies, public bodies (INSEE) or companies specializing in behavioral Big Data; all this data will then be geocoded. The data analysis approach here is based on Data Envelopment Analysis (DEA) (Cooper *et al.* 2006), a classic benchmarking method. For each store, the differences between the values of the variables in these stores and the highest values, that is, best practices, are then measured for each store. Some variables can be controlled by the store manager and others not. The first variables characterize the local context of the store, the age of its establishment, the income level of households in the trading area or the intensity of competition and constitute the contribution in terms of geomarketing. On the other hand, the other variables are internal and therefore controllable by the manager who can act accordingly to

improve the performance of his point of sale. This results in much more precise benchmarking (Grewal *et al.* 1999).

In one of the few research studies published on geomerchandising (Vyt 2005), the internal variables are: the number of households in the trading area and the theoretical market as defined by the brand; the sales surface of the five largest competitors in the market area; the location criterion (urban or rural). The external variables are: the number of store employees; the surface area of the point of sale in square meters; the number of products in the assortment referenced in the product category studied. Several DEA models were applied to determine the most explicit compared to the retailers' usual method of taking into account only one performance variable, most often the store's turnover (Vyt 2008). The DEA applied to geomarketing therefore allows the design of standards based on considerations related to local contexts (Volle 2002) and thus the setting of individualized objectives leading to a more accurate evaluation of points of sale (Vyt 2005).

In addition, benchmarking based on local contextual data from stores and the DEA makes it possible to measure the performance of stores and therefore of their managers more fairly. A study highlighted both the unfair way of evaluating the performance of point of sale managers in a French supermarket chain and the contribution both in terms of site marketing and in terms of the management of supermarket managers that this method had led to (Vyt and Cliquet 2017). Most retail chains only consider turnover as a performance indicator; however, this amount of sales cannot be a fair way to measure the activity of outlets, as they are not located in areas that are comparable in terms of potential. The benchmarking method gives a ranking of stores that is extremely different from that determined by the retailer and thus puts the most deserving store managers in their right place given the local context. This method also makes it possible, as has already been pointed out, to highlight good practices according to the various environments that the chain's store managers are likely to face.

3.2.2.2.5. An application using an agent-based model

A recent proposal (Robert-Demontrond *et al.* 2018) calls for a redefinition of the problem based on agent-based models (ABMs). Criticizing overly empirical merchandising methods leads to the development of a mathematical approach to the problem and a method of solving it through the implementation of an agent-based model (ABM). In the case of assortment management, agents are items placed on the shelf in a certain environment. ABMs make it possible to model the interactions between these agents, in this case the articles, and to simulate these interactions within their environment, in this case the department of a store. Indeed, placing an item in a specific place in a department can have an influence on the items surrounding it and vice versa: it is a space management problem. Organizing the

merchandising of a department can be done, in the first instance, to maximize the location of an assortment by maximizing all the offers of items while minimizing the "structural dissipation", adding up the product of the physical distances between the items and structural dependencies. Simulations can then be carried out using various methods such as heuristics, as is shown in an illustration of a ground coffee shelf.

3.2.2.3. *Geomerchandising and store location*

There is no need to compare the consumption of products between countries that are very distant from each other: very significant disparities can be observed between local markets located in the same country. Nielsen carried out a comparative study of the main products sold in each French department according to the importance of the variation in relation to the consumption of these same products by the entire French population (Deluzarche 2014). The results are edifying. While we will not be surprised by the importance of nougat in the Drôme, department of Montélimar or Calvados in the eponymous department, we will probably be surprised to learn that in Occitania and in the Hauts-de-France, the product category with the highest sales rate compared to the average sales of the French is canned meat. The same is true for caviar in the Paris region and the Maritime Alpes, which attract many Russian tourists.

However, traditions are not the only causes of consumer habits. Retailers also help to promote new products from other horizons that can change consumption patterns. Exporting companies may be confronted with this problem, especially with the globalization of markets, because they may all have to set up in places geographically distant from their current location.

These installations in new territories can have multiple consequences for both the company itself and the territory concerned, as the company is then involved in another local community while developing its international network (Cragué 2014). The need then arises, on the one hand, for manufacturing companies to adapt their products to local tastes and customs, and on the other hand, for retailers to adapt their marketing and thus their assortment to the diversity of cultures in different places.

3.2.2.2.4. *Geomerchandising and interior design of the store*

The interior design of the store also requires a real spatial management, and maybe everyone has seen points of sale where this management is questionable or even stunning. However, the impact of good spatial management of product categories within a sales area is now a little less well known. Many studies have attempted to design models to optimize the space offered by gondolas in department stores, such as SHARP (Bultez and Naert 1988) and others have followed (Bultez *et al.* 1989; Urban, 1998). A spatial model of brand sales showed the importance of

product category location and display in central supermarket aisles (Bezawada *et al.* 2009) for inter-category cross-selling; placing categories in relation to each other and communicating this helps to increase sales. This model facilitates simulations to optimize the effects of category locations on sales by affinity between products. Here again, we see the value of spatial management within the store itself.

3.3. Spatial approach to the price

To study the spatial management of prices and price promotion is in fact to associate prices and promotion with the location of points of sale. The spatial aspects of sales promotion will be addressed in section 3.4 on the spatial approach to promotion and sales force management. Setting a price must take into account both the cost of the product, competition in the market and the degree of acceptability of consumers: acceptability price or psychological price. You cannot make a profit by selling at a price below cost; you cannot sell at prices higher than the competition for the same product quality; and finally, it is difficult to get a product accepted by customers who would consider the price too high.

3.3.1. *Space and prices*

Adapting the pricing strategy to the characteristics of the various trading areas (Montgomery 1997) in which a network of outlets is set up is sometimes a challenge for the company and a pious wish for the public authorities. The following two examples will attempt to illustrate these two feelings.

The situation of the company 3M (Minnesota Mining and Manufacturing) in the early 1990s is particularly enlightening when it comes to showing the link between price and space at the international level. The following was presented at a seminar organized in 1991 by the AFM (*Association française de marketing,* the French marketing association) and this story is old enough not to affect this company's otherwise remarkable business. 3M was then very active in many markets, particularly in France and Germany. At the time, it had nine factories in France and now has 13, although the Beauchamp (Val-d'Oise) factory is due to close in 2019. In the early 1990s, 3M had a leading position on the French Post-it market, but was only number two in Germany behind the local producer Tesa. When you are a market leader, it is easier to impose a price while as a challenger this policy is much more difficult. As a result, the price of Post-it notes was higher in France than in Germany and French retailers were going to buy them from Germany. These are referred to as gray markets (Bucklin 1993). We thus understand the importance of a good understanding of space.

A study carried out in 2008 by Astérop, a geomarketing company, showed that, of the 629 local markets in France, 60% had only one major retailer when 25% had two and the rest had more (Brafman 2008). Faced with this situation, we have a better understanding of the very local link between space and price and the return of inflation at that time. This inflation was stopped very quickly by the consequences of the subprime crisis. The phenomenon of commercial evasion then began; consumers did not hesitate to make their purchases in more favorable geographical areas.

It can therefore be argued that pricing must take into account local or national markets, in other words the space in which business takes place. A simple global vision can lead to inadequate decision-making. It has been shown that considering differences between market areas can increase price sensitivity through appropriate advertising (Wittink 1977). But analyzing firms' pricing and location strategies is difficult, because too many factors come into play and most analyses are based on simplified conditions that are too often out of touch with reality, not to mention imperfect consumer information (Miller 1996).

The frequent use of price comparisons and store geolocation tools today can give consumers the opportunity to improve their information and companies must adapt to this new situation.

3.3.2. *The influence of geography on pricing*

Each of the elements that contribute to price setting (costs, competition and psychological price) can be linked to spatial aspects. There is, in fact, a geography of costs, a geography of competition and a geography of demand (Desmet and Zollinger 2006).

3.3.2.1. *The geography of costs*

It must be understood that this is about dealing with costs that affect the selling price of a product. The notion of cost includes both transport costs and social charges or taxes. Other, more intangible elements such as the brand's reputation or the services associated with the sale of the property lead to real differentiation. These costs concern both the production and distribution of the product. As far as production costs are concerned, the geography of these costs can be linked to salaries and social security contributions as well as to the location of production units, which should theoretically be located as close as possible to the market. The relocation phenomenon that has characterized production units for many years is a clear example of this, which leads consumers to boycott companies that engage in this type of action (Hoffmann and Müller 2009), even if, for reasons of increasing transport

costs, transport time or lack of staff competence, we are also witnessing factory relocations (Lampóna *et al.* 2015).

3.3.2.1.1. Transport costs

Transport costs vary throughout a region or country; everyone acknowledges that fuel prices differ from one French region to another, including in stations of the same brand. On the other hand, taxes and social security contributions are generally the same throughout a country, except in federal states such as India or the United States, where tax and social security laws differ from one state to another. For example, in the United States, where there is no VAT, sales tax varies from state to state, as do corporate taxes; this is why many American firms are headquartered in Delaware, a small state with minimal taxation.

The distance between economic actors – a supplier and his customer – can play an important role in assessing the risks of the transaction and thus increase the price of the product. These risks may result in the obligation to store the product, the taking of certain precautions to ensure the execution of the transaction and the delivery of this product. There is also a currency risk when the currency of the players is different, hence the attraction that the opening of the euro zone may have made for companies located in that zone. Given both monetary and non-monetary characteristics, the price is presented as "information used as a qualitative guide in monetary and time choice" (Desmet and Zollinger 1997).

The problem of transport costs arises acutely when the retailer, whether operating from a physical store or an Internet platform, offers home delivery, which is tending to become more and more common. What policy should it adopt? Should it charge the exact cost of transport costs with FOB (Free on board) delivery or apply the same cost to all customers (uniform delivery plan)?

It seems that giving the customer a certain freedom of choice by offering him or her a "menu" between these two options makes it possible to better optimize the retailer's profit without penalizing the customer, because he will know in advance whether the place where he lives is easily accessible or not and will therefore be able to estimate the cost; moreover, it is a fairer solution, because customers located closer to the store will not subsidize those located at the edge of the trading area (Basu and Mazumdar 1995).

3.3.2.1.2. Logistics

The arrival of the Internet and web-based platforms has greatly increased the importance of logistics in order to control distances and limit transport costs as much as possible. The growth of home deliveries requires companies to solve the last mile problem, because in cities with congested road traffic, reaching the

recipient in good conditions is sometimes a challenge. Consumers do not all choose the same delivery options: some prefer home delivery while others agree to pick up their parcels in dedicated locations (nearby shops or boxes located near a station). A hybrid genetic multi-population algorithm has made it possible to explore the space of solutions (Zhou *et al.* 2018). Delivery optimization is a central problem and algorithms have been proposed to solve it, some based on a branch-and-price combinatorial optimization method (Desrochers and Solomon 1989; Johnson 1989; Johnson 1989) and implemented (Florio 2018); others on graph theory and more precisely on the minimum cost flow technique (Klein 1967) recently applied to the problem of recipient absence at the time of delivery (Wang *et al.* 2016). UAVs (unmanned aerial vehicles) or UASs (unmanned aircraft systems) have been designed to optimize delivery times (Murray and Chu 2015) or limit CO_2 emissions (Figliozzi 2017).

3.3.2.1.3. Tax system and standards

As for the tax system and other regulatory features, governments tend to constantly increase not only taxes, but also the number of product-related standards, legal notices in the local language, local regulations or technical constraints related mainly to pollution, "thus transforming a continuous space into a discrete space" (Desmet and Zollinger 2006): some see them as disguised forms of protectionism. Manufacturers are then forced to adapt the product according to the countries, which increases the cost.

3.3.2.2. *The geography of competition*

Competition is often analyzed in a global way without taking into account major local disparities. However, it has long been known that the geography of competition can be very different from one local market to another (Hollander 1965).

3.3.2.2.1. Local competition

Astérop's previously mentioned study (Brafman 2008) on competition shows how weak it is in local French markets. Some French groups have developed format strategies combining hypermarkets, supermarkets and convenience stores (Carrefour, Casino, Cora, Système U) while others have penetrated various sectors in addition to the predominantly food sector (Auchan, Intermarché and E. Leclerc to a lesser extent). It has been shown that early entry into a market space makes it possible to create barriers to entry and thus maintain an oligopolistic or even monopolistic situation even when the market is growing (Eaton and Lipsey 1979a). Another UFC-Que Choisir study carried out the same year on hypermarkets shows that only 25% of local markets face real competition (OECD 2009). The OECD

report shows that insufficient competition penalizes productivity and therefore employment. We could add on the subject of productivity:

> Based on the methodology used in an earlier study (Conway *et al.* 2005), it is estimated that the level of productivity in France could increase by nearly 10% over a 10-year period if the regulations in force in several production sectors were aligned with the practice observed in countries where regulatory barriers to competition are the lowest. (OECD 2009)

It should be noted that the uniform pricing policy, beyond the advantage of simplicity, may be optimal depending on the level of competition, but not in the presence of monopolistic elements such as public services (Norman 1981). Spatial price non-discrimination (the same price everywhere) found on monopolistic markets or with collusion of oligopolies allows sales to be maximized without aiming for profit maximization.

3.3.2.2.2. International competition

We have therefore just discussed the situation of a country, France, in relation to its competitors and seen how high the barriers to competition are there. Every company today is likely to face global competition. The Internet allows companies, even very small ones, to develop quickly if they know how to manage a website and especially logistics in the case of tangible products. In other words, the geography of competition is totally disrupted by the use of these websites and this has also favored the growth of emerging countries.

Moreover, all marketing strategies seem possible *a priori*. It was long thought from the 1980s that product globalization implemented by manufacturing firms would eventually invade the world (Levitt 1983), and from the 1990s that only single, low price strategies, as practiced by many retail companies (Colla and Dupuis 1997), were necessary for success at the international level. It turns out that, from now on, globalized products, that is, products standardized at world level, and low prices are no longer necessarily the keys to entry. Consumer resistance to globalization is growing stronger as a result of identity reactions that assimilate globalization to a loss of cultural identity and economic and therefore political submission. With low prices, retailers are experiencing serious problems with their "factories for sale" hypermarkets which, although they are still popular in emerging countries that are discovering them, are short-circuited in advanced countries by convenience stores (Gahinet 2018; Gahinet and Cliquet 2018), new forms of trade (organic stores, consumer cooperatives, sales websites), very short marketing channels favoring local products to the detriment of those that have come from far

away, both for social reasons such as maintaining local jobs and ecological reasons such as limiting CO_2 emissions (Cliquet *et al.* 2018).

At the international level, a firm, whether in the manufacturing or retail sector, is always looking for a place where it can establish itself at a lower cost and where there is sufficient demand to fill its order book or shelves, provided that it corresponds to its target.

3.3.2.3. *The geography of demand*

Geographic locations are one of the main criteria for segmentation of demand (Desmet and Zollinger 2006). These geographical locations, which are all customer segments, cover entire markets as well as market areas or parts of these areas or even city districts.

3.3.2.3.1. Demand and political geography

One study was able to show that the geographical segments related to the demand for meat in seven European countries based on data from stores selling this product were often "straddling" borders (Hofstede *et al.* 2002). Among several models, the country segmentation model gave the worst results, showing that political borders are not always the best criteria for customer segmentation.

3.3.2.3.2. Demand and product geography

We can see that there is a geography of products, in other words of supply, resulting from the geography of demand. Food consumption areas can be distinguished (Didelon 2009) with large disparities in meat and cereal consumption. Given such geographical market configurations, it seems difficult to propose an undifferentiated pricing policy, regardless of the location of these markets. It has been possible to show how to establish price indices at the level of euro area countries (Ferrari *et al.* 2005).

Sometimes, in the real estate market, prices can hardly be established in a comprehensible way and even explode in the form of "bubbles", as in the United Kingdom (Zhang *et al.* 2015). This market is also affected by the deterioration of the environment, particularly in terms of noise: in several local markets, particularly in the suburbs of Minneapolis in the United States, there have been indications of impairment of properties located too close to road traffic (Swoboda *et al.* 2015). However, there are also positive criteria, such as being close to a valued natural area, which can have a beneficial effect on the price of the property (apartment or house), as has been shown in the Netherlands (Darke *et al.* 2016).

3.3.2.3.3. Demand geography and "country of origin"

There is a "feeling" that shows the extent to which space can be treated both in geographical and relational terms (Duan *et al.* 2018): the "country of origin" (COO) of the products sold (Peterson and Jolibert 1995). This concept of COO applies to both product brands (Melnyk *et al.* 2012) and store fascias (Kan *et al.* 2014). Local products are sometimes abandoned in favor of foreign products considered, rightly or wrongly, to be of better quality when, in other circumstances, boycotts of foreign products are observed for various reasons such as a company's decision to relocate a factory (Hoffmann and Müller 2009). The "country of origin" can therefore constitute a surplus value of the brand (Peterson and Jolibert 1995) without creating a real competitive advantage (Agrawal and Kamakura 1999) or, on the contrary, a drawback for the brand because of firm decisions challenged by the local population, government decisions, or pure ethnocentrism (Fischer and Zeugner-Roth 2017): Japanese people tend to believe that Japanese products are always of better quality than foreign products (Gurhan-Canli and Maheswaran 2000a; Gurhan-Canli and Maheswaran 2000b). Based on the theory of equity (Adams 1963), research shows that the COO has an impact on the willingness to pay the price of an imported product and that it is the image of the country that explains the attraction power more than the adequacy between the brand and the country of adoption (Koschate-Fischer *et al.* 2010). It can therefore be seen that setting a price is always a delicate operation, on the one hand because this operation requires linking often contradictory elements (costs and competition, costs and demand) and on the other hand because the geography of these elements often constitutes as many barriers to a rigorous and uniform price policy.

3.3.3. *Spatialized pricing policy or geopricing*

Geopricing aims to distinguish aspatial analyses from price analyses considering space. But what does the theory tell us? Is the theory always in line with reality? And what happens on the store shelves in terms of prices, because that is where consumers encounter both space and price?

3.3.3.1. *Spatialized price theories*

When we talk about price and space theory, we cannot ignore the principle of minimal differentiation (Hotelling 1929).

This principle is based on a simplified example of ice-cream sellers on a beach, in other words a linear market, who offer the same product at the same price. Each seller looks for a place that will allow him or her to maximize his or her income: the differentiation is therefore only about the choice of place and not about the price or quality of the product. Hotelling shows that these two sellers end up getting closer to

each other until they are both located at the same place on the beach, knowing that the potential buyers are evenly distributed. Buyers at the ends of the beach will have to travel a long distance. Moreover, the sellers' profit will be zero, because they will price at marginal cost: this is Bertrand's enigma (Bertrand 1883). Indeed, it would be curious if the protagonists opted for such a solution in a duopoly situation where they have some market power. This situation shows that it is in the best interest of both sellers to be in the middle of each half of the beach: this maximizes both their income and the travel of customers.

Hotelling's theory has been the subject of much debate (Eaton and Lipsey 1975; Basaille-Gahitte and Mathieu-Nicot 1991; Anderson *et al.* 2018), with reality not always conforming to the theory (Anderson 1986). However, Hotelling's theory explains why certain types of businesses tend to gather in the same place (Boulding 1966) despite reservations (Eaton and Lipsey 1979b). This is the case for furniture stores on "furniture roads" (Cliquet 1997b), clothing stores in cities or shopping malls. But in these cases, however, differentiation by price and/or product quality is necessary, otherwise there is a risk of a sharp drop in profit. Models have been able to link pricing strategies and location (Aboolian *et al*. 2008; Zhang 2015). Studying spatialized markets is a difficult task, because these markets are imperfect: consumers cannot always inform themselves and search for products with sufficient foresight. The agglomeration of points of sale is a means of reducing the effort in the customer's approach, but with its corollary of price dispersion.

3.3.3.2. *Between theories and realities*

Theoretical and other more concrete work are not always consistent. One of the differences is that economists rarely consider retail companies in their work. However, prices are often set according to a balance of power that retailers handle with great experience, which has the ability to annoy suppliers, resulting in conflicts (Legouet 2010; Dang and Cliquet 2012). Generally speaking, in the retail sector, there are often two main pricing policies, namely (Cliquet *et al.* 2018):

– the EDLP (Every Day Low Price) implemented with the success that we know about from Walmart and that is applied by the E. Leclerc group in France;

– the HILO strategy (or hi-low pricing) or "an island of loss in an ocean of profits" developed by the major French retailers.

It was also possible to compare the profitability for the retailer of various more precise pricing policies than the two previous ones: on the one hand, discounts linked to the size of the packaging, in other words to the quantity purchased, and on the other hand, price fixing at store level or micromarketing, in other words a geopricing policy (Khan and Jain 2005). As a result, maximum profit is achieved when the retailer combines both policies and the quantity purchased policy is more

efficient than the geopricing policy. In the natural and therefore real context of analyzing a market situation, account must be taken not only of the spatial dispersion of consumers and price discrimination, but also of the heterogeneity of products (Anderson and Palma 1988) and thus of differentiation. This is insufficiently addressed in economics textbooks, although it is well known that the spatial approach facilitates the analysis of the oligopolistic balance (Philips 1988).

One of the crucial points of a spatial analysis is the spatial heterogeneity of a market area that is always difficult to grasp: discontinuities in the market area under study, namely inner boundaries, "peninsulas" and "inner holes" (Bhattacharjee *et al.* 2017), must be taken into account. Geographers refer to the "roughness" of the terrain (Ewing 2019) which can be seen by comparing the results of gravity models with actual data (Helle 1993). The case of factory outlets that attract price-sensitive customers away from city centers is an *a priori* paradoxical link between price and location: these customers allow clothing stores to sell less "desirable" products (Ngwe 2017).

This objective of adapting the price at the local level requires the implementation, using the scanned data at the cash register, of an adapted micromarketing strategy, that is a geopricing taking into account socio-demographic data and data on competition. It has been shown that such a policy could increase the gross margin by 4 to 10% (Montgomery 1997). In the hamburger market in Texas, there was no correlation between the prices of restaurants located in a nearby radius, regardless of the chain to which they belong (Kalnins 2003). It can be concluded that hamburgers are not substitutable, probably because the reputation and image of each chain is perceived differently by customers. Consequently, any price promotion action generally does not lead to any change in market shares. On the other hand, there is a spatial correlation of prices between restaurants close to and belonging to the same chain: if the hamburger is not substitutable from one chain to another, the restaurant is substitutable according to its location.

3.3.3.3. *And on the shelves of store gondolas?*

Pricing policies were considered to be dependent on elements generally external to the point of sale (Desmet and Renaudin 1998): socio-demographic characteristics of customers in the trading area, pricing policies of competitors in the market area, transport costs, etc. However, pricing policies also concern elements specific to the point of sale insofar as the products are displayed on shelves of gondolas. Indeed, there are also internal spatial effects and the location of an item in a point of sale is never neutral for its turnover and profitability. All retailers are looking to optimize their assortment (McIntyre and Miller 1999), product prices and spatial allocation on the shelves (Amouche and Zaccour 2009; Murray *et al.* 2010). This is a real

challenge that affects both the spatial management of products, even if it concerns a much smaller area, and the question of pricing.

Within a chain of stores, it is possible to evaluate losses related to the misallocation of space on shelves. An econometric model combining, for a category of products in a popular chain of stores, the share of space allocated to the sales share shows that differences in spatial elasticities are explained by external characteristics and that these increase with the impulse purchase rate for products in the category studied without depending on the type of store (Desmet and Renaudin 1998). A model has been developed considering that products can be stacked on store shelves, which allows the retail firm to better associate its decisions on space allocation within its shelves with those on price setting (Murray *et al.* 2010). The adoption of an RFID chip can also have an impact on both the allocation of space within shelves and price setting (Szmerekovsky *et al.* 2011). This last point shows the influence of technology and in particular digital technology on pricing. This influence is also evident in distance selling, whether based on a catalog or a website: the dedicated space, in other words the size of the paper catalog (Desmet 1991) or the electronic catalog on the Internet, is decisive for the importance of turnover.

3.3.3.4. The *influence of digital technology on pricing*

The influence of digital technology on pricing is twofold and concerns both supply and demand. On the one hand, companies are using increasingly sophisticated algorithms to practice yield/revenue management (Legohérel and Poutier 2011), and on the other hand, consumers can easily find out more by using their mobile tool.

3.3.3.4.1. Yield/revenue management

Yield/revenue management allows certain service companies in particular to apply a pricing policy to ensure the filling of their hotels, aircraft, etc. This management concerns more the temporal aspects of their activities than the spatial aspects. These firms choose the right time to accelerate the sale of their products and thus optimize their revenues. However, spatial aspects are not totally absent insofar as these pricing policies generally target places where the risks of loss of income are greater: destinations for transport companies, places of leisure, regions or cities for hotels. One application proposed to integrate such a system into motorway tolls (Nagae and Akamatsu 2006). A service station in Rotterdam applies performance management by varying fuel prices every hour depending on traffic.

3.3.3.4.2. Price comparisons

On the consumer side, a real revolution, which some retailers have been able to use, seems to be taking shape with price comparison systems, which have an

increasing role in consumer choices, and this has consequences that are not always favorable to companies. It has been argued that these, as well as trading platforms and reverse auctions, have created a new paradigm in the pricing process (Kung *et al.* 2002). The Internet allows greater price transparency, which can hinder firms in their pricing policies even if yield management makes it possible to bypass this difficulty, as well as auctions or on-demand pricing (Desmet 2000). There is indeed a risk that prices will converge towards a "single price law" regardless of the store located in a given space and it has been shown that this evolution receives some evidence in the context of electronic products (Baye *et al.* 2004). A distinction should be made between loyal and non-loyal customer segments: stores with more loyal customers are expected to engage in price battles through promotions, unlike stores where customers will be more likely to change outlets based on price (Koças 2005).

A comparison between pure players and multi-channel retailers for three product categories (books, CDs and digital cameras) in two different countries (China and the United States) showed that the price dispersion of pure players was lower in the United States than in China, showing that a more mature market reacted more quickly than a more emerging market (Bock *et al.* 2007): retail therefore seems quite constrained by its geographical environment. It appears that the level and dispersion of prices are lower among pure players than among multi-channel retailers (Bock *et al.* 2007). Price comparisons can encourage the entry of certain players into a market in a hit-and-run strategy, either in the form of guerrilla warfare that forces incumbents to keep prices low (Haynes and Thompson 2014): this result strengthens the promoters of contestable markets (Baumol *et al.* 1982). In a so-called contestable market, the potential competition that threatens to enter it imposes competitive prices on existing players, regardless of the structure of the market (monopolistic or oligopolistic).

Price comparisons influence the value of so-called reference prices (Monroe 1979), especially for non-ostentatious products, unlike ostentatious products (Jung *et al.* 2014). But this influence must be accentuated according to, on the one hand, the type of store if it practices high price and, on the other hand, the attitude of the consumer who may seek a service from the retailer (Bodur *et al.* 2015); in these cases, the influence of the price comparison will be stronger and the spatial behavior of the consumer will be affected.

3.4. Spatial approach to sales force promotion and management

Promotion in the broad sense, which includes all forms of communication, namely advertising and sales promotion (public relations and sponsorship will not be mentioned) is rarely the subject of a spatial approach. In reality, however,

promotion has an impact on the consumer's spatial behavior, just as the place where it takes place has an impact on promotion. Advertising has a strong link with space, if only when it comes to choosing the locations of advertising panels. Finally, sales force management is the subject of spatial studies in order to optimize it and manage salespeople through digital tools.

3.4.1. *Geo-advertising*

Given the high costs of advertising, companies are seeking to limit this type of investment without giving up its advantages. Geomarketing makes it possible, on the one hand, to better define communication targets and thus to adjust advertising tools according to the target audience segments, and on the other hand, to properly manage the media plan by improving the choice of advertising panel locations, hence the interest in identifying the issues involved in spatial advertising studies. Surprisingly, however, the marketing literature has rarely studied the spatial aspects of advertising (Gallopel and Cliquet 2002). Some studies have nevertheless provided insights into health attitudes and behaviors. It was possible to compare, on the one hand, the availability, price and advertising of cigarillos and, on the other hand, the socio-demographic characteristics of people living near the points of sale of this product. This has led to the conclusion that prices in the United States are lower, products are more available and advertisements are more frequent and well adapted to African-American youth communities, which explains the health problems encountered in this community (Cantrell *et al.* 2013). The effectiveness of advertising for the *Affordable Care Act* (ACA) was measured by locating television ad recipients, the elderly, youth, the disabled (Barry *et al.* 2018). Above all, geomarketing makes it possible to better understand customer segments by linking them to specific market areas, even neighborhoods or IRISs in France or ZIP codes in the United States, which allows advertisers to develop effective micromarketing and much better targeted ads, because many campaigns aimed at everyone do not ultimately reach many people (Marzloff and Bellanger 1996).

The problem is identical at the international level where the adaptation of messages to local culture, which is not always done seriously, is essential for greater efficiency (Decaudin 1991; Croué 1994; Usunier and Lee 2013). Globalization is not always the solution for international advertising campaigns (Douglas and Wind 1986) and localization is preferable for basic products, technologies or symbols of a country or culture (Gallopel 2002). We can therefore see that the contribution of geomarketing appears to be quite similar for products and prices and for communication.

But the originality of the geomarketing contribution in terms of communication lies in the implementation of the media plan. It is necessary to differentiate the

geomarketing of clientele stocks from the geomarketing of clientele flows (Gallopel 2006; Douard *et al.* 2015) and not to forget that this decision remains linked to the knowledge of the customer segments concerning the geomarketing of stocks. Flow geomarketing aims at the mobility of current and potential customers, but understanding the characteristics of mobile consumers is more difficult. One thing is certain: billboard advertising is intended for both types of population. Some media are considered "mass media" because they do not take into account the location of prospects: this is the case for radio or television at the national level. On the other hand, they are able to separate current or potential customer segments according to the programs listened to or watched on radio or television, the qualitative audience of newspapers and magazines or the category of cinema films.

The choice of media is made according to the GRP (gross rating point), which measures the average number of contacts between a medium and 100 individuals belonging to the target audience of the advertiser, the OTS (opportunity to see) or the OTL (opportunity to listen) and the CPT (cost per thousand; Baynast and Lendrevie 2014) and this cost may be prohibitive, hence the need to adopt a methodology allowing precise targeting to avoid audience losses. Knowledge of consumers' socio-demographic and behavioral characteristics and data on frequented points of sale associated with geographical areas that can extend as far as IRIS make it possible to build databases to better target communication to targets. The media are nowadays very sensitive to the location of prospects and are therefore more and more interested in geomarketing.

3.4.1.1. *Direct marketing and geomarketing*

"Direct marketing is a marketing approach that consists in managing a personalized offer and transaction based on the systematic use of individual information" (Desmet 2003). Direct marketing aims to reach the target defined by the firm "directly". This approach represents a very important part of the communication expenses incurred by companies. The information used is both individual and longitudinal (Petr 2006) and is therefore monitored over time. This systematic exploitation of individual information is the subject of increasingly vehement criticism and controls that are intended to be strict on the part of the CNIL (see Chapter 1), because this type of operation often risks crossing the boundaries of individuals' privacy. Reaching the target directly implies the implementation of a spatial strategy and an "approach focused on the commercial potential of the territories or an approach focused on the location of its customers and prospects" (Petr 2006), that is, true direct geomarketing. It is possible to rely either on market area analysis (but without using individual data, which limits the scope of strategic analysis) or on an analysis of consumer behavioral data with a geolocated database. Unfortunately, the marketing literature offers very little work in this area. On the other hand, practitioners are much more aware of the benefits of geomarketing in

terms of communication and especially in terms of direct marketing. The distribution of leaflets and catalogs remains a very privileged way for retailers to be in contact with their targets and is appreciated by consumers contrary to what they claim. Geomarketing makes it possible to optimize this distribution in the market areas where they are located and to distinguish easily and quickly (Goujon 2016):

– the "stronghold" areas where the brand finds its highest actual and potential sales;

– the "conquest" areas that the retailer can hope to exploit in the medium term.

Direct geomarketing involves delimiting market areas, locating the addresses of consumers and stores in the market areas studied, geocoding these addresses, and analyzing the behavior of those consumers who tend to group geographically according to their social class (Berry 1967) or to that which they believe is theirs (Bailly 1984). We can see how important geographical location is for direct marketing, which can therefore not only easily contact the prospect, but also optimize prospecting thanks to geocoded information (Petr 2006).

However, leaflets and catalogs are likely to decrease in number, or even disappear in the long term, at the initiative of retailers such as Monoprix, in favor of messages on websites or even by sending emails that are still not appreciated by consumers. However, it will be necessary to consider drastically reducing this practice when we know that every person in France receives an average of 27 kilograms of leaflets and other brochures in their mailbox each year, despite an increasing number of refusals. The hypermarket chain E. Leclerc expects to be able to stop paper prospectuses in 2020. The company had to stop by proposing to recycle these leaflets with the slogan "1 E. Leclerc leaflet returned to the store = 2 cents for research."[2]

3.4.1.2. *Display and geomarketing*

Display media, or outdoor advertising, is an old medium that includes

– outdoor billboards with paper or digital support;

– billboards on transportation means;

– street furniture displays;

– in-store posters;

– digital.

According to the BUMP (*Baromètre unifié du marché publicitaire*, which compiles the amount of French media advertising revenue in net value), poster

2 https://www.mouvement.leclerc/prospectusutiles.

campaigns are a declining medium in terms of turnover and therefore market share, except for digital out-of-home advertising. The choice of advertising panel locations is an important decision and is linked to a spatial strategy. All advertising billboard companies rely on geomarketing to manage their billboard assets. These signs are located either in the city, on roadsides, in pedestrian areas (stations, subway stations), or on street furniture (bus shelters, city maps or neighborhoods), etc. France was the leading poster user in 2016, with 6.6% of advertising investment. This medium is considered to have a high impact, because how can we not see signs that remain in place 24/7 and reach a mobile population that is often difficult to reach.

Geomarketing helps to make decisions about the choice of panels, and we can then talk about flow geomarketing. It facilitates the work of sales representatives in advertising agencies, who must accurately show panel performance through traffic measurements in order to segment the display offer instead of offering too global a product (Gallopel 2006). For example, JCDecaux, the world's leading out-of-home advertising company with a market share of nearly 40% in France, is optimizing the management of its billboard advertising fleet and boosting the media planning offered to its advertising customers with geomarketing solutions. Concerning the geomarketing of flows, panels are located on trucks or bicycles.

However, out-of-home advertising is a medium that is becoming limited in its development, because placing an advertising billboard (of which there are approximately 600,000 in France) is an increasingly delicate operation. In addition to the increasingly negative reactions of citizens, both national and local authorities frequently oppose new installations, as billboards are considered to destroy the landscape. The display has its rigidities and the panels cannot be changed as soon as the advertiser wishes, limiting responsiveness to competitors. Geomarketing also has its limits, because the CNIL prohibits any use of individual data in territories with a population of less than 2,000 inhabitants and some advertisers still consider that the use of geomarketing is mainly a means of increasing prices (Gallopel 2006). Geomarketing is used to optimize mobile signage to determine a good route and maximize advertising coverage with respect to the target or to evaluate the number of people who have potentially seen the mobile signs.

3.4.1.3. *Cinema advertising and geomarketing*

If the cinema attracts the lowest investments, it is also because, on the one hand, it attracts a specific population composed of individuals with high levels of education and higher socio-professional categories, and on the other hand, few individuals go to the cinema every week. In addition, prices tend to increase and the number of cinema admissions to decrease (e.g. by 4% in 2018).

Despite a relative and recent decline, cinema advertising investment has increased. The memorization rate of cinema ads is very high compared to other media and social selectivity is an important asset for some advertisers (Baynast and Lendrevie 2014). The expansion of multiplexes (although governed by the Raffarin law of 1996) continues and geomarketing plays a major role in refining the criteria for location; we can know and visualize, thanks to precise maps, the profile of cinema viewers, their consumption behavior and their residence (Petr 2006). However, the organization of cinema circuits linked to multiplexes is opposed by independent cinemas, associative structures practicing lower prices; they screen independent films (Fabre 2016) and do not have the means of multiplexes. And while the number of screens is increasing (5,900), the number of cinemas is decreasing (2,046) (Forest 2019).

3.4.1.4. *Press advertising and geomarketing*

The press has long been the leading French media for paid advertising space. But it is now largely overtaken both by the Internet, which has become the leader, and by television. Its turnover decreases by about 7% each year. The press media includes the national daily press (NDP), the regional daily press (RDP), the regional weeklies, magazines, the specialized and free press. It is the magazines and the NDP that currently concentrate the most advertising investments. We should not forget the important place in the press of "classified ads", the amount of which corresponds to more than 20% of the amount of retail ads (2017). In the USA, the press medium declined in importance of more than 40% between the 1980s and 2017.

Geomarketing has become an indisputable tool over the past 20 years or so for publishers in order to build reader loyalty and to try to maintain the level of audience, which seems increasingly difficult in the face of the Internet that these media have appropriated by creating sites and setting up on social networks. The development of Big Data and data mining make it possible to improve reading knowledge. Precise maps are used to determine the diffusion of these media, which also makes it possible to orient the content according to the diffusion area, as well as for advertising inserts. This is true at the international level (Petr 2006). But the increasing and often daily mobility of many individuals makes it increasingly difficult to monitor the distribution of the press, except once again to track the reader using his or her smartphone.

3.4.1.5. *Radio advertising and geomarketing*

The CSA (*Conseil supérieur de l'audiovisuel*, the French committee for audio-visual activities) distinguishes the following:

– private FM radios, divided into five categories:

- A: community radio stations with access to local advertising;

- B: independent local or regional commercial services with access to local and regional advertising;

- C and D: thematic radios with access to national advertising;

- E: generalist national radio stations with access to national advertising, but not to local advertising, plus highway radio stations;

– public FM radios, with the addition of overseas and international radio stations.

Radio allows for the repetition of advertisements and a certain selectivity in terms of target and geographical areas, but it lacks creative possibilities and suffers from a certain commercial congestion (Gallopel and Cliquet 2002). Moreover, audience research is not easy to conduct, as radio can be listened to at home, in the car or on the Internet (Chandon 2000).

Geomarketing is of particular interest to radio stations in categories C and D, as they can be organized in the form of local dropouts and thus have access to local advertising.

Advertisers such as distributors (Moati 2001), restaurateurs or hoteliers (Petr 2006) are interested in the study of individual movements offered by flow geomarketing (Douard *et al.* 2015).

3.4.1.6. *Television advertising and geomarketing*

The television medium outperformed the press in terms of advertising investment, but was itself outperformed by the Internet. We still watch a lot of television, but more and more individually and on various screens (TVs, computer screens, tablets and smartphones), with the possibility of eliminating "ads": all this makes it difficult to measure audiences. While sponsorship spaces see their still modest share increase, that of so-called classic spaces decreases slightly according to the BUMP. In France, historic channels are still favored for advertising, but DTT (digital terrestrial television) with six additional channels has somewhat changed the rules of the game. Geomarketing is used to better identify and target population segments. But the television medium suffers above all from a strong tendency to "skip advertising". According to an OpinionWay survey, they leave the room, go to the toilet, a fact demonstrated by Eaux de Paris, which has seen an increase in water consumption during television commercials; they change channels, watch their smartphones or tablets, lower or mute the volume or even turn off their TVs. This is more the case for men than women and older people (Didier 2017).

3.4.1.7. *Internet advertising and geomarketing*

Digital advertising spending increased from €2,305 million in 2010 to €4,094 million in 2017. In 2017, its market share was 34.4% compared with 27.2% for television, 17.8% for the press, 9.7% for billboards, 5.7% for radio and 5.2% for catalogs to take over the media[3]. Digital advertising grew by 3.4% from 2016 to 2017 when all other media all had a negative growth rate. We can therefore see the importance of digital advertising and its rise in comparison with other media whose audience measurement is increasingly difficult to achieve and which do not allow individual contact and personalization as with the Internet. These digital media have the advantage of being able to benefit from innovations resulting from virtual reality and augmented reality, voice assistants and artificial intelligence, which will especially benefit mobile advertising in the coming years. The major question that currently arises with this type of medium still concerns the risks of intrusion into private life. One can then legitimately wonder if geomarketing is still of interest in the management of traditional or digital media. Some will point out that there is also a geography of the web and that it is important to know it well in order to know how to best place your ads. But the most interesting spatial aspect concerns the use of mobile advertising in connection with geolocation techniques (see Chapter 5).

3.4.2. *"Geopromotion of sales"*

Sales promotion mainly concerns retailing in its management part of point of sale marketing. We find an approach similar to that of geomerchandising. Indeed, it is a question of knowing the population living around the store in the case of geomarketing stock and possibly information that large chains are able to possess on mobile consumers by analyzing geolocated data on smartphones. The objective is to adapt the promotional pitches and products promoted to the various characteristics of the store's actual and potential customers. Point of sale chains not only have the means to perform these analyses, but they can also collect data using loyalty cards by maintaining relationships with their customers through smartphones. Independent firms, which are therefore smaller, such as hotels, are thus brought together to facilitate these operations in connection with technologies that are better mastered by several people (Carlbäck 2012). From these data, it is a question of developing a micromarketing strategy characterized by the policy of assortment, prices and promotion. The promotional response, or immediate effect of the promotional action in terms of sales and market share, varies between brands, stores of the same type and stores of the same brand (Macé 2000a). In addition, the commercial policy of

3 http://www.sri-france.org/wp-content/uploads/2018/01/PwC_Observatoire_2017_VF.pdf.

the point of sale influences this immediate effect of promotions (Macé 2000b). These results were obtained "after the fact" once the promotion was completed using econometric models developed from data from a panel of retailers.

According to practitioners, it seems difficult to make predictions of sales and market share by product category; store visits are less difficult to identify. A spatial attraction model (SAM) used on the furniture market (Cliquet 1995) with attendance shares as a dependent variable showed that, depending on the type of inhabitants of the market area divided into homogeneous cells (younger, older) where the promotion campaign takes place, the promotions do not have the same impact. The study is based on discounts (–20%, –30%, –50%), the take-back of old furniture and credit (total or postponed). The attractiveness of these promotions was measured among consumers using an analysis of joint measures (Green and Rao 1971). The utility values of each promotion are then integrated into the SAM, built from the most important variables in store selection. The results highlight the attraction of young generations towards high price discounts, while seniors are attracted to more reasonable discounts and hate the credit deferral that consists of buying one day and only starting to repay six months later.

3.4.3. *Spatial management of salesforces*

Many companies are looking to better control or even better manage the work of their sales representatives. The objective is not just to check whether the salespeople are at work, because they know that a more or less important part of their remuneration depends directly on their performance; better control of sales representatives' work also involves optimizing their rounds to increase the number of customers visited, ensuring that the sectors assigned to each of them are properly respected, and limiting transportation costs. The importance of sales force management decisions has long been recognized. It is a series of interrelated processes (Beswick and Cravens 1977) to do the following:

– determine the role of sales personnel in the organization;

– allocate sales efforts to customers, market areas and products;

– size up the salesforce;

– define the sales territories;

– manage the salesforce.

Today, geomarketing has gradually become the essential tool for managing the salesforce. Sellers have very fluid access to the information they are interested in (Arnold 2009). Since 2013, L'Oréal, the world leader in the cosmetics industry, has

been using decision support software to manage its sales teams in order to better define the strategic sectors of the sales teams and to properly size up the team (approximately 200 salespeople visit and prospect hair salons), to optimize salespeople's rounds and reduce travel times, and finally to distribute the workload evenly between each salesperson by setting more precise and realistic objectives in terms of the number of visits to be made, the duration of these visits and the number of customers per salesperson. On this site, it is indicated that this work can be done in two hours for a team where it used to take two days. We now speak of "geomanagement". Since the intention to resign was often stronger in the sales profession (Johnston *et al.* 1987), firms are making efforts to improve the job satisfaction of their salespeople. Geomarketing helps to define the role of each person, the geographical areas to visit and to prospect. Figure 3.1 shows a sectorization.

Figure 3.1. *Geomarketing and delimitation of geographical areas for sellers (source: with the kind permission of Articque). For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

Figure 3.2 shows that geomarketing helps to identify the geographical position of potential customers and thus improve prospecting. On the map representing the sectors where potential customers are located (here agricultural equipment) with a shade of green, we can place competing stores, while providing the 20-minute

isochrones to get an idea of the time required to travel around each store of the brand.

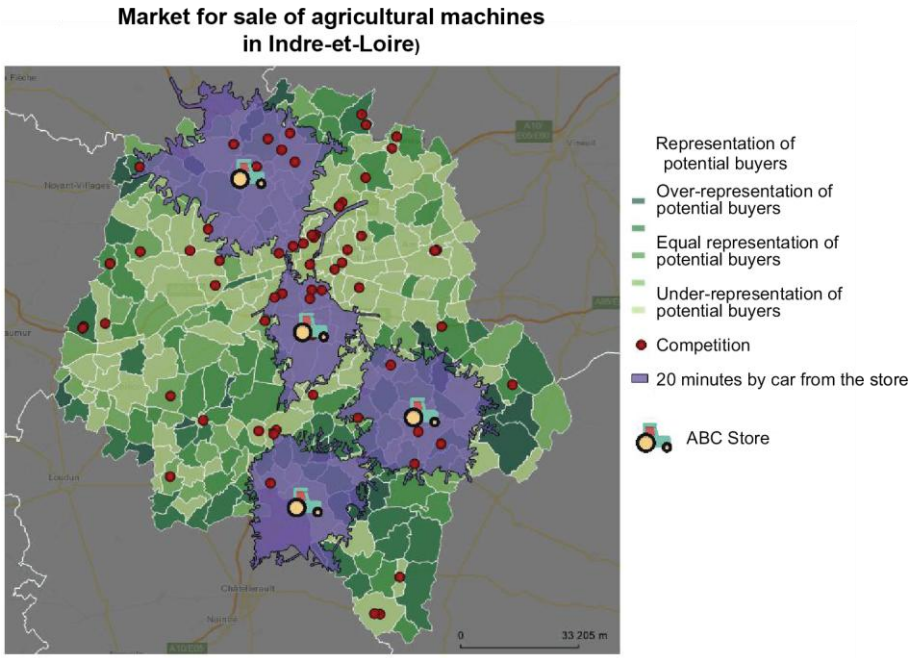

Figure 3.2. *Mapping of potential customers (source: with the kind permission of Articque). For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

It can be used to organize salespeople's tours (see Figure 3.3), representing the geographical areas where potential buyers are located and the time to reach them in the form of isochrones with a shade of blue, while distinguishing individuals from companies based on their sales.

Firms are wondering what controls to carry out on sales representatives. A meta-analysis (Samaraweeraa and Gelb 2015) of 6,678 interview respondents from many different countries highlights the influence of the two main types of salesforce control: salespeople's behavior and results on revenue performance. It is above all the influence of behavior that prevails. While they should be treated separately, management means that the effects of the other type of control must also be estimated: they are therefore not inseparable. One thing is certain: there is no geographical effect and the same influences are found everywhere (i.e. the same observation concerning age and sex). The arrival of the Internet sometimes has

negative consequences for some salesforces. This is the case in the pharmaceutical industry where the consultation of the laboratories' websites, which are increasingly efficient, no longer encourages medical practitioners to receive medical sales representatives. As a result, pharmaceutical companies laid off 9,700 jobs between 2004 and 2015 (AFP 2015).

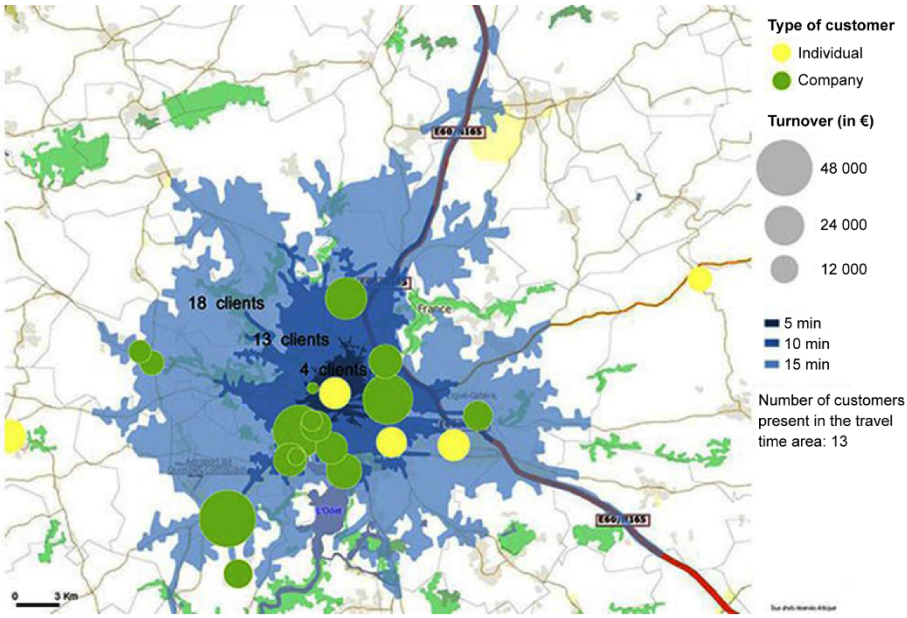

Figure 3.3. *Travel time to visit potential customers, distinguishing between individuals and companies according to their turnover (source: with the kind permission of Articque). For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

3.5. Conclusion

Since the seminal definition of the marketing mix, this concept has been subject to some attacks to make it certainly a little less mnemonic with its famous 4P and therefore also a little less pedagogical, but a little more usable for practitioners. But the real evolution of the marketing mix seems to be more towards a real spatialization of its elements, as this chapter has tried to show. We can now talk about strategic spatial marketing.

4

Store Location and Georetailing

Why talk about georetailing? In fact, the first (and still among the most frequent) applications of geomarketing concern retail activities. Geomarketing within the meaning of geodemographics is of great interest for retail activities (Johnson 1997; Gonzàlez-Benito *et al.* 2007). Chapter 3 presented the knowledge concerning new products, merchandising, pricing and promotion in the broad sense: all these elements are also part of the retailing mix, even if it requires an adaptation of the marketing mix to the specificities of retail.

Merchandising, pricing and communication issues are far from being the same between manufacturers and retailers. Place (from the 4Ps) in the marketing mix concerns mainly linked to the retailing mix-store location issues (Cliquet 1992). A distinction is made between development or growth, in general, and expansion, which corresponds to territory development.

Chapter 4 focuses on these issues of store location, which are always at the heart of the expansion strategies of retailers and many service companies such as banks. A good location is defined as a site where sales can be transformed into profits (Pyle 1926). But the context is changing very rapidly: Internet sales and consumers' desire for omnichannel, new players called "pure players", the return of proximity and the need to reduce the size of hypermarkets and certain networks of points of sale. The problems of location are at least as much the result of desires for territorial conquest as of the need to restructure networks.

These issues can be addressed using the knowledge of spatial marketing that this book aims to synthesize and geomarketing tools in the technical sense of the term. This chapter will also cover the management of spatial data once the point of sale is open, as these techniques have a definite cost and it is better to continue using them during the life of the store.

Location-based Marketing: Geomarketing and Geolocation,
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4.1. Store location

Opening a new point of sale is a long-term decision, except for ephemeral pop-up stores (Picot-Coupey 2014) and stations. This decision-making process also depends on the type of organization of the company that will need to be taken into account to understand its location decision-making process.

The establishment of a new store must use geographical data as well as socio-demographic, economic or legal data and not ignore the current trend of customers towards omnichannel shopping.

4.1.1. *The location decision process*

The decision-making process for locating points of sale can be described as in Figure 4.1 (Ghosh and McLafferty 1987; Cliquet 2008; Cliquet *et al.* 2018) and amended according to the feedback loop.

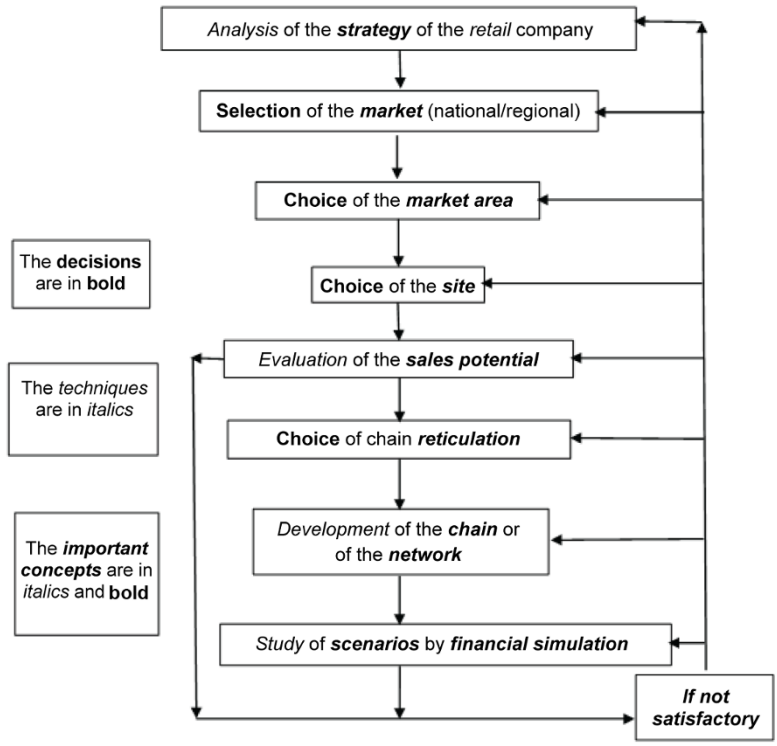

Figure 4.1. *The process of deciding on the location of points of sale*

This decision-making process for the location of points of sale is therefore composed of:

– **decision making**: selection, choice;

– applications of **techniques**: analysis, evaluation, development, study;

– **important concepts**: retail company strategy, national or regional market, market area, site, sales potential, reticulation, chain, network.

4.1.1.1. *Location decisions*

Selections and choices related to markets and sites may not be satisfactory, resulting in a double feedback loop. Indeed, if the evaluation of sales potential is considered insufficient or if the networking scenarios carried out by simulation using attraction models do not lead to the expected results, the decision-making process is called into question. It remains to be seen whether the error stems from the analysis of strategy or the choice of markets, market areas or sites, hence the need for in-depth studies of each of these elements. However, in this type of decision-making process, time plays an essential role and choices often have to be made quickly (Lafontaine 1992; Bradach 1998) in order not to be overtaken by competitors who have identified the same sites. The need to be able to anticipate by carrying out upstream studies is quickly becoming apparent in order to be ready to react in a timely manner. Many location errors result from decisions being made too quickly and sites suitable for some types of points of sale may be totally inappropriate for others.

4.1.1.2. *Location techniques*

The necessary techniques include strategic analysis, evaluation of sales potential, chain and network development and scenario studies. It is necessary to add to these the preliminary studies essential for decision making regarding markets, market areas and sites. The assessment of sales potential and studies prior to decision making will be discussed in section 4.1.2. The development of chains and networks will be addressed by studying the main concepts.

Strategic analyses concern only groups, chains or networks of points of sale. The aim is to assess, as part of a strategic expansion option, whether it is appropriate to open new contact points in territories that have not yet been invested. Similarly, it may be necessary to close points of sale. However, it should also be noted that some of these opportunities are often opportunistic. A foreign firm may be interested in developing a concept that is absent from its domestic market. They will then contact the firm that owns this concept in order to import it. In the event that the retailer considers that its expansion, or territory development, is essential to improving its results or even its survival, strategic analysis makes sense. It is a question of

deciding whether or not the company, which has only one point of sale, should start a reticulation process and replicate its concept on new sites. Scenario studies make it possible to consider several situations based on competitors, the presumed location of potential customers and the firm's other points of sale in order to avoid cannibalization of sales, in other words, the absorption of a portion of a store's sales by another of the firm's points of sale. Figure 4.2 shows an example of a cannibalization situation.

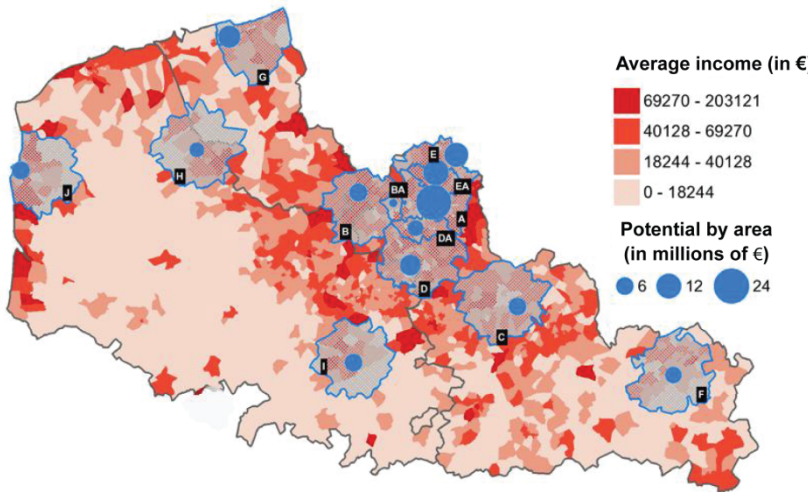

Figure 4.2. *Trading area and cannibalization of sales and potential by area in Nord-Pas-de-Calais (source: courtesy of Articque). For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

It is immediately clear that these situations cannot be assessed in the same way depending on whether the firm wholly owns its stores (all the stores belong to it), wholly franchises its stores (it does not own any stores), is a plural form organization (some stores are franchised and others are branches or subsidiaries), or a cooperative type where each member owns its store(s) and participates in the management of the whole. These simulations are made possible through the use of attraction models that are now found in many geo-marketing software applications. At the international level, the organizational form adopted to set up in a foreign country varies according to market conditions (Preble and Hoffman 2006).

4.1.1.3. *The main concepts related to location*

These are concepts directly related to the decision-making process, in other words: retail company strategy, national or regional market, market area, site, sales

potential, cross-linking reticulation, chain and network. Equally important concepts have already been seen in the previous sections and others will emerge as this book advances in the techniques and models used in location issues.

4.1.1.3.1. The retail company's strategy

Concerning the retailers' strategy, it is first necessary to be aware of the specificities of this type of firm. Retail markets are very competitive for most of them and, unless you have the chance to be in a niche market that is both profitable and where the firm is in a quasi-monopoly situation, which is quite rare and never lasts long, margins are fairly low. And when they are stronger, discount retailers often disrupt the market and quickly make these situations uncomfortable. In other words, if we want to improve the profits of a retail firm, whether in retail or in services, it is necessary to expand its market by setting up new points of sale. It should be added that networked firms must increase the scope of their activity, as expenses will continue to increase and will have to be offset by additional sales. These firms are therefore "condemned" to the expansion of their network.

Opening a new store means not only acquiring new customers in a new territory, but also and above all increasing its power over both competitors and suppliers, because the retailer offers a new point of sale. Nor will financers, shareholders or bankers, view this spatial strategy in a negative light, as most stakeholders (Freeman 1984) see it as a way to create value (Freeman *et al.* 2004). The spatial strategies of retail firms will be examined in detail in section 4.3.

4.1.1.3.2. National or regional market and market area

Selecting markets and market areas is an operation that requires knowledge of geography, geopolitics, law and economics or even consumer sociology concerning the markets in question. The market is generally bordered by administrative boundaries: a region or country in order to obtain the necessary data to identify the potential of this market. The market area is much more restricted; it is a question of delimiting a geographical area in which the new point of sale can attract customers, but can also run the risk of meeting either competitors with the same organizational characteristics (hypermarkets, known as intratype competition), or competitors of different forms (supermarkets, fairground markets, convenience stores), known as intertype competition.

4.1.1.3.3. Site and sales potential

The choice of site is an essential decision in an expansion process. Once the market and market area have been identified, and competition is sometimes strong, highlighting a site in a market area is always a difficult and risky exercise. One does not open a point of sale for a few days (except in the case of a pop-up store), and the

error can sometimes be expensive. We will see below which techniques and models are used to select sites and assess sales potential.

4.1.1.3.4. Reticulation, chain and network

Reticulation, that is, the implementation of chains or networks, is a term usually used in polymer chemistry: it is also referred to as networking. But what about the difference between a chain and a network? Why is there such opposition between these organizational forms? In fact, the idea of a chain implies a simple link with one preceding and one following while the network allows any element of the whole to be in contact with any other element (here points of sale). The notion of networking is essential in the general theory of systems (Bertalanffy 1968): all elements of a whole should be allowed to be in contact with each other and with their environment without having to go through a hierarchical link as in the case of a chain. These concepts can be found when company-owned systems are distinguished from franchises or cooperatives, organizational forms that have often very different approaches to location problems.

4.1.2. *Store location studies*

All retailers are required to study their market before deciding on the implementation of a point of sale. The analyses presented here can be used by these practitioners regardless of the size of their point of sale or group of points of sale. Some of them can appear very sophisticated and therefore relatively expensive; there is something for everyone. The decision-making process exposed at the beginning of this section describes four major decisions that require four main types of studies:

– the opening of one (or more) point(s) of sale or not: the opportunity study;

– the choice of a market: the study of markets;

– the choice of a market area: the study of specific markets;

– site selection: site study;

– the control of the *a priori* profitability of the project: the feasibility study.

4.1.2.1. *The opportunity study*

An opportunity study allows, thanks to the analysis of the retail company's strategy, to reach the decision to open or not one (or more) point(s) of sale. The financial implications must be considered in order not to unbalance the company's accounts, as was the case when the Auchan group bought the Mammouth hypermarkets from the Docks de France in 1996 (Cliquet and Rulence 1998). This raises the question of the choice of the status of the point(s) of sale: branch(es),

subsidiary(ies) or franchise(s)? In the case of retail cooperatives (or groups), the question is *a priori* simpler.

The elements to be taken into account in the strategic analysis are both internal and external. The internal elements concern the current territorial coverage of the network and the positioning of the fascia, even if the latter point is even more sensitive to the choice of site. Present and future competition are the essential external elements to highlight markets or market areas where the network's territorial coverage is clearly insufficient. Good territorial coverage (Cliquet 1998) not only allows better network coverage, but also more efficient access to the media and reduced logistics costs thanks to better proximity to points of sale, provided that any form of cannibalization is avoided. It is then decided whether or not the opening of one (or more) points of sale is appropriate and potential markets are defined either at national level if a new country is to be invested in, or at regional level in order to strengthen coverage in a country where the firm is already present.

4.1.2.2. *The study of global markets*

Market research is standard when launching a product. Retailers are no exception, as their products are in fact their points of sale (Dicke 1992; Rittinger and Zentes 2012). Opening a new store is like launching a new product and one has to know how to adapt it more or less to the local context of the establishment. These market studies can be carried out either by the retailer, provided that he has the technical means and qualified staff, or by specialized firms that are well acquainted with the markets to be studied, but whose services may have a high cost. In franchise networks or cooperative retail groups, these studies may be carried out either by the franchisor or the structure of the cooperative (i.e. by the network operator) or by the franchisee or the cooperative member, who may operate alone or through a specialized firm. The second solution, again provided that it is affordable, can avoid a possible conflict in the event that the operator's study proves to be far below the expectations of the contracting partner.

4.1.2.2.1. The market research approach to store location

The market research process to locate a point of sale can be broken down into 10 steps, given that many networks work in multiple locations:

– a general study of the various markets envisaged following the opportunity study at both regional and national level;

– the choice of the national, regional or even local market;

– the delimitation of market areas within the selected market;

– the choice of potential market areas;

– the definition of a methodological approach for studying market areas;

– data collection within each defined market area;
– data processing, if possible, by geomarketing software (GIS);
– the analysis of information, if possible, using an attraction model;
– scenario simulation when using an attraction model;
– the choice of market area.

4.1.2.2.2. General study of potential markets

The general study of the various potential markets consists in detailing the main economic, legal, sociological, geographical and geopolitical characteristics. In order to highlight all the characteristics to be taken into account during this type of study, the PESTEL model can be used: political, economic, sociological, technological, ecological and legal (see Table 4.1).

Main characteristics of the markets studied	Details of the characteristics
Political	Political system, stability of government policies, policies regarding trade, taxation, social protection, foreign investment, etc.
Economic	Level and evolution of GDP, inflation, unemployment, household purchasing power, interest and exchange rates, business climate, importance of retail companies, presence of foreign companies, etc.
Sociological	Changing demographics and lifestyles, life expectancy, existence of "gray" or even black markets, income distribution, social mobility, consumer habits, attitudes towards foreign labels and brands, leisure and work behavior, presence of consumer associations, level of education, health, etc.
Technological	Technological level of households and local business methods, acceptance of new technologies by households and employees, technological level of logistics, etc.
Ecological	Constraints with respect to environmental protection, energy consumption, waste recycling, etc.
Legal	Laws on point of sale locations, prices and promotions, contracts, labor law, health and safety standards, etc.

Table 4.1. *The PESTEL model (source: Evans and Richardson 2007 and PESTEL analysis adapted by the author to the case of retail companies)*[1]

1 https://en.wikipedia.org/wiki/PEST_analysis.

The PESTEL analysis of different markets deemed suitable for targeting and a precise study of the development potential of these markets should enable making the right choice. The study of the potential is based on the usual sales forecasting techniques (Maricourt 2015; Bourbonnais and Usunier 2017). From this point on, it is important to carry out a precise analysis of the possible market areas.

4.1.2.3. *Study of market areas*

The analysis of market areas involves studying the approach, describing the available data, assessing the saturation of market areas and determining purchasing flows.

4.1.2.3.1. The methodology of market area research

The process for studying market areas begins with an inventory of available data. Data of all kinds already exist in economically advanced countries; these are called secondary data, because they are already collected and processed in the form of tables and/or maps. However, they may be incomplete depending on the implementation project to be carried out. In such cases, it is necessary to collect data in the field from traders and/or consumers, or from experts. It is important to then do what is called triangulation of all these data; in other words, it is important to look for not only convergences between these data, but also divergences and to explain them.

Secondary data have the advantage of speed when they answer precisely the questions you are asking and are sufficiently recent. In recent terms, the survey is obviously more appropriate because it allows a better understanding of behavior by interviewing consumers, avoiding mistakes in choice by interviewing experts and a better understanding of local market strategies by asking questions to traders or their representatives, for example in chambers of commerce.

4.1.2.3.2. Secondary data

Various national or regional institutions are authorized to collect data on a very regular basis, which they often make available to the public for a fee according to the required accuracy. Private organizations also sell services. Geomarketing companies now also provide the data necessary for the location of stores (in the form of mapped and sometimes even analyzed data), and many large marketing firms are also increasingly offering this service.

These organizations provide specific data on income or expenditures in increasingly specific market areas. Some of these organizations offer located behavioral databases based on household surveys representative of the market areas studied, which allow a better understanding of purchasing flows (Douard *et al.* 2015). These flows are determined from questions about the last purchase of various

product categories: this gives a clear idea because the risks associated with the memory effect are limited. This avoids being dependent on purchasing habits in the sense that the respondent does not reveal these usual purchases, but the last one made by indicating the place of purchase. The form of sale is then specified in the database. The results, in other words the flows, are presented in the form of origin-destination matrices, all supplemented by data on leakage, internal attraction, marketable expenses, etc., to constitute a true GIS. Specific publications can be consulted when choosing to locate stores in France (Cliquet *et al.* 2018, p. 171).

4.1.2.3.3. Assessment of the saturation of a market area

A market area may appear to be particularly suitable for store location. But competitors have been able to judge it in the same way and for a long time. It is therefore necessary to estimate the degree of saturation in terms of commercial equipment in the market area in order to measure its attractiveness. At least two methods are available to analysts: the saturation index and the purchasing flows.

One method consists in determining a saturation index of retail activities in the study area calculated on the basis of the level of expenditure incurred in retail activities in this area (Ghosh and McLafferty 1987):

$$ISCD_i = {(POP_i * DCD_i)}/{SVCD_i}$$

where

– $ISCD_i$ is the saturation index of retail activities in the market area studied i;

– POP_i is the population in number of inhabitants of the market area i;

– DCD_i is the amount of expenditure per inhabitant in retail activities in area i;

– $SVCD_i$ is the sales area of retail stores in market area i.

Several organizations, public or private, can provide the necessary data to calculate the saturation index of retail activities. This index works all the better because customer demand depends mainly on the number of inhabitants and their income, a situation in most markets. However, other situations may also arise (Cliquet *et al.* 2018):

– the saturation index of retail activities may be underestimated if we consider the traditional standards in this area. This may mean either that expenditure per square meter of sales area in a particular sector is low given the commercial equipment of the market area, as the density of retail activities is too high, or that the market area in question suffers from a strong sales leakage to other areas, with local retail activities lacking dynamism. Such a situation may lead to a decision to set up a

new point of sale in order to revitalize this market area and offer customers the goods and services they are entitled to expect;

– the saturation index of retail activities may also be overestimated. This is the case in market areas where there is a glaring lack of commercial equipment that allows established retail activities to achieve abnormal commercial performance. The consequence is an observation of strong development potential that can lead to the project creating a new point of sale in order to recover part of the profits and thus provide customers with healthier competition and therefore more attractive prices.

4.1.2.3.4. The method of analyzing purchasing flows

The purchase flow analysis method is based on a geomarketing approach (Douard *et al.* 2015) and can complement the results of the first method. It is based on the idea that the traditional gravity attraction models (Huff 1964) or MCI (Nakanishi and Cooper 1974) only take into account flows within the trading area of the point of sale. However, some of the customers, not negligible in some cases, come from other market areas for the reasons mentioned above in terms of sales leakage. In other words, the traditional models only consider the so-called gravity or polar attraction and not the so-called transient attraction (Cliquet 1997a): in the first case, a clearly spatially identified customer stock is studied, in the second case, a "flow" of customers from elsewhere and whose geographical origin is not necessarily known is dealt with. These flows are little studied in marketing, unlike geography (Golledge and Stimson 1997) and tourism economics research (Eymann 1995). Better knowledge of these flows is becoming essential for companies and some national institutions have been addressing this issue for many years by publishing studies on home-to-work flows.

Companies now base the establishment of their points of sale on flow analysis, some examples of which are as follows (Douard *et al.* 2015):

– the large malls found in some stations or airports are obvious examples;

– the location of certain *click and collect* systems, known as *drive* in France, partly respond to this mobility problem by trying to divert certain flows to other market areas;

– the strategy of opening stores in urban areas is based, for some point of sale networks, on maximizing pedestrian flows, as is the case with Zara or H&M.

The method of analyzing purchasing flows is based on four elements (Douard *et al.* 2015):

– a division of the market to be analyzed into distinct areas, often difficult work in hyperurban areas;

– origin/destination type purchase flow matrices determined from customer paths for each product family in more or less detail (food, non-food, personal goods, household goods, culture/leisure) according to the requirements of the study specifications;

– additional information from located databases or the calculation of indices such as the ACFCI Consumption Disparity Index (IDC);

– surveys on purchasing flows determined from samples of households in the market areas studied, who are asked to describe their "last" purchase of different product families in order to avoid the pitfall of habits that often aim to "average" purchasing behavior and thus ignore the atypical behaviors that are often at the root of sales leakage.

This method of analyzing purchase flows therefore makes it possible to obtain objective data on purchasing behavior insofar as the memory effort required of the respondent is relatively low and his response is therefore more reliable. Technology can avoid this still very cumbersome investigative process, but the legal implications of tracing customer paths remain and will remain difficult obstacles to overcome unless they are agreed to by these customers (e.g. through a reward system). The purchase flow method was compared, both theoretically and practically, with other methods such as objective or subjective deterministic and probabilistic trade attraction models. It is obvious that this method makes it possible to study flows that models do not allow (Douard *et al.* 2015).

4.1.2.4. *The site study*

Remember that we are part of the expansion of a network of points of sale. After the general market study and the evaluation of the market areas, a third step, the site study, should make it possible, for each location, to evaluate the sales potential of the trading area and to measure what the new point of sale will bring to the network. Simulations may eventually be carried out to refine choices not only in terms of site, but also in terms of surface area and even to predict the reactions of competitors. It will then be necessary to clarify the relevance of the concept of trading area. Indeed, we can see that this concept has now been replaced by the notion of a consumer supply area. We will have to take this change into account in the market and site studies that follow. There are many methods and models to facilitate the choice of site for a future point of sale. The objectives of these methods and models are as follows: choice of site, of course, but also delimitation of the trading area and sales forecasting of the market area and the point of sale.

4.1.2.4.1. Delimitation of the trading area

The concept of a trading area can also be broadened by assimilating it to a geographically defined area containing potential customers with a non-zero

probability of purchasing a certain category of goods or services offered by a company or a group of companies (Huff 1964). The study of trading areas has been the subject of numerous publications (Fine 1954; Huff 1963; Applebaum 1965; Lillis and Hawkins 1974; Rosenbloom 1976; Houston and Stanton 1984; Boots and South 1997; Baray and Cliquet 2007). The measurement of distances within this area between the distribution center (e.g. a store) and its customers can be done either in terms of geographical distance in kilometers or miles, or in terms of access time. The predominant use of the car has favored time measurement in most of the models that will be examined in this section. But these objective measures always come up against consumer psychology, which perceives these distances very differently according to individuals (Croizean and Vyt 2015).

A measurement method allowing the delimitation of customers' areas of origin was then very often used, and is still used in geomarketing software: it is the isochrones defined from the car travel times necessary to reach a point of sale from residential areas (Brunner and Masson 1968). Illustrations from geomarketing software are provided in Figure 4.3.

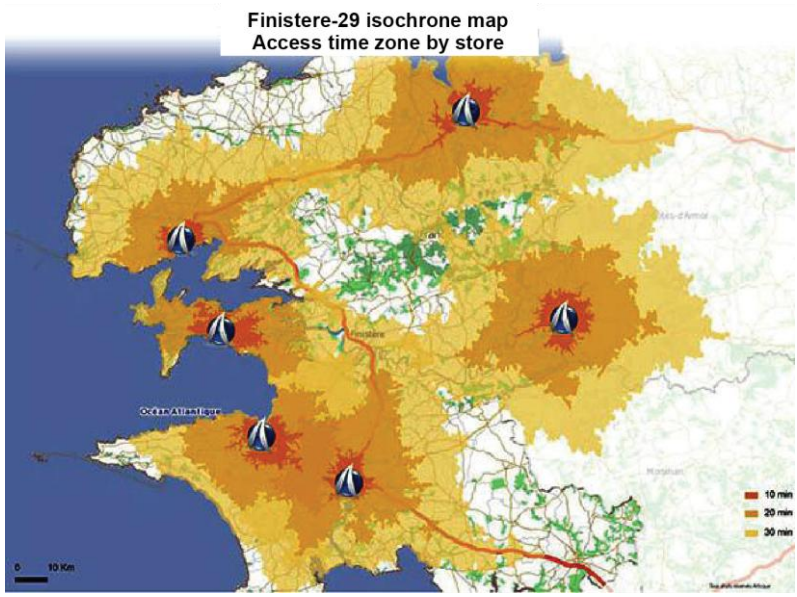

Figure 4.3. *Map of isochrones (source: courtesy of Articque). For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

The greater the distance to the point of sale, the greater the lack of loyalty according to this decomposition. However, computerized mapping using

geomarketing software shows that trading areas resemble "spots" that form an archipelago and concentrate the store's customers (see Figure 4.4). The work resulting from geomarketing is made possible by the use of the addresses of customers with a loyalty card, which now makes obsolete for store cashiers to collect these valuable addresses from customers at the till, as well as the colored maps of the city or region attached to the wall in the office of the person in charge of a store. Today, everything is accessible on screen.

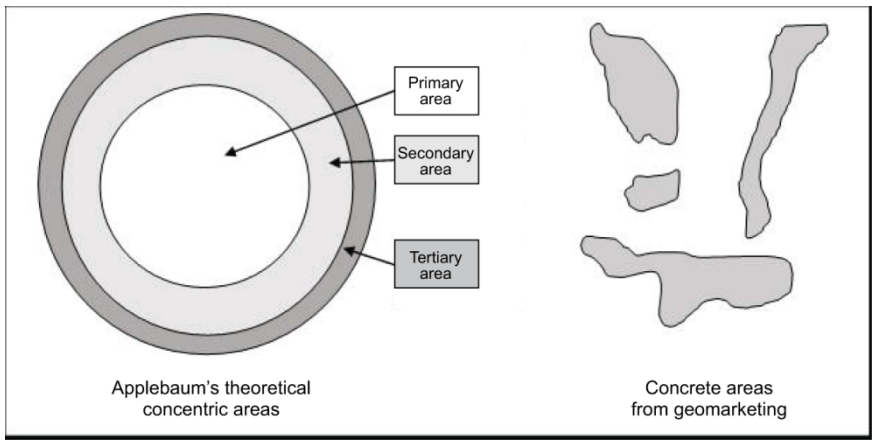

Figure 4.4. *The evolution of the shapes of trading areas*

4.1.2.4.2. Other techniques for delimiting the trading area

Many other so-called customer spotting techniques have been applied to determine the geographical origin of the customers. The famous Samuel Walton, founder of the Wal-Mart stores (now Walmart) and who died in 1992, made a point of observing the license plates of vehicles in his stores' parking lots (and those of his competitors), hoping that a growing number of them would come from neighboring states and beyond in order to measure the attractiveness of his fascia. The practice of customer spotting is based on various techniques:

- interview at the point of sale or place of residence;
- tracking of vehicle license plates in parking lots;
- mail survey (low return rate);
- telephone survey (fast);
- home survey (expensive);
- Suelflow method: evaluation of vehicle traffic (Suelflow 1962).

In France, a method based on interviews with key people (secretaries of town halls or teachers, for example) who know the population of their town well has made it possible to identify trading areas in their secondary and tertiary areas (rural areas) and which are the object of envy by all competitors in the market area (Piatier 1957). Such methods could be revived, based on interviews with neighbors, building guards, etc. Companies use these methods in highly competitive markets where rival stores are close to each other to benefit from a cumulative effect: specialized companies offer an original service to retailers of tracking the number of consumers passing in front of their store according to the brand on the bag they carry, thus giving an idea of the attractiveness of the fascia in the market area.

Somewhat more sophisticated methods have emerged to delimit trading areas. The proximal area method is based on the theory of central places (Christaller 1933) and is still used in particular in geomarketing software. Its principle is based on the delimitation of proximal areas by the construction of so-called Thiessen polygons (Thiessen and Alter 1911; see Figure 4.5):

– by identifying competing points of sale (or points of sale of a chain) that need to be completed in order to ensure a better coverage of the territory;

– by connecting each of these points of sale through segments;

– by tracing the mediator of each of these segments;

– by determining the so-called Thiessen polygons delimited by the mediators and their intersections, thus forming the trading area of each point of sale.

Thiessen's polygons, also called Voronoi's decomposition, partition or polygons or Dirichlet's tessellation (Dirichlet 1850) allow a metric space to be decomposed according to the distances from a set of points.

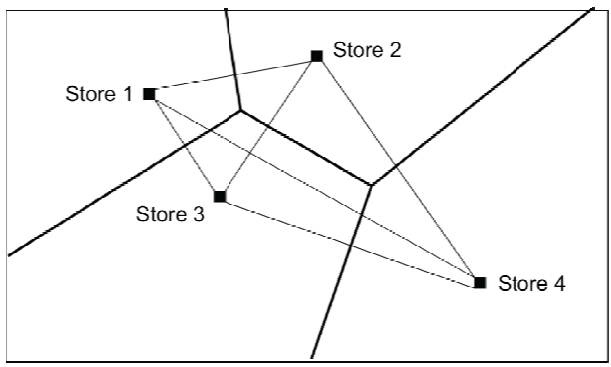

Figure 4.5. *Definition of trading areas by the proximal area method (source: Ghosh and McLafferty 1987)*

This proximal area method is far from perfect, as it is based on two simplifying assumptions:

– the points of sale are of similar size (in terms of surface area and assortment width);

– the population is well distributed over the area.

Nevertheless, this method has been applied, especially in the United States, particularly to convenience stores, emergency medical centers, liquor stores, dry cleaners, copy centers and drug stores. It has also been used to locate bank branches in Belgium and to set up ATMs (automated teller machines).

Finally, a very sophisticated method has been developed based on cubic spline functions: "A spline is a strip of wood or lead that a draftsman uses to draw a smooth (continuous) curve through a series of points" (Huff and Batsell 1977, p. 584). It is a method of delimiting the trading areas of distribution centers. These may concern stores, but also hospitals, or all the daily commuting movements of a city's inhabitants. The principle of this method is based on the identification of customers by their address graphically represented by a point (which can be weighted according to its importance in terms of the amount of purchases) on a card in a metric space of polar or Cartesian coordinates to facilitate computer operationalization. Then it aims to delimit the trading area by joining the points furthest from the distribution center. It is always possible to get an overview of the trading area at a glance. But if more precision is needed, an objective procedure involving a specific methodology must be used, especially if we realize that this trading area differs according to the products offered by the distribution center studied, if, on the contrary, we observe regularities according to the products or if we observe frequent changes in customer behavior. This method is based on the distinction between primary, secondary and tertiary areas. The distance between each point representing a customer's place of residence and the distribution center is calculated. It is then necessary to identify the most extreme points on the graph and draw a closed curve linking all these points. To identify the extreme points, the procedure is as follows (see Figure 4.6):

– draw two radial lines from the distribution center to form a 22.5° segment with the initial radial segment corresponding to the western part of the east-west axis, namely the polar axis (the choice of the initial radial segment is arbitrary, but this has no impact on the results);

– identify the point furthest from the distribution center within the segment (0–22.5°);

– specify the location of the point in terms of polar coordinates, that is P{r, θ} where r is the radius vector indicating the distance from the distribution center to the

point and θ is the angle that the radius vector forms with the polar axis. If there is no point within this segment, record the angle of the bisector of the two rays forming the segment and a zero for the vector of the radius;

– rotate this segment clockwise by one degree. The 0–22.5° segment then becomes 1–23.5°;

– identify the furthest point within this segment and record its location according to r and θ;

– continue rotating the segment by one degree 360 times. Identify the most extreme point within each of the 360 segments formed in this way and specify its location.

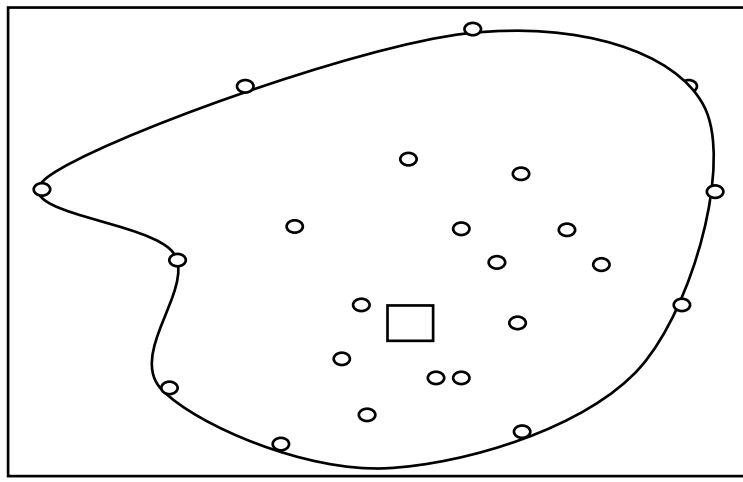

Figure 4.6. *Outermost points and limits of the trading area (source: according to Huff and Batsell 1977)*

To draw this boundary curve, the authors use a curve fitting technique, in this case cubic or thin plate spline functions (Roger 1984). This technique fulfils the three conditions necessary for a good representation of the curve: to represent the outermost points from the distribution center, to allow comparisons with other trading areas and to be replicable. These functions can be used to analyze changes in sales penetration, delineate a sales territory, evaluate the location of new services, indicate where to make promotional efforts, forecast sales or analyze market potential.

Most of these methods are inaccurate or based on intuitions or simplifying assumptions. A more recent methodology aims to rationalize the concept of trading

area and to objectify its measurement (Baray 2003a). It makes it possible to bring out the fragmented places (right side of Figure 4.4) from which the customers of a store come, thus forming the trading area, based on mathematical morphology. Morphological analysis is based on topology, signal processing, probability and graph theory. It can also be used to delimit a trading area from customer addresses. To do this, we use the concepts of physics such as filtering and convolution. The methodology for delimiting a trading area based on morphological analysis proceeds as follows (Baray and Cliquet 2007):

– data coding and mapping;

– data pre-processing by filtering;

– data segmentation;

– refining and regulating the boundaries of the trading area.

Most retail points of sale now have accurate data on their customers' addresses, mainly through loyalty cards, but also through occasional game newsletters or direct surveys with customers. Each of these addresses is geocoded, in other words, assigned coordinates on a chart that can be transposed to a map. Groups of more or less dense points are formed depending on the degree of spatial concentration of the clients. Each customer address corresponding to a point on the map is a black pixel of coordinates (x_i, y_i) in an orthonormal base (OX, OY) where i varies from 1 to N and j from 1 to m for a division of the geographical area into N times m small cells (x_i, y_i). The black pixels (representing at least one customer) and white pixels (no customers) make up a block included in a square network. This square network (in fact a matrix) is obviously not the best partition of the geographical space, because it does not preserve the topological properties of the real world as the property of connectivity (unlike the hexagonal network). To improve the representation of the trading area, the color of each pixel can be shaded according to the number of customers in the area or the sum Σfij of the number of visits to the point of sale by all customers in the area (x_i, y_i) during a period T. These color shades can be as follows:

– white pixel: no customer at this location;

– light gray pixel: low frequentation;

– dark gray pixel: more frequent use;

– black pixel: maximum frequentation of this group among the customers of the point of sale.

a)

b)

Figure 4.7. *a) Division of the area into regions. b) Exploded trading area (source: Baray 2003a)*

Other variables can of course be considered depending on the requirements of the analysis, which may relate to turnover or margin. The methodology then goes through a stage of wave filtering the data (technique resulting from the signal processing) in order, on the one hand, to accentuate the crenellation, ("stressing of the borders between the zones of various characteristics"; Baray and Cliquet 2007, p. 891), and on the other hand, to reduce the noise due to atypical data which can come from errors in the addresses. Various filtering techniques are available: average filtering, median filtering, Laplace filtering, Sobel filtering, Nagao filtering (Pouget *et al.* 1990). Once the data have been analyzed, it is necessary to geometrically characterize the trading area. In order to analyze in depth the characteristics of the clientele for segmentation purposes, it is first necessary to define these areas analytically, preferably by the coordinates of their linear borders which form closed curves (Baray 2003b). We thus obtain the delimitation of the various customer origin areas that constitute the trading area (most often exploded) from the point of sale as shown in figures 4.7a and 4.7b by taking the case of a mall installation (Baray 2003a).

Figure 4.8 shows the coverage of a network of points of sale in France.

Figure 4.8. *Coverage of a network of points of sale in France (source: Baray 2003a)*

This method has been applied to the restructuring of a network of organic stores and the establishment of a mall (Baray 2003a; Baray and Cliquet 2007).

However, the concept of a trading area is now being questioned as the store is less and less at the center of the attraction phenomenon for the benefit of the consumer. Indeed, the use of ICT allows the latter to obtain the best prices at equal quality, either by traveling to the most interesting store while shopping around, or

by home delivery. Thinking that it is enough to set up a large retail store in a site where the price of the land is affordable with good accessibility conditions is no longer an option: hypermarkets are suffering the consequences every day and must reinvent themselves to bring customers back and update their concept to better reflect the digital revolution and fight against convenience stores (Gahinet 2014).

4.1.2.4.3. Site evaluation and selection

What is a good location? This is a question that researchers and practitioners have been trying to answer for a long time. We were able to highlight: the potential of the trading area, the accessibility of the site, the potential growth, the interception of customers, the cumulative attraction, the compatibility with other retail activities and on the other hand, the risk of incompatibility, the adequacy of the site in terms of size and shape (Kinnard Jr. and Messner 1972). In addition, the cost of occupying the site and the importance of the size of the store must be included, two elements often cited by store chain development managers to be in line with the retail firm's marketing strategy (Toumi and Cliquet 2019). More succinctly, the choice of a site must comply with five principles, four of which are positive and one of which is negative (Lewison and DeLozier 1986):

– principle of interception: it is necessary to be able to "capture" as many customers as possible thanks to a site near the crossing points;

– principle of cumulative attraction: for many shopping goods, it is more worthwhile for competing points of sale to group geographically;

– principle of compatibility: some products sell better when they are located near other products that may not have anything to do with each other;

– principle of accessibility: a distribution center must be easily accessible thanks to its car park, transport routes and the proximity of public transport;

– principle of store congestion: negative principle according to which too much attractiveness, leading to traffic jams, can hinder the attraction.

The method of (weighted) site evaluation grids is based on these principles and is still widely used, as it is very useful and easy to implement. Table 4.2 provides an intertype comparison between a supermarket and a convenience store.

Site Evaluation Factors	Scores		Weight		Totals	
	Sup	Cs	Sup	Cs	Sup	Cs
Interception						
Road traffic volume	4	2	5	2	20	4
Road traffic quality	4	3	5	2	20	6
Pedestrian traffic volume	1	5	1	5	1	25
Quality of pedestrian traffic	1	5	1	5	1	25
Cumulative attraction						
Number of attractors Degree of attraction	etc.	etc.	etc.	etc.	etc.	etc.
Compatibility						
Compatibility style Degree of compatibility	etc.	etc.	etc.	etc.	etc.	etc.
Accessibility						
Number of highways Number of lanes on highways Traffic directions Number of intersections Configuration of intersections Type of center lines Speed limit Type of signage Size and shape of the site	etc.	etc.	etc.	etc.	etc.	etc.
Store congestion						
Traffic jams around the site Possible traffic jams inside the site (on a map if available)	etc.	etc.	etc.	etc.	etc.	etc.
Grand total for the site						

Sup = supermarket site; Cs = convenience store site.

Table 4.2. *Weighted evaluation grids for a supermarket site and a convenience store site, on a scale of 1 to 5 (source: after Lewison and DeLozier 1986)*

4.1.2.4.4. Sales forecasting

First of all, a clarification is required. Indeed, it is important not to confuse prediction with objective setting, which sometimes happens and leads to unfortunate misunderstandings. If we repeat the traditional sales forecasting process, we obtain the following sequence:

– market forecasts: technique;

– sales forecast: technique;

– setting sales objectives: decision;

– budget preparation: technique;

– implementation of actions: technique;

– action control: technique.

We start by making forecasts on the market in general, then on the company's sales using specific techniques. A decision can then be made based on the sales objectives that will be used as a basis for drawing up budgets. The company's actions to consolidate and develop its position on the market(s) are also based on techniques (particularly sales techniques), which will then be monitored using methods well known to management controllers. The setting of sales objectives is therefore a decision that can follow the results of the sales forecast or differ more or less strongly depending on the decision maker's opinion as to the strength of competition and the need to strengthen the company's position on its markets.

A first method is well known and is called the sales/surface area ratio. As its name suggests, it is based on the assumption that the larger the surface area, the greater the sales: the current difficulties of the large hypermarkets put this *a priori* into perspective. In addition, this method has other disadvantages:

– the analyst's ability to identify the trading area is crucial;

– in the case of a frozen food store, there is no indication that such an isolated point of sale is more efficient than a supermarket shelf or vice versa;

– in this method, neither the capacities of the sales area manager nor the attractiveness of the brands is taken into account;

– this method will be used where the trading area is easy to define and covers, for example, the territory of a small or medium-sized town, in an area where everyone's capacities are well understood. But what about a store in a big city?

Some of the methods presented above are old, although they are still often used. But now, the evolution of modeling techniques and technology makes it possible not only to choose sites and forecast sales, but also to manage the spatial marketing of the point of sale once it is open. This requires the use of modeling resources and in particular gravity and spatial interaction models.

4.1.2.5. *The feasibility study*

The best possible market, the best possible market area, the best possible site, in short, the perfect location, will never ensure the profitability of the implementation project every time. It is therefore essential to carry out a feasibility study whether it concerns the opening of a point of sale or the expansion of an existing store or even its reduction on the surface. This feasibility study essentially includes, following the location studies, a financial analysis linked to the marketing analysis of the project (Colbert and Côté 1990). The location decision will therefore depend on the results of the feasibility study as a last resort. In the marketing analysis, all strategic aspects must be addressed, in other words, it is necessary to take into account the sites of competitors already present: a saturated market area can sometimes be more attractive than a market area that is not. In addition, implementation costs are essential data. However, the price per square meter (sale or rental) can sometimes be prohibitive, as is becoming the case in some malls: Darty has decided to set up outside malls, which are increasingly becoming rents for real estate development companies. The marketing analysis makes it possible to check whether the characteristics of the chosen location correspond to the elements defined for the retailing mix (Toumi and Cliquet 2019). It is important to ensure that the location and atmosphere of the point of sale (Chebat and Dubé 2000), merchandising techniques and the fascia's image are in harmony with consumer expectations. From a financial point of view, it may also appear that the interest rate is more attractive than the project's rate of return (Colbert and Côté 1990); in this case, it is legitimate to question the opportunity to launch this project. This leads to Figure 4.9.

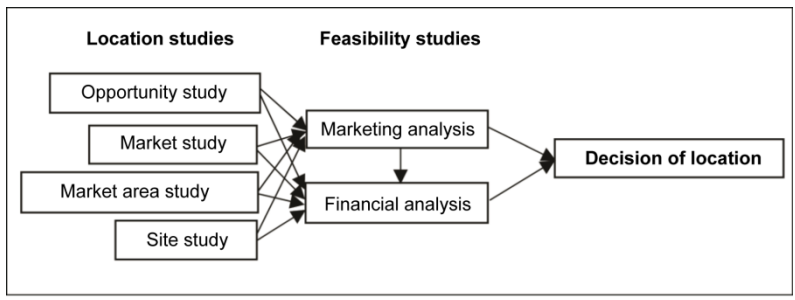

Figure 4.9. *Studies prior to the opening of a point of sale*

4.2. Location models and the use of geographic information systems

The study of these models could be part of location studies, but on the one hand, their scope goes far beyond simple location studies, and on the other hand, their concrete application directly affects specific aspects of geomarketing, because they

are, for some of them, integrated in software. Designing a model that allows a better understanding of the stakes involved in setting up points of sale has long been an objective for both geographers and marketers. Geographers have provided many of these models (Haynes and Fotheringham 1984), but marketers have developed models that are commonly used by practitioners.

Americans use many models to set up points of sale. It should be noted that American cities, which are relatively recent – at least those built after the 1820s when the grid technique was first applied – are mostly built on a grid model crossing streets and avenues at right angles, which facilitates the definition of "blocks". Under such conditions, it is easier to "geolocate" sites and thus model their position.

In this section, we will look at location models, namely the law of retail gravitation or Reilly's law, the MCI and the subjective MCI models and the MULTILOC model for multiple location, as well as the contribution of geomarketing to location and the links between location issues and omnichannel strategies, because the role and importance of Internet applications encourage consideration of consumers' new strategies in terms of point of sale traffic.

4.2.1. *The law of retail gravitation or Reilly's law*

The law of retail gravitation (Reilly 1931) can be stated as follows (Converse, 1949): "…two cities attract trade from an intermediate town in the vicinity of the breaking point approximately in direct proportion of the populations of the two cities and in inverse proportion of the squares of the distances from these two cities to the intermediate town."

The breaking point or limit point is the place between the two cities where the attraction of the two cities is the same, in other words where an individual located precisely at that place will be able to choose to go to one city or the other without distinction. A mathematical formulation has been defined (Converse 1949). Let's say two cities, X and Y:

$$A_X/A_Y = \left(P_X/P_Y\right) * \left(D_Y/D_X\right)^{\beta}$$

where

– A_X and A_Y are activities attracted respectively by cities X and Y, in other words the respective attraction of each of the cities;

– P_X and P_Y are respective populations of cities X and Y;

– D_X and D_Y are respective distances from the breaking point to cities X and Y;

– β is a specific coefficient of distance, but which is equal to 2 according to experiments that have been done even if, sometimes, authors have been able to imagine a value equal to 3.

Experiments have shown that the β coefficient was generally equal to 2 and this value is commonly used for the β coefficient as it has long been recommended in guides on the location of points of sale (Applebaum 1968). Or an intermediate place *Z* whose activity is entirely oriented towards city *X* or city *Y*. In *Z*, the value of the relationship between the attractions of these two A_X/A_Y cities is equal to 1:

$$1 = \left({}^{P_X}/_{P_Y}\right) * \left({}^{D_Y}/_{D_X}\right)^2$$

which gives:

$$D_Y = \left({}^{P_X}/_{P_Y}\right)^{-1/2} * D_X$$

If:

$$D_X = D_{XY} - D_Y$$

then:

$$D_Y = \left[{}^{D_{XY}}\Big/ \left({}^{P_X}/_{P_Y}\right)^{1/2} \right] + 1$$

The problem of the breaking point or limit point can be summarized as follows:

> If two cities are of the same interest, i.e. if they have the same attraction power, consumers located between these two cities will choose the closest, but if their attraction is different, the breaking point of influence will always be closer to the least attractive.

If two cities 120 km apart with respective populations of:

– *X* = 250,000 inhabitants;

– *Y* = 10,000 inhabitants.

How far is the *Z* limit point, the place where the two attractions are identical? The *Z* limit point will be 20 km from *Y* and 100 km from *X*, because:

$D_Y = 120 / \{1 + (250\,000/10\,000)^{1/2}\}$ D_Y➔ = 20, hence: $D_X = 100$

This can be illustrated by a graph (see Figure 4.10).

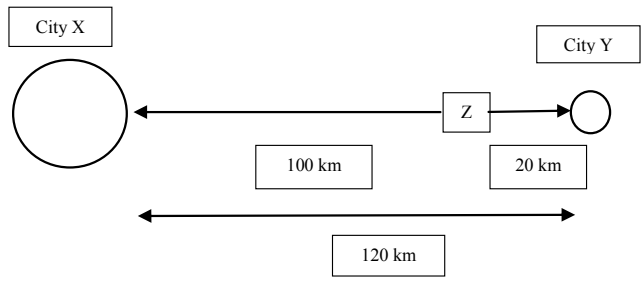

Figure 4.10. *The breaking point or limit point*

Reilly's law is characterized by its determinism; in other words, it requires that a consumer living less than 100 km from city *X*, for example, must be attracted to city *X*. Similarly, for a consumer located between the breakpoint *Z* and city *Y*, he will automatically be attracted to city *Y*. It can be said that this model exclusively determines the consumer's behavior according to his place of residence. Reilly's law was applied to supermarkets in rural areas in France (Giraud 1960) and Italy (Guido 1971). The breaking points of attraction in Quebec (Victoriaville) were determined with cities such as Drummondville, Trois-Rivières, Sherbrooke, Thetford Mines and Quebec City (Colbert and Côté 1990). A geographer was able to show that distances between cities in Normandy could be found from their population and their distance from the main city (Caen) (Noin 1989), as shown in Table 4.3.

Distance between Caen and the breaking point with...	According to the Reilly formula	According to the observation
Lisieux (14)	31 km	30 km
Argentan (61)	42 km	38 km
Flers (61)	44 km	38 km
Vire (14)	41 km	36 km
Saint-Lô (50)	39 km	37 km
Bayeux (14)	21 km	20 km

Table 4.3. *Application of the Reilly Law formula to Normandy cities*

Reilly's law has long been, and perhaps still is, applied in the United States to set up malls, even if the time has come to abandon them rather than expand them. The

feasibility approach of an implementation project using Reilly's law is well codified by specialized firms (McKenzie 1989) and makes it possible to introduce the notion of a site coverage ratio, which represents the proportion of marketable expenses that a store manages to capture in its trading area. The feasibility study of a project to set up a point of sale can be summarized by the following sequence of operations:

– determine the market area;

– carry out a geographical breakdown into homogeneous cells;

– determine the population and its income (per individual or per household);

– estimate the sales of the points of sale in each cell;

– identify the categories of products sold;

– highlight the relationships between retail sales and revenues in the total trading area and each cell (if possible);

– identify the current and future competition, the size of each cell and the access time between each cell;

– determine the indices and the rates of access using the formula: size/access time;

– multiply the site coverage ratio by the sales of each cell in the market area studied;

– divide the total sales by the total area, to estimate sales per square meter;

– repeat the analysis using the future population and income estimates;

– conclude on the feasibility of the project.

Since Reilly's law, the location of retail activities has been the subject of multiple models used to set up stores, mainly in the United States, either by retailers or by specialized companies.

These models available in geomarketing software allow the determination of trading areas as well as frequentation or sales forecasts.

Two main types of models can be distinguished:

– spatial attraction models that combine gravity models from Reilly's law and attraction models used for brands;

– location-allocation models based on linear programming techniques.

Gravity models such as the law of retail gravitation do not leave consumers with free choice; however, this choice is made increasingly free by means of mobility and more recently by mobile technologies at the disposal of the customer.

4.2.2. *Huff's model*

To overcome the major disadvantage of deterministic models, the probabilistic conception prevailed while retaining the gravitational character with Huff's model (Huff 1964) whose formula is as follows:

$$P_{ij} = \frac{S_j(T_{ij})^{\beta}}{\sum_{j=1}^{q} S_j(T_{ij})^{\beta}}$$

where

– P_{ij} is the probability for a consumer i to frequent store j;

– S_j is the sales area of store j;

– T_{ij} is the distance in time from the place of residence of consumer i and store j;

– β is the specific coefficient related to the distance which is generally 2 (see Reilly's law).

Hence the generally used formula of Huff's model:

$$P_{ij} = \frac{S_j(T_{ij})^{2}}{\sum_{j=1}^{q} S_j(T_{ij})^{2}}$$

We certainly find in this formula the idea of gravitation because it connects a mass, represented here by the surface of the store, and a distance measured in time (hence the variable T), which separates this store from the place of residence of the consumer.

The "probabilization" of the consumer's behavior is based on the one hand on Luce's axiom (Luce 1959), which in general measures the probability of making a choice by the relationship between the utility of this choice and the sum of the utilities of all possible choices and on the other hand on Kotler's theorem (Kotler 1991), which concerns the relationship of product utilities, or offers in general, for the consumer.

The Huff model was completed for malls by varying the size of the point of sale, whereas gravity models, such as Huff's model, only give it a parameter equal to 1

(the equivalent of β for the distance generally equal to 2) and by adding the total expenditure in the trading area (Lakshmanan and Hansen 1965):

$$R_{ij} = Y_i * \frac{\left({M_j^{\alpha}}/{D_{ij}^{\gamma}} \right)}{\sum_{k=1}^{m} \left({M_k^{\alpha}}/{D_{ij}^{\beta}} \right)}$$

where

– R_{ij} is the aggregate amount of sales of the mall's market area;

– Y_i is the total expenditure of the trading area;

– M_j is the size (in m²) of mall j;

– D_{ij} is the distance between the cell where consumer i resides and mall j;

– M_k is the size (in m²) of mall k;

– D_{ij} is the distance between the cell where consumer i resides and mall k;

– α, β and γ are friction parameters.

A low value for α means that the size of the mall is of little importance and low values for β and γ that distance is not a factor in the choice of mall (Eppli and Shilling 1996).

This model has many uses and can be found in various forms in some geomarketing software. It has been used to understand multi-purpose shopping (Popkowski Leszczyc *et al.* 2004). It has undeniable advantages over Reilly's law:

– it is a probabilistic model, because it gives the consumer his freedom of choice;

– it is a model based on principles that are easy to understand;

– it is applicable for supermarkets in small and medium-sized towns in rural areas and for convenience stores;

– it has two distinct functions from the user's perspective:

- it can be a model for setting up a store or managing its attraction against its competitors once it is open;

- be used to understand and predict consumer behavior (see Chapter 2).

However, it remains a little simplistic and has the following disadvantages:

– only two variables are taken into account, namely the sales surface area of the store and the distance between home and store, so it is unusable for a large number of points of sale with more sophisticated concepts (and store concepts are becoming more and more sophisticated);

– it has been possible to write *above* that the coefficient β was equal to 2 and it is the value that is generally used, but the determination of this coefficient is not so simple;

– like all spatial models, it requires a geographical breakdown of the market area in which the store(s) to be studied are located (or to be located) and the results are sensitive to the geographical breakdown.

4.2.3. *Competitive interaction models (MCI and subjective MCI model)*

To avoid the disadvantages of Huff's model, its generalization to a large number of variables is known as the MCI (Multiplicative Competitive Interaction) model (Nakanishi and Cooper 1974). The variables can be either objective (surface areas, distances or number of employees) or subjective from surveys and when we talk about the subjective multiplicative competitive interaction or subjective MCI model (Cliquet 1990, 1995). Its resolution mode is simpler than the Huff model and amounts to a multiple regression that provides the values of the coefficients β_k. Its formula seems more complex, but in fact, it is very easy to understand.

4.2.3.1. *The MCI (Multiplicative Competitive Interaction) model*

The formula of the MCI model is as follows:

$$\pi_{ij} = \frac{\prod_{k=1}^{q}\left(X_{ijk}^{\beta_k}\right)}{\sum_{i=1}^{m}\left[\prod_{k=1}^{q}\left(X_{ijk}^{\beta_k}\right)\right]}$$

where

– π_{ij} is the probability that the consumer living in cell i will choose the possibility of choice (here store) j;

– X_{ijk} is the value of the variable k describing store j in cell i;

– β_k is the sensitivity parameter relative to variable X_k;

– m is the number of choice options (stores);

– q is the number of X_{ijk} variables.

NOTE–. Σ means "sum of variables X_k" and Π means "produces X_k variables" hence the qualifier for the MCI as a multiplicative model.

The subjective multiplicative competitive interaction or subjective MCI model accepts perception data. However, perceptions are in theory considered as ordinal data, and therefore not metric.

It is possible to transform them into quasi-metric data by a scale of intervals with semantic supports (Pras 1976), then by the transformation from zeta squared (Cooper and Nakanishi 1983) into ratio scale data. The subjective MCI model formula differs very little from the MCI model:

$$\pi_{ij} = \frac{\prod_{k=1}^{q} \left(X_{ijk}^{\beta_{ki}}\right)}{\sum_{i=1}^{m} \left[\prod_{k=1}^{q} \left(X_{ijk}^{\beta_{ki}}\right)\right]}$$

where

– π_{ij} is the probability that the consumer living in cell i will choose the possibility of choice (here store) j;

– X_{ijk} is the value of the k variable describing store j in cell i;

– β_{ki} is the sensitivity parameter relative to X_k variable for cell i;

– m is the number of choice options (stores);

– q is the number of X_{ijk} variables.

The only change is that β_k becomes β_{ki}. Indeed, the data entered in the SMIC model are based on surveys. The consumers interviewed are asked to evaluate objective variables: surface areas, distances, number of employees, because any decision is made not on the basis of an objective truth, but on the perception that consumers have of these variables. But the big advantage lies in the possibility of also investigating qualitative variables such as the image of the store or the skill of the salespeople. This requires a survey plan that respects the geographical division to which all these gravity models are subjected. This survey must be carried out in different cells of the breakdown. In order to avoid carrying out these surveys in all cells, a cluster analysis of the cells makes it possible to constitute homogeneous groups of cells according to certain socio-demographic characteristics defined in advance according to the type of store studied, and then randomly choose one cell from each group to survey (Cliquet 1990). We will therefore have results that will depend on the cells and in particular on the β_k factors that will be estimated per cell or group of cells in order to respect the stationarity of the data (Ghosh 1984). This stationarity is practically impossible to obtain on all cells, which are often far too heterogeneous.

The MCI model has a number of advantages over Huff's model:

– it is a much more applicable probabilistic model than Huff's model;

– this model, like Huff's model, is easy to understand in its basic principles;

– the MCI model can be used to set up stores, calculate market shares and sales forecasts and study consumer behavior;

– the MCI model gives market shares equal to 100% (which is not always the case for some models) (Bultez and Naert 1975);

– a theoretically unlimited number of variables can be included, even if parsimony is always a good adviser in this area;

– this model is simplified by using geometric means and a logarithmic transformation and its formula is a multiple regression of the shape:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n$$

– this model is based on both gravity models and market-share models (Cooper and Nakanishi 1988).

But the MCI model, although superior in many respects to Huff's model, also has some disadvantages:

– the MCI model requires a sufficient number of objects (here stores) in the market area studied, as it is theoretically inadvisable to perform a multiple regression with less than 15 individuals. However, this can be done by following specific procedures (Tomassone *et al.* 1983) or by using a very simplified procedure provided by a composite model (Cooper and Finkbeiner 1983) that weights the variables using a survey that can be a dual questionnaire (Alpert 1971; Jolibert and Hermet 1979);

– we find the same difficulty as in Huff's model in defining a good geographical breakdown; this is true for all geographical breakdown operations;

– the variables to be included in the MCI must be measured on metric ratio scales, because the model is ultimately a regression;

– the MCI model, as a market share model, violates the assumption of independence of irrelevant alternatives (IIA), a phenomenon long denounced for all attraction models (McFadden 1974);

– the MCI model is not adapted to transient attraction (Cliquet 1997a), in other words to the consumer's mobility behavior outside his supply area;

– it is not easy to integrate as many variables as necessary, especially when limited to objective variables such as distances, surface areas or numbers of

employees; other variables that are often more decisive, especially when the retail concept is more sophisticated, are rather subjective insofar as they are perceived by consumers and more difficult to measure; in this case, mixing objective data measured on ratio scales with non-metric, rather ordinal, subjective data can lead to distortions in the results.

The MCI model has been used on many occasions to assess the competitive environment in the American mass retail markets (Jain and Mahajan 1979), to set up banking branches in France (Jolibert and Alexandre 1981), to formulate retail market strategies in an unstable environment in the United States (Ghosh and Craig 1983), to optimize the location of services in the United States (Ghosh and Craig 1986), to avoid territorial conflicts within franchise networks in the United States (Kaufmann and Rangan 1990), to improve the decision-making process for the establishment of new points of sale within a multiple franchise network by incorporating opening times in the United States (Kaufmann *et al.* 2000), to characterize the attraction of hypermarkets in Spain (Gonzàles-Benito *et al.* 2000), or even to illustrate the establishment of points of sale on a local market in the United States (Kaufmann *et al.* 2007)[2]. These models have been criticized for often leading to *encroachment* situations (see Chapter 5), in other words, to overlaps that are detrimental to franchisees (Schneider *et al.* 1998).

4.2.3.2. *The subjective MCI model*

The subjective MCI model (Cliquet 1990) solves some of the concrete problems of the MCI model, which gives the subjective MCI model a wider applicability. Indeed, it does not integrate objective data such as the MCI, namely surface areas, geographical or temporal distances or numbers of employees, but subjective data, in other words, judgments by consumers on these variables, because once again decisions are made according to the individual's perceptions of reality and not according to this reality.

The following advantages emerge:

– the subjective MCI model can theoretically receive as many variables as possible, even if there are limits, it can accept them, especially since it is easier to obtain a large number of perception (or subjective) data than objective data, which are often limited to distances, surface areas or numbers of employees; however, if these objective data are limited in number, they are not the most important in the consumer decision-making process, individuals' perceptions being more at the root of their decisions;

2 An example of the use of the MCI model can be found in the book (Cliquet *et al.* 2018).

– the subjective MCI model can also be simplified by geometric means and logarithmic transformation to obtain a multiple regression (Nakanishi and Cooper 1974);

– the principles are equally understandable (see Huff's model and the MCI);

– the subjective MCI model is also based on both gravity models and attraction or market share models;

– the subjective MCI model is more accurate than the MCI model in that it is calculated by cell of the geographical breakdown based on surveys that can be regularly conducted to monitor changes in consumer behavior; the property of stationary data is preserved (Ghosh 1984);

– the subjective MCI model, like Huff's model and the MCI model, is used to establish stores and understand consumer behavior, but more accurately and precisely on the latter point because the data are based on surveys of these consumers; it can also be used to predict sales and store frequentation shares (Cliquet 1990);

– the results lead to explanation rates (regression determination coefficient) by the subjective MCI model well above the MCI and therefore above Huff's model;

– following the opening of the store, the subjective MCI model makes it possible to continue to manage its attraction and in particular that of its promotional campaigns (Cliquet 1995).

But the subjective MCI model also has its disadvantages. Some are similar to those of the MCI model, others are specific to it:

– the subjective MCI model also requires, as with the MCI model, a sufficient number of stores in the market area studied;

– we find here again the same difficulty as with the MCI model in defining a good geographical breakdown;

– IIA's property is violated (McFadden 1974) unless certain methods are used (see *below*);

– a difficulty specific to the subjective MCI model concerns the provision of subjective data from surveys and measured on ordinal scales; if we want to be rigorous, we must go through specific transformations such as the use of a Thurstone scale to make the data metric either on interval scales initially, then on ratio scales using the zeta squared transformation (Cooper and Nakanishi 1983; see section 4.2.3.3.3);

– the specific need for the subjective MCI model to administer surveys considerably increases the cost of implementation of this model; this is, however,

the price to pay for deeper insight into the increasingly frequent changes in consumer behavior, because the surveys can be repeated as many times as necessary. Furthermore, the Internet does not interfere but rather supports and changes the consumer purchasing process;

– the subjective MCI model is no more adapted than the MCI model to temporary attraction, that is, to the mobility behavior of consumers outside their supply area.

As far as temporary attraction (i.e. the attraction of flows linked to customer mobility) is concerned, some retail and service activities are not covered by the so-called polar attraction models (see Chapter 2). The most common example is the hotel business. The methodology of setting up a hotel is quite different from that of a store. The aim is to attract a mobile clientele and therefore to be located on major roads or near stations or airports. A regression-based methodology has been developed for the replication of hotel concepts (Wind *et al.* 1989). SMIC has been applied to manage the attraction of furniture stores (Cliquet 1990), to choose the best promotions on the furniture market (Cliquet 1995) or to segment hypermarkets in Spain (Gonzàlez-Benito 2000).

One of the advantages of the subjective MCI model is its flexibility in the choice of variables. Another quality of this model is the ability to replace certain measures, for example concerning the consumer's perception of the promotion, with evaluations of promotions in this case with an analysis of joint measures (Green and Srinivasan 1990). Trade-off matrices (Johnson 1974), one of the data collection methods of the joint analysis, can be used. Fractional experimental designs can also be used when the number of stimuli is too large (Chapouille 1973; Philippeau 1985; Pillet 1992).

4.2.3.3. *Difficulties in implementing competitive spatial interaction models*

The MCI and the subjective MCI model must therefore overcome several difficulties related to:

– the gravitational basis of these models;

– the geographical distribution of the area to be studied and the stability of the parameters;

– the characteristics of the scales on which the data are measured;

– the violation of the IIA hypothesis.

4.2.3.3.1. The gravitational foundation

Are the MCI model and the subjective MCI model gravity models?

A gravity model is theoretically composed of two variables: a mass and a distance with a coefficient generally equal to 2, but if Reilly's law and Huff's model respect these constraints, the same cannot be said for the MCI and the subjective MCI model, which open up to larger quantities of variables. In addition, the distance may not be statistically significant as a result of multiple regression (Cliquet 1990): in this case, gravity is no longer relevant. Indeed, some stores have an attraction that is not proportional to distance, but which obeys a threshold logic (Malhotra 1983): this is the case for the furniture market (Cliquet 1995) and more generally for shopping goods that require research. We can only observe that the MCI and the subjective MCI model are not gravity models, but rather spatial attraction models.

4.2.3.3.2. Geographical breakdown

What breakdown should be implemented to apply these models?

The user of these models is often faced with two solutions: one suggests a division into a limited number of cells, while the other proposes a much finer division. It should be noted that the finer the division of the market area, the more difficult it will be for the MCI model to ensure the stationarity of the data and the value of the coefficients β, and the higher the cost for the subjective MCI model. The subjective MCI model can limit non-stationarity problems by conducting surveys by cells (or groups of homogeneous cells), the cost of which is not negligible. The decision will therefore often be dictated by budget constraints.

4.2.3.3.3. The characteristics of the scales

How do we enter data measured on ordinal scales as perceptions are in the subjective MCI model?

The MCI and the subjective MCI model are demanding for data entry mainly because of their regression transformation (Gautschi 1981). Ordinal data can be transformed into metric interval data by Thurstone's scale (Myers and Warner 1968; Pras and Summers 1975; Pras 1976; Pras 1976) first, then later by using the zeta squared transformation to make data measured on ratio scales that offer all the reliability guarantees to enter this type of model. The zeta squared transformation (Cooper and Nakanishi 1983) allows us to go from an origin equal to 0 to an origin equal to 1 and must be applied to each score so that all values are positive. Its formula is as follows

If:

$$\left[\left(X_{ijk} - \bar{X} \right) \Big/ \left({}^{1}/_{k} \sum_{j=1}^{m} X_{ijk} \right)^{1/2} \right] > 0$$

then X_{ijk} is written:

$$1 + \left[\left(X_{ijk} - \overline{X} \right) \Big/ \left({}^{1}/_{k} \sum_{j=1}^{m} X_{ijk} \right)^{2} \right]^{1/2}$$

otherwise X_{ijk} is written:

$$1 \Big/ \left\{ 1 + \left[\left(X_{ijk} - \overline{X} \right) \Big/ \left({}^{1}/_{k} \sum_{j=1}^{m} X_{ijk} \right)^{2} \right]^{1/2} \right\}$$

4.2.3.3.4. The violation of the IAA hypothesis

How can these models be prevented from violating the assumption of independence of irrelevant choices (or IIAs)?

This assumption is a major flaw in market share models (McFadden 1974). A simple example helps to understand it: the story of the blue and red buses. A city has both a metro and a blue bus network and decides one day to organize a second bus network with red buses. In the initial situation, let us imagine that the metro and the blue bus network share the market: 50% for the metro and 50% for the blue buses. The arrival of red buses leads to a new distribution of market shares: as with any market share model, the MCI model tends to structure it in three equal parts, that is, 33% for each mode of transport, whereas in reality, it is very likely that the supporters of the metro will remain loyal to it, in other words that the distribution of market shares will be 50% for the metro and 25% for each of the bus networks (we take a simple case). It is then said that the MCI model violates the IIA. The zeta squared transformation seems to avoid this bias (Cooper and Nakanishi 1983).

4.2.3.3.5. Non-response problem and Bayesian statistics

Another question concerns the subjective MCI model more strictly. Indeed, during the surveys, consumers are asked about their frequentation at stores in the market area and are asked to evaluate, on a Thurstone scale, the determining variables of their choice. But these respondents do not necessarily know all the points of sale, so the final matrix of survey results inevitably has “holes”. To overcome this defect, it is recommended to use Bayesian statistics (Pham 2014). Pham’s thesis also shows an attempt to use multi-agent models to locate points of sale.

The MCI models face more and more frequent criticism: the main one is the inability to take into account the mobility of consumers, in other words their ability to change market area and thus customer flows and the resulting purchase flows (Douard *et al.* 2015).

4.2.4. *Multiple location and allocation-location models*

Multiple location has developed with the expansion of point of sale networks. This expansion has taken place either in a so-called branch structure with company-owned points of sale, or within a franchise system bringing together a franchisor, owner of the brand and know-how, and franchisees, or in a group of retailers and cooperatives (Cassou *et al.* 2016), on the one hand, and concessions, on the other hand. In franchise networks, multi-franchise (Kaufmann 1996; Hussain *et al.* 2013; Hussain *et al.* 2018) is used when the franchisor allows the franchisee to have its own points of sale. It can be an area development contract that allows a franchisee to develop in an entire region.

Location-allocation models were developed at the beginning of the 20th Century to set up factories (Weber 1909). Since then, these models have been improved (Cooper 1963, 1964; ReVelle and Laporte 1996; ReVelle and Eiselt 2005).

These models, based on linear programming, require:

– an objective function corresponding to the profitability of the location;

– an allocation rule to allocate each individual (factories, etc.) in a market area to each of the proposed locations;

– a matrix of distances (geographical or temporal) between the demand areas and the proposed locations.

It has also been possible to take into account the profitability constraints of the surrounding locations for market areas by proposing a threshold model below which implementation is not recommended (Serra 1999).

These models have since been developed by geographers (Ghosh and Rushton 1987) and industrial location specialists, before being applied to trade. The MULTILOC model (Achabal *et al.* 1982) combines this type of model to identify potential customer areas with the MCI for site selection. It is typically a multiple location model. MULTILOC is used by retailers, mainly in the United States, to set up their stores, especially supermarkets and convenience stores, within large retail networks. This model is based on the following:

– a location-allocation model based on a P-median algorithm (Weber 1909) used to set up factories;

– an MCI model;

– a heuristic to choose the best locations among those highlighted by MULTILOC.

The MULTILOC formula is complex:

$$P_{ij} = \sum_{l=1}^{L}\left(\prod_{k=1}^{q} A_{ijkl}^{\beta_{kl}} * x_{jl}\right)\left[\sum_{j=1}^{n}\sum_{l=1}^{L}\left(\prod_{k=1}^{q} A_{ijkl}^{\beta} * x_{jl}\right)\sum_{j=n+1}^{n+s}\left(\prod_{k=1}^{q} A_{ijk}^{\beta_k}\right)\right]$$

MULTILOC has shown how to avoid cannibalization of sales within franchise networks (Ghosh and Craig 1991). In terms of professional practice, this model has been used in the United States by Super Valu retailers (a chain of convenience stores in Eden Prairie near Minneapolis), and Scrivner (a supermarket chain in Oklahoma City) and marketing companies in Minneapolis and Boston, for example (Achabal *et al.* 1982) for over 30 years. Other applications have used the P-median algorithm for commercial establishments (Baray, Cliquet and Pelé 2014).

The problem of multiple location can also be addressed using a portfolio matrix (Mahajan *et al.* 1985) with:

– a measure of the attractiveness of the trading area: size of the area, annual growth rate, profit rate, intensity of competition;

– a measure of competitive strength: market share, store quality, brand reputation, promotional effectiveness.

Table 4.4 shows how to interpret this matrix.

		Competitive strength		
		High	**Moderate**	**Low**
Attractiveness of the sector	**High**	0	+	+
	Moderate	–	0	+
	Low	–	–	0

Table 4.4. *Portfolio matrix for multiple locations*

Another application made it possible to identify the transit flows of metro customers in a major Parisian station (Baray 2003b) as shown in Figure 4.11 by combining a gravity model and a location-allocation model in the methodology.

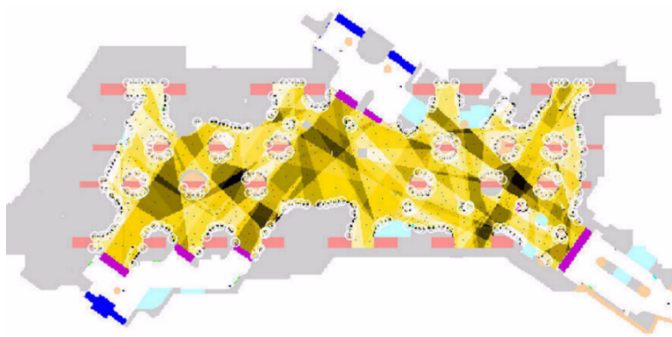

Figure 4.11. *Service locations within a major metro station in Paris (source: courtesy of its author Jérôme Baray). For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

4.2.5. *The contribution of geomarketing to the location of points of sale*

Geomarketing software has become an essential tool when setting up stores. They make it possible to identify the socio-demographic characteristics of the market areas to be studied, to map them and thus to visualize, within the market area studied, the presence of competing points of sale, the possible locations for store setting up and the potential trading areas. For a long time, store location studies were carried out on the basis of old works (Applebaum 1966). Since then, geomarketing has made it possible to carry out analyses prior to establishment based on the mapping of phenomena that the decision-maker must quickly understand before making his choice (Douard 2002):

– the general shape of the market area with its communication routes, natural obstacles and infrastructures (road, rail, industrial, etc.);

– the demographic structure of the market area with criteria such as age, household size, owner/tenant distinction, type of housing (single-family homes or buildings), etc;

– the level of income in the market area using indices of living wealth;

– the statement of expenditure by major product categories in the market area using an index of consumption expenditure disparity among regions.

4.2.6. *The influence of the Internet on the location of points of sale*

Just as some believed that with the Internet, distance was dead (Cairncross 1997), others may have thought that now, with GPS location assistance, it was

useless to look for specific locations for points of sale and that location issues were outdated. This is obviously not the case, as consumers continue to leave their homes and road or pedestrian traffic is still just as dense. Moreover, physical location is important for imposing its image on consumers and there is a reason that pure players have decided to buy a chain of stores or plan to set up their own chain (Sancerre 2019). Indeed, if pure players open or buy physical stores, it turns out that for a traditional retailer, opening a sales site, or transactional site, is a complementary rather than a substitutive operation. Retailers can thus, with the help of their sales site, allow consumers who do not yet have physical points of sale of a chain of stores near their place of residence to access their products.

More generally, consumers tend to develop so-called omnichannel strategies (see Chapter 5); they are thus ready to test any form of virtual or physical marketing channel and use both forms for the same purchase operation. This is referred to as a ROBO or ROPO (research online buying/purchasing offline) purchasing process. Indeed, the consumer can choose his product on the Internet and buy it in a store, or the opposite. Retailers, like Decathlon, have opened stores where purchases are not made, but where you try the products you can then buy on the sales site: this is called showrooming. These hybrid shopping practices can be a source of conflict (Kalyanam and Tsay 2013), as they can correspond to free riding: the customer may consider the physical store only as a showroom and remains free to buy the identified product from a competitor (cheaper) after consulting a price comparison either in another store, or at home on his computer, or thanks to his tablet or smartphone and this anywhere and anytime (ATAWAD: anytime, anywhere, any device), a symptomatic process of the ubiquity that mobile technologies facilitate. This evolution forces retailers to define a hybrid marketing system in which the location of points of sale continues to play a major strategic role, even if it may be different from that played in the days when the Internet did not exist. Logistics also has an essential role to play, as delivery can take place either to the store, to the home, or to a warehouse or box near the customer's home. Retail firms are required to design cross-channel strategies in which the location of stores and product receiving locations (custodians or drives) is of essential interest in its relationship with their customers.

4.3. Spatial strategies for locating points of sale

So far, only the single or multiple location of points of sale has been covered. These operations must be part of spatial strategies within chains or networks of contact points for businesses and services. These are indeed strategies, because the idea is to "position" a product in a real space according to objectives and means intended to achieve the objectives. These objectives do not only concern the establishment of new points of sale, in other words expansion strategies, but also

their closure; we could add their re-merchandising and reorganization, but this is a problem that goes beyond the scope of this book (Davidson *et al.* 1988; Cliquet *et al.* 2018). In addition, it appears that the addition of a point of sale affects demand, price and profit levels for both new and existing points of sale (Duan and Mela 2009).

4.3.1. *The fundamental concepts of spatial strategies*

The desire for expansion imposes spatial strategies with the objective of adding points of sale, while restructuring strategies aim to reduce the number of points of sale. Several concepts are important to understand these expansion strategies:

– the chain and the network, a problem already addressed above;

– the business concept;

– the territorial, spatial or geographical coverage according to the authors.

The advantage of the chain, that is, a set of points of sale owned by the same operator, is clearly a quick and unquestioned implementation of management orders, one of the disadvantages resulting from the expression "without discussion". While, in a network, the operator, franchisor or management body of the retail cooperative must first and foremost convince its franchisees (Lafontaine 1992) or members; not having invested in all points of sale, the franchisor – or the body of the cooperative – will be less exposed in the event of economic difficulties, while the branch operator will be subject to a significant risk.

The business concept is clearly the focus of any attempt at duplication. And before considering setting up other points of sale based on the same concept, it is still necessary to ensure that it is well adapted to new environments, even if it means changing some peripheral elements of the concept (Kaufmann and Eroglu 1998). The choice of the organizational form of the chain or network, company-owned systems, franchises or cooperatives, depends not only on the operator's financial means, but also on the ability of its concept to be duplicated and the operator's ability to find suitable market areas. The sites will be evaluated during the concrete implementation of the expansion strategy either by the operator, or by the franchisee or member according to the internal site management method. In the case of a plural form network, mixing franchise company-owned units, the organizational choice is rather virtual during the first duplication. There are disclosure laws in many countries like the Franchise Full Disclosure Act passed in 1975. In France, the Doubin law passed in 1989 requires that a potential franchisee must provide financial documents (balance sheet and income statement for at least one year), the

Fédération française de la franchise (FFF, French federation of franchising) strongly advises its new members, as well as former members who want to launch a new network, to respect the 2x3 or 3x2 rule: managing two points of sale for three years or three points of sale for two years. These ideas are now implemented at the European level.

Territorial coverage, in other words the ability to open several points of sale in order to seize site opportunities, quickly becomes a challenge to be met, as does the challenge of standardizing the concept, responding to competition and adapting the concept to new customer behavior (Bradach 1997; Broniarczyk *et al.* 1998).

4.3.2. *Between territorial coverage and the location speed of a point of sale network*

In a spatial strategy, space should not be the only concern, because the objective is to find the best sites that the competition is also looking for. Time is therefore part of the game and when we mix space and time, the idea of speed appears to be essential: we have already said that the speed of intervention was Napoleon's great advantage in his battles. We will therefore first consider how to determine the territorial coverage, and then we will consider how to accelerate the process.

4.3.2.1. *Measuring territorial coverage*

Territorial coverage is not the geographical dispersion that is simply measured (Lafontaine and Shaw 2005) by counting the regions in France, provinces in Canada, states in the United States or India, länder in Germany, etc., according to the countries in which the points of sale are located. On the other hand, territorial coverage seeks to assess the extent to which a network of points of sale covers a region or country. Its measurement makes it possible to obtain a value comparable to that of competing networks and to show whether or not the acquisition of another network is desirable in order to increase territorial coverage objectives more quickly. This can be achieved by using the concept of entropy as used in communication theory to measure information (Shannon and Weaver 1949). Then geographers (Chadule 1997) used this concept to measure the rural exodus. The idea is as follows: if we divide a territory into cells, we can see that some of them are depopulated as a result of this rural exodus, and in this case entropy decreases. Entropy can then be applied to measure an increase in the number of cells that "populate" new points of sale (Cliquet 1998). The entropy formula is as follows:

$$E = -\sum_{i=1}^{k} f_i \, log(f_i)$$

where

– E is entropy;

– k is the number of cells of the geographical breakdown;

– f_i is the store frequencies in cell i.

The calculation of this entropy therefore requires, as for all calculations in the spatial environment, a geographical breakdown of the territory, or market area, targeted by the strategy. The use of relative entropy (RE):

$$RE = {}^{E}/_{log(k)}$$

gives a measure calculated in an interval [0, 1] allowing comparisons with competing networks. Once the coverage has been calculated, geomarketing software then makes it possible to choose, according to population and income, the priority areas where new points of sale can be set up. It will then be possible to see whether the opening of points of sale in certain market areas makes it possible to increase territorial coverage.

It should be noted that, when points of sale are set up in the same city, for example, in the same market area, in other words in the same division cell, the territorial coverage decreases slightly. But in this case, the opening of new points of sale aims to "mesh" the city or territory as much as possible in order to sometimes stifle any desire on the part of competition. Improving territorial coverage serves, especially in the retail sector where delivering products is a major constraint, to limit logistics costs. The German discounters Aldi and Lidl gradually invaded French territory from 1988 onwards: they set up a warehouse capable of supplying their small stores around them, which they then opened very quickly, taking advantage of the 1973 Royer law on locations, which only targeted supermarkets; then they opened another warehouse in a neighboring area, etc.

The calculation of the territorial coverage was used to justify the purchase in 1996 of the Docks de France group (Mammouth hypermarkets and Atac supermarkets) by the Auchan group (Cliquet and Rulence 1998), and to determine whether the drives opened by retailers allowed them to improve their territorial coverage (Vyt *et al.* 2017) which is not at all the case. When Auchan bought the Mammouth hypermarkets of the Docks de France group in 1996, it was of great benefit to Auchan, because the territorial coverage and spatial coherence (Rulence 2003) were much better (see Figure 4.12), even if the financial operation was more difficult to digest.

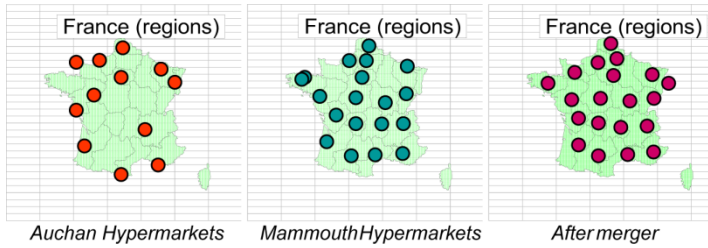

Figure 4.12. *The merger of the Auchan and Mammouth hypermarkets (NB: in these patterns, only the presence of stores in the regions is indicated by circles; at the departmental level, this presence is even more significant). For a color version of this figure, see www.iste.co.uk/cliquet/marketing.zip*

Some will say that it is enough to look at a map to realize the change, but they will not be able to quantify it and therefore argue about the gain compared to the old situation and especially compared to competitors. Logistical advantages are not the only ones involved. Better territorial coverage also provides the possibility of having access to the major national media without losing audiences in regions where the network is not present. The major French retailers were able to benefit from television advertising from 2007 onwards and all had sufficient coverage to take full advantage of it. Finally, the advantage in terms of fascia awareness should not be overlooked either.

The problems of territorial coverage are well known to geographers, some economists and specialists in applied mathematics. They use coverage models based on the P-median algorithm (Weber 1909). One application has enabled a spatial restructuring of maternity hospitals in France (Baray and Cliquet 2013).

Moreover, territorial coverage is not territorial coherence, which can be measured by spatial autocorrelation coefficients (Cliff and Ord 1975). Spatial autocorrelation aims to show that points are not located by chance in a space and that there is therefore a spatial structure (Charre 1995) that favors the proximity and similarity of these points (stores): the Moran coefficient has been used for its stability and to show the coherence of the networks of points of sale (Rulence 2003).

4.3.2.2. *Location strategy and percolation theory*

Physicists have developed the theory of percolation to understand diffusion in random media in the form of graphs. The French 1991 Nobel Prize in Physics, Pierre-Gilles de Gennes, used this theory to understand how glues work. Percolation is the simplest model of a disordered system (Bunde and Havlin 1996). Since then, this theory has been used for multiple applications and in particular to model forest fires (Stauffer 1985). Each tree is treated as the vertex of a graph and the

propagation of the fire can be predicted. Stores can also be considered as the vertices of a graph. In order to make the fascia of a network of points of sale known as quickly as possible, it is necessary to open a large number of points of sale, which represents a very significant investment. It is therefore essential to choose the right sites in order to cover the target region as quickly as possible. The procedure is as follows: first choose a point at one end of the plane of the region transformed into a graph; then, join a point at an opposite end of this graph by following the road network and according to the population density living along this network; we then end up with a series of vertices of the graph which represent how many stores to open. Figure 4.13 shows an application for a maxi discount sign in the Morbihan department in France.

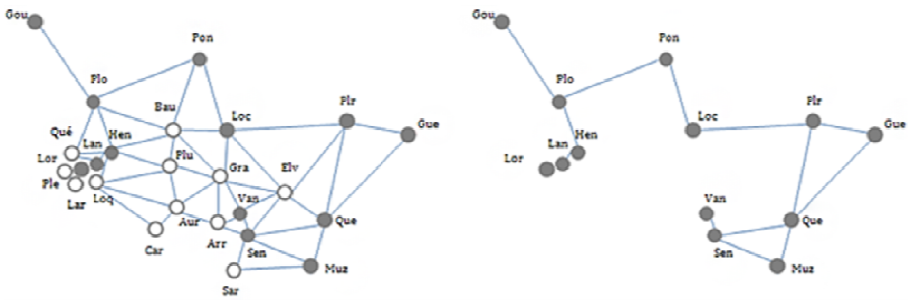

Figure 4.13. *Application of the percolation theory to a chain of stores at maximum discount in Morbihan (source: Guillo 2007, courtesy of the author)*

Figure 4.14 compares the Leader Price and Lidl store networks in Brittany. These two networks are "soft" discounters, one of which has implemented a network that percolates (Lidl) better than the other (Leader Price) in this region (Cliquet and Guillo 2013).

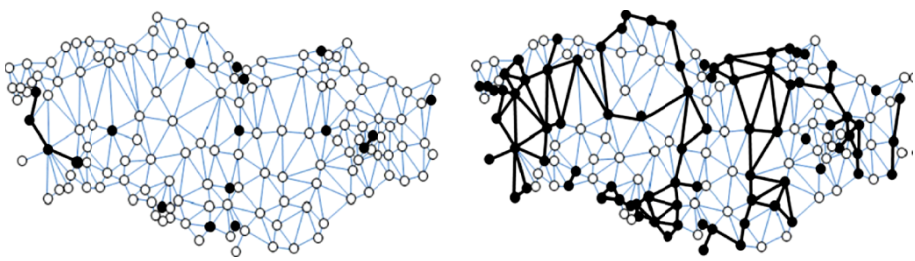

Figure 4.14. *The meshing of two networks of "soft" discount stores (source: (Cliquet and Guillo 2013))*

4.3.3. *Expansion strategies for point of sale chains*

Reticulation retail stores are an old phenomenon in France where Félix Potin, who had opened his first store in 1844, decided to open several in Paris in 1860 (Camborde 1997). It may be recalled, for example, that Carrefour increased the number of its points of sale by 5,300 between 1999 and 2003 when this group merged with the Promodès group to reach more than 12,000 stores in 30 countries, just as the Dollar fascia in the United States increased the number of stores by 2,426 during the same period (Duan and Mela 2009). McDonald's and Subway have around 40,000 fast food units worldwide.

These networks cannot be set up in any way, on the one hand, on the spatial level in order to respect the objectives of territorial coverage (Cliquet 1998) and spatial coherence (Rulence 2003), and on the other hand, on the organizational level: which stores should you own and which others should be franchised, for example? With regard to the organizational challenge, three strategies were identified (Cliquet 2008):

– a purely opportunistic strategy, which consists in seizing any opportunity to open a point of sale without regard either for territorial coverage or even for spatial coherence, or for the mixed structure of the network, in other words the PCO (Proportion of Company-owned Outlets, or the proportion of company-owned units in the franchise network). The objective is to open as many points of sale as possible in a minimum of time, but this has led networks like L'Occitane to restructure themselves;

– a strategy of major international groups seeking to apply a global PCO at the network level, but not at the local level. Some groups, such as in car rental (Budget), buy back part of the network when they negotiate prices with manufacturers in order to increase their financial surface and refranchise them as soon as the negotiation is completed;

– a strategy that takes into account a global and a local PCO in order to best manage the relationships between company-owned units and franchisees (Mercure hotels).

On the spatial level and in order to respect territorial coverage and spatial coherence objectives, five expansion strategies can be distinguished (Davidson *et al.* 1988):

– the contiguous expansion strategy;

– the beachhead strategy;

– the clustering strategy;

– the skim strategy;

– the acquisition (or merger) strategy.

Contiguous expansion, or the contagion strategy (Laulajainen 1987), favors proximity to points of sale and aims to open them in market areas more or less adjacent to those of existing stores in the network. This strategy simplifies logistics and headquarters controls and limits promotional investments. This is the strategy generally followed by regional networks or discount retailer networks for whom reducing logistics costs is strategically essential (Wortmann 2004).

In the event that the network leaves its usual region, it must then establish what are known as beachheads. Locating these beachheads quickly makes it possible to set foot in another region and choose a quality site before competitors take it over; once the site of the new beachhead has been identified and acquired by the operator or a franchisee, the contagion strategy still needs to be repeated in this market area. The association of contiguous expansion and beachheads is undoubtedly the most applied by the networks: this is the strategy adopted by a recent French fast food network Big Fernand, even if the lack of capital forces this plural form network (9 points of sale and 27 franchises) to become English to ensure its international expansion (Bianchi 2017). Thus, on the one hand, the networks limit the risk, and on the other hand, they respect the principle that you must maintain a strong position in your stronghold; this is one of the criticisms currently leveled at McDonald's, which is increasingly being challenged in the United States while international development continues to work well (de La Héronnière 2015).

Within these strategies, a question arises as to whether it is appropriate to make hierarchical geographical choices, in other words, by giving priority to the largest cities in order to immediately ensure a better reputation, as did the Novotel group, which became Accor, when it acquired the Mercure hotel network in 1974, since it was based more in medium-sized cities. However, networks such as Walmart in the United States or the Beaumanoir group's Cache-Cache fascia in France began their expansion in small and medium-sized cities, and they caused a shock when they began to invade large cities, because the invasion was rapid, sometimes with quite violent reactions, as was the case in California or New England for the Walmart group.

In order to accelerate the rate of location of their network expansion, operators are trying to operate simultaneous multiple locations. Sam Walton, founder of Wal-Mart in Arkansas, a southern U.S. state, decided in 1992 to open a dozen stores in Michigan, a northern state and stronghold of his rival K-Mart; but the owner of Wal-Mart could not carry out his project because he died in April of that year. Georges Plassat, then head of the Vivarte group (later the head of the Carrefour group),

decided to open 24 stores simultaneously in 2008. The objective of such decisions is clearly to disrupt competition. It is difficult to imagine the implementation of such strategies without the help of spatial marketing methods and geomarketing techniques. Other chains such as Zara of the Spanish group Inditex or the Swedish H&M (Hennes & Mauritz) are always looking for the best sites wherever they are located in order to capture the maximum pedestrian traffic, even if it means opening several stores on the same street ranked number one in the city. They are willing to buy at any price or pay considerable rents in order to limit their advertising costs (Zara does not advertise outside its points of sale). The consequence is of course an inflation of prices and commercial leases to the detriment of other businesses.

Clustering strategies consist in setting up as many points of sale as possible in a market area in order to prevent competitors from settling there. McDonald's has often proceeded starting with a city center restaurant, striving to respect the architectural style of the surrounding buildings – the example of Mozart Street in Salzburg is well known. Then, other sales units complete the cluster as quickly as possible, either with the direct support of the franchisor or, more often, by signing a development contract with a multi-franchisee.

The skim strategy is the prerogative of luxury retail chains that only target very high-end customers who live in well-defined neighborhoods. But this sector is not always easy and Hédiard's experience, whose Russian owner (from 2007) demanded that only bottles of alcohol worth more than 300 euros be sold. This clientele, although rich, were not attracted, and Hédiard is going through a difficult period (Scemama 2017). It also seems that some networks in this luxury sector are facing competition from Internet sales sites.

4.3.4. *Merger and acquisition (M&A) strategies*

Establishing points of sale as soon as possible in order to hinder competition or to improve territorial coverage and/or spatial coherence can take time that networks often do not have. Acquisition strategies are expensive, but they save valuable time by buying back quality sites and an already loyal customer base. The purchase of the Docks de France by Auchan in August 1996, despite a cost of 17 billion francs (more than 2.5 billion euros, certainly difficult to swallow) enabled Auchan hypermarkets to improve their territorial coverage and spatial coherence. But in the Docks de France group's shopping basket, the buyer found a supermarket chain under the Atac fascia that Auchan never really took advantage of despite the reorganization and launch of the Simply Market chain. Indeed, it should not be forgotten that any merger or acquisition leads to a reorganization of the network and a reorganization of the points of sale. In addition, it should be noted that during these mergers or acquisitions the competition state commission often monitors and

asks for too many points of sale to be resold in market areas. This was the case with the Carrefour group when it merged with the Promodès group in September 1999: 34 hypermarkets had to be sold. It was also necessary to reorganize all the logistics of the company of which Promodès had become master. Moreover, in one night, the Carrefour group became France's leading franchisor with several thousand franchisees, whereas the franchise was not, with few exceptions, in the group's DNA.

By allowing the number of points of sale to increase very quickly, which corresponds to a faster location rate, these mergers and acquisitions have several objectives:

– accelerate the company's development through external growth, provided that the cost is kept under control in order to have a greater impact on competitors: in the retail sector, the largest companies consider that they must be at worst in third place in terms of market share and some have left foreign markets for not having achieved this objective;

– accelerate the expansion, in other words the company's territory development, to promote the fascia everywhere and the brands sold, such as private labels, and thus to put more pressure on suppliers in view of the increased number of points of sale, and therefore the opportunities that are now available;

– provided that the M&A operation does lead to an improvement in both territorial coverage and spatial cohesion, reduce logistics costs per point of sale and facilitate access to the mainstream media without risk of audience loss.

But now, in most of the most advanced European countries, particularly Germany, France and the United Kingdom, mergers and acquisitions in the retail sector are closely monitored by European and national competition commissions, which aim to avoid any monopoly or rather quasi-monopoly situation. This would have been the case in 2018 in France with the almost certain refusal of the competition commission if the merger between the Auchan group and Système U had been successful. It must be said that merging a family business with a group of cooperative retailers was a challenge. The negotiations stopped as they were moving towards an exchange of stores: Auchan was to take over the Système U hypermarkets from Hyper U, Système U recovering the Auchan supermarkets from the Atac brand received when the Docks de France were acquired in 1996 (Vyt, Jara and Cliquet, forthcoming).

This problem is linked to organizational forms, on the one hand, when new points of sale are set up (or when the network is restructured with store closure), and on the other hand, when networks want to set up abroad. In the first case, the question is how to grant a new point of sale status: company-owned unit or

franchise? A model would have to be designed using a model based on the median and taking into account the characteristics specific to each status with advantages and disadvantages while respecting a certain proportion of own points of sale, company-owned units or subsidiaries (Bradach 1998; Cliquet 2000). In the second case, choosing the entry mode and then the expansion mode of these networks is a crucial decision (Picot-Coupey *et al.* 2014). The location speed remains a strong argument against competition and stakeholders in general, and M&A strategies can significantly accelerate it, while contagion strategies, even associated with beachhead strategies, are much slower.

4.3.5. *Expansion strategies and the role of the Internet*

The Internet and in particular so-called e-commerce are disrupting the retail and service sectors. Here, we are referring to the geography of the net (Volle 2000) and digital geography (Ash 2016, 2018). Companies use the Internet to complete an unfinished spatial network by filling "gaps" in the grid without having to invest heavily in physical sites. This strategy then becomes a means of replacing physical distance by psychological distance, in other words, clients' distrust of a site whose geographical origin is unknown: improving this psychological distance thus appears to be a necessity (Darke *et al.* 2016). Curiously, it is through physical measures such as improved logistics that this evolution can be achieved: a product delivered on time even when it comes from the other side of the world can contribute to it. *Pure players*, such as Amazon, have understood this well, even if this company, initially specialized in bookshops, then became the largest logistics company, decided to buy the American Whole Foods stores which have a strong reputation and market organic products. Reputation and, above all, image, undoubtedly come and will come for some time from the physical presence on the markets.

Moving to a point of sale is no longer an obligation to buy a product, good or service. Nevertheless, consumers continue to patronize stores, with an increasingly social and even hedonic objective. Hence the need for the retail sector to offer potential customers an atmosphere, a short break, an experience that encourages them to come back: that is "re-enchantment" of the retail sector. This does not necessarily mean that store locations will stop or even slow down. The Fnac-Darty group was able to open 70 points of sale in 2017, and 200 franchised store projects are under study with a view to improving customer service and experience. But not all stores are in a position to make such a change, and companies in this sector that know what it costs to set up and manage a store must now restructure their networks. Some have several, such as Carrefour with its hypermarkets, supermarkets and convenience stores. Carrefour and Casino have begun their restructuring, as have the banks; the opening of the online banks they have created in France is beginning to harm physical branches and payment cards and mobile payment are calling into question

the existence of many ATMs (automatic teller machines) even if these online services have not yet balanced despite their 4.5 million customers.

Expansion strategies will undergo several changes, not to say revolutions, which could have serious consequences for the establishment of new points of sale.

Not that these establishments are stopping, but they will probably not be of the same nature with different objectives for the following reasons (Cliquet *et al.* 2018):

– an ever-increasing urbanization, especially in emerging countries where electronic money is already much more widely used than in so-called developed countries;

– the sharp slowdown of the cities of these countries, which are advanced in their development to the detriment of agricultural land, leading to the growth of high-rise housing;

– shopping behavior that will undergo increasingly radical changes as mobile technologies develop, and not only information and communication technologies (robots, transport modes, etc.);

– the risk of desertification of the countryside leads governments to legislate in order to avoid too many store closures (although it may be too late).

4.3.6. *Space, commercial urban planning and public policy*

We will look at the problems of commercial urban planning before turning to territorial marketing.

4.3.6.1. *Commercial urban planning*

Commercial urban planning is a sensitive issue for both network developers and public policy. The least we can say is that the France has never shone through in this field and that commercial urban planning legislation has been unstable to say the least (Basset 2018). Decisions have always been made under pressure from small traders and have at best slowed down the evolution of retail formats, often for a short period of time. Pierre Laval's 1935 decree-law banning single-price stores, opened by Parisian department stores during the Great Depression following the 1929 crisis (arrived in France towards the end of 1931), did not prevent the development of so-called variety stores after the Second World War. The 1973 Royer law eventually provoked a vast movement of corruption that had to be stopped in the early 1990s (1991 Sapin act). The 1996 Raffarin act did not prevent the takeover of the Docks de France by Auchan in 1996, as we have seen, nor the Carrefour-Promodès merger in 1999, a decision that is not entirely independent of

the corruption phenomenon mentioned *above*. In addition, this act also covered the hotel industry and, instead of protecting small hotels, it led to a massive takeover by hotel chains of small and medium-sized hotels located in city centers. The part of the 2013 Duflot act, originally intended for Ms. Pinel, which aimed to oversee the opening of the drives came a little late, when more than 3,000 of these establishments had already been created since the launch of Chronodrive by the Auchan group in 2004 and the first drives of the E. Leclerc group in 2007; and was this really useful? But criticism is easy.

However, some laws have had positive consequences. The Raffarin act forced retailers to set up stores in rural and mountain areas for each new supermarket opened and tried to limit the expansion of cinema multiplexes. But it failed to maintain the small hotels, as their owners were quick to sell them to chains, especially those located in the city center. The Duflot act, in its part on trade, aimed to improve the financing of critical stores and their switchover to digital, and above all to no longer link commercial leases to the construction price index, which led to sudden jumps in rental prices; the right of pre-emption for municipalities was strengthened. On the other hand, and once again, the obligation to apply for an authorization to open a click and collect from the first square meter does not seem clear in this act (Aubril 2014).

4.3.6.2. *Territorial marketing*

More positive and less state, although still concerning public policies, but local, it is necessary to deal with territorial marketing, which is the prerogative of local authorities: regions, departments, municipalities according to the French hierarchy of these authorities. Territorial marketing, a major consumer of geomarketing techniques, can be considered as part of spatial marketing at the same time as it participates in regional and local public policies to attract both economic and cultural activities. It has been regrettable that there is a lack of academic work in a field that concerns all countries, "such as architectural icons, the search for quality labels, event creation for promotional purposes, contemporary creations and other means generating image and meaning that enable territories to exist at the national and international level" (Heilbrunn 2009).

The purpose of territorial marketing is first of all to take into account the existence of a market made up of sites where it is possible to set up any form of organization (administration, commerce, factory) likely to attract jobs, but also events likely to spread the image of the community. Territorial marketing then intervenes to help the public decision-maker to define and manage his project (Meyronin 2015). Geographers and economists continue to have a strong interest in it, but with different concerns from those of marketers. Criticizing the usual measures of a territory's influence, a measure of this impact was proposed using, on

the one hand, an analysis from place name websites and, on the other hand, a geographic information system (GIS; Baray 2008). But territorial marketing can no longer be satisfied with meetings in the offices of public decision-makers. Many projects are now rejected by the local population, who feel that they should be consulted before any decision is taken. The role of social networks can then become interesting to interview this population and thus avoid situations that can quickly turn out to be conflicting (Barabel *et al.* 2010).

4.4. Conclusion

Store location problems have long been addressed by the scientific work of economists, geographers and marketers. Geomarketing has enabled a real evolution in the science of location and has improved decision-making regarding the location of points of sale. But it is also useful for managing trading areas and thus giving a real dynamism that the only decision, now more and more complex, to open a store made a little static, if not fixed. The extraordinary expansion of chains or rather networks of points of sale has also been fueled by the contribution of geomarketing techniques to achieve spatial coverage and coherence that make these networks more efficient. Today we can talk about real georetailing. Territorial marketing also benefits from geomarketing.

5

Spatial Marketing, Geolocation and Mobile Marketing

The link between the Internet and spatial issues has been established several times in this book. The development of information and communication technology (ICT) requires us to deepen this link which, with the smartphone, is undergoing a real revolution in the behavior of individuals and companies alike. Beyond the fascination that the microcomputer has aroused, especially since it is portable and now mobile in bags and pockets in the form of a smartphone or tablet, there is undoubtedly a relationship between the Internet and the notion of distance. This raises a number of questions: what does the transition from e-commerce to mobile commerce and then to mobile marketing mean? Is mobile marketing spatial? And if so, does this mobile spatial marketing have an impact on the management of space by organizations?

5.1. From e-commerce to mobile marketing

It is now clear that the digital phenomenon has radically transformed many aspects of human life, whether they concern economic, cultural or political life. Digital goods and services have emerged on markets and platforms, social networks are changing human relationships and governance must undergo major changes, not to mention the risks of cyber-attacks feared by all governments (Ash 2018). Of course, marketing is not immune to this evolution; on the contrary, doing a basic marketing course today is extremely different from a course you would have given 20 years ago. Marketing is undoubtedly the discipline among the management sciences that has evolved the most thanks to or because of technological change. Another discipline in the social sciences has undergone these changes with great force: geography. We are now talking about digital geography (Ash 2016). It has been shown that geography still has an influence even on Internet users' purchases

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according to different locations and price sensitivity, which has multiple strategic implications for firms in targeting customers (Jank 2005).

And when we talk about the Internet, another question arises: is the diffusion of the Internet well distributed throughout Europe? A study (Billon *et al.* 2008) shows that the insufficient spatial diffusion of the Internet is explained by GDP per capita (the poorer the country is, etc.), unemployment rate, human capital "stock" and population density. This was reflected at the time of the study, in terms of the percentage of Internet users in the total population, in high rates in Scandinavia, the Ruhr (Germany), the Netherlands and Belgium as well as in the London region, and in much lower rates in the Iberian Peninsula, South West France, South Italy and Greece. The Internet can therefore also be a source of inequalities if its dissemination is not ensured by the public authorities. They can also take advantage of it for land use planning and revitalization.

Although the subject has already been touched on, it is important to talk again about the link between the Internet, or more precisely here e-commerce, and distance, because this link is far from being overstretched as some have been able to advance it, especially with the arrival of smartphones.

This development should make it possible to better understand issues such as the evolution of spatial marketing, logistics and in particular click and collect.

5.1.1. *E-commerce and distance*

The arrival of the Internet is one of the major milestones of the third industrial revolution (Rochet and Volle 2015). And a question quickly emerged when the web was opened to the general public in the early 1990s[1]: didn't the arrival of the web lead to the death of distance, a subject already mentioned in Chapter 1 (Cairncross 1997)? In an attempt to answer this question, it is necessary to refer to an important concept of marketing: the distribution channel. The term "distribution channel" has been heavily criticized (Lusch 1979) and replaced by the term "marketing channel" which includes communication and distribution. This concept is reinforced in the literature because "marketing channels not only satisfy demand by providing goods and services in the right place, in the right quantity and quality and at the right price, but also stimulate demand through the promotional activities of its members (the producer sales force, sales offices, wholesale and retail traders)" (Stern and El Ansari 1988).

1 For more information: http://www.01net.com/actualites/les-15-dates-qui-ont-fait-le-web-615 826.html.

This lack of knowledge of the duality of functions (distribution and communication) may have led, according to some observers, to the bursting of the Internet bubble in the early 2000s: it may be one of the causes of this burst, at least of its onset, but certainly not the only one. However, voices had been raised to warn against the risk of not delivering on time (Neubome 2000). Indeed, many start-ups have offered to sell products via the Internet, and sometimes without measuring logistical needs: coordinating communication and distribution channels is the very basis of any development of activities on the Internet in order to make sure customers' expectations arising from communication match the delivery times through a physical distribution channel. Obviously, the problem only concerns tangible goods and not services such as travel or entertainment tickets or banking.

Questions were raised (Tranos and Nijkamp 2013) as to whether or not the Internet had led to the "end of geography", considering that the relationship between physical space and the Internet had not been sufficiently explored. The study is based on geographical economy and relational proximity. In terms of methodology, a database containing geocoded IP (Internet Protocol) links and spatial interaction models. The results indicate that in fact, physical distance and relational proximity have a significant impact on Internet infrastructure, thus highlighting the spatial nature of the Internet.

The data resulting from the Internet user's travels on the web are of course used in a very sophisticated way by e-commerce giants who can use this data to define a mapping of the paths on the web as a virtual space (Hui *et al.* 2009). At a time when the Internet is demonstrating its incredible potential to relocate and open up the company, this mention of the physical relationship between the prospect and the firm may come as a surprise. Indeed, since the modalities of connection to the global network are easy and the data transmission infrastructures efficient, selling and distributing digital service products as software by download is a task that can be carried out independently of metric distances and transport constraints. It is therefore possible to sell to all consumers, regardless of their location. Similarly, services such as the sale of transport or insurance services, translations, advice or even psychotherapy no longer necessarily require a physical place as long as consumer confidence is assured. On the other hand, distributing concrete and materialized products requires a physical relationship. While there is a virtual geography of supply and demand with definite consequences on business strategies (Reynolds 1997), physical space retains a hold on the commercial universe of firms. The Internet is a tool for deconstructing physical retail space by creating a virtual retail space, but it does not offer the possibility of permanently freeing oneself from physical space. And, if the arrival of the virtual network has led to a wave of announcements about the imminent end of physical retail spaces, it is clear that this is not the case. The global network has an undeniable impact on the physical space of stores and service locations, but it is rather an extension of the main mission of these physical retail

spaces. Indeed, rather than just being places of supply, they are increasingly becoming places of "social connection" (Aubert-Gamet and Cova 1999).

With regard to communication, it can be said that distance has disappeared, because now any transmitter can contact any receiver, to use the terms of the theory of communication (Shannon and Weaver 1949), at a lower cost with immediate possibilities of feedback than has never been possible before. On the other hand, the ease of distribution channels is far from comparable. Indeed, when communication is fast, and even very fast, the customer expects the delivery to be fast and the related services, such as after-sales service, to meet expectations. And there begin the difficulties generally related to land management. There has been caution towards distance selling (Volle 2000) insofar as customers prefer to buy products that do not come from too far away in order to keep control of them. To this can be added the possibility of maintaining the possibility of being able to either exchange or have the product repaired. This trust issue is crucial for the development of foreign sales, as sites from other countries do not offer the same sense of trust as domestic market sites (Shi *et al.* 2013). This is particularly true for countries like China whose sales sites suffer from a lack of credibility, although it is not always unjustified (Zhang *et al.* 2013). This phenomenon of lack of credibility also affects what is now called s-commerce or social commerce, in other words, commerce that passes through social network sites (Kim and Park 2013), sites used by Amazon and Starbucks (Huang and Benyoucef 2013). Proposals have been made to improve this situation, which is very detrimental to these transactional sites, through social recommendation mechanisms (Li *et al.* 2013). These difficulties are likely to increase as the possibilities of mobile commerce (m-commerce) land in the pockets and bags of Internet users, who thus become mobile users, where the s-commerce we have just mentioned is developing and who knows what will follow?

The possibility of a kind of electronic commerce, which could be called virtual commerce (v-commerce) (Maamar 2003), in which stakeholders, buyers, friends, sellers, are all in contact in a totally virtual 3D space, has been considered. All these technical solutions exist, all that remains is to dare to implement them. However, it should be remembered that consumers prefer channels with a great wealth of means of communication, such as a point of sale, or an average wealth using e-commerce, when the decision-making process is complex. On the other hand, they will be able to be satisfied with m-commerce when the decision-making process is simple (Maity and Dass 2014). Beyond these credibility problems, there are important spatial management issues concerning on the one hand logistics and on the other hand the control of market areas. As was mentioned in the Introduction, if this book is specialized in marketing, it may nevertheless have to deal with broader problems involving other management sciences. In addition, managing space in an organization can often involve dealing with not only commercial but also economic and/or legal difficulties.

5.1.2. *The first approaches to mobile marketing*

Traditional marketing literature is beginning to focus on what is known as mobile marketing after initiating the movement in the early 2000s (*Journal of the Academy of Marketing Science*), but articles are still too rare. It is better to look for articles published in a highly specialized electronic commerce journal or information systems management journals. However, calls for articles are beginning to appear, particularly in retailing, even if it is more a question of promoting ICT than truly mobile marketing (Grewal *et al.* 2017). Current trends in e-commerce research do not appear to be moving towards mobile marketing (Yang *et al.* 2017). But it is necessary to resume the evolution of mobile marketing, starting with the work on mobile commerce (m-commerce) and uber-commerce (u-commerce).

A special issue of the *Journal of the Academy of Marketing Science* published in 2002 had already seen very clearly where marketing would go under the pressure of new ICT tools when only the mobile phone existed at the time (the smartphone, in fact Apple's iPhone, did not appear until 2007). An article asked four questions about m-commerce (Balasubramanian *et al.* 2002):

– how do we conceptualize m-commerce and build a body of knowledge?

– how does m-commerce change the fundamental nature of time and space in the context of consumer behavior?

– how can m-commerce applications be categorized?

– how will pricing strategies change in the context of m-commerce?

Each of these questions is addressed in the following paragraphs. Then, another article in the same special issue of the *Journal of the Academy of Marketing Science* that develops the idea of "u-commerce" (Watson *et al.* 2002) will be reviewed.

We can legitimately ask ourselves what the relationship is between m-commerce and m-marketing. In fact, m-commerce represents the direct sale of retailers and industrials based on these mobile technologies, while m-marketing refers to all the necessary reflections and actions to be carried out by both retailers and industrialists in order to capture the attention and promote consumer sales. Being interested in m-commerce can only generate ideas among m-marketers who want to integrate mobile applications into their strategies. Let us go back to the four questions above.

5.1.2.1. *Conceptualizing m-commerce*

Several concepts are necessary for the understanding and conceptualization of m-commerce (Balasubramanian *et al.* 2002):

– one-way or two-way communication between individuals or between an individual and a device such as a mobile, or between mobiles;

– one of the individuals with his mobile must be in a mobile situation;

– the need to master communication in a mobile situation;

– the communication signals must be carried mainly by electromagnetic waves;

– the purpose of the communication, in terms of m-commerce, must necessarily lead to an economic result.

5.1.2.2. *The influence of m-commerce on time and space*

Time and space are two of the fundamental dimensions of economic activity. It is therefore normal to consider them when conceptualizing m-commerce. With m-commerce players, and unlike traditional located commerce with physical stores (brick and mortar), the notion of vendor location by Internet and mobile phone has little (or no) relevance (depending on the products) to analyze competition. Time and space are closely interrelated and "if time is the warp of economics, then space is its woof"[2] (Ohta 1993). This time-space interconnection is essential in m-commerce to ensure the flexibility of activities in time and space and must be able to be deployed at any time and in any place (ATAWAD). How can the interconnection of time and space be judged? Matrices of activities as a function of time and space were designed in a first case, without mobile technology, and in a second case, with mobile technologies (Balasubramanian *et al.* 2002). It is then shown that mobile technology imposes a certain flexibility while freeing up constraints.

5.1.2.3. *The different categories of m-commerce*

Eight categories of applications are designed for the development of m-commerce depending on whether they are sensitive or not to the user's location, whether time is considered a critical element or not and whether the activity is initiated or controlled by the user or the service provider (Balasubramanian *et al.* 2002):

– sensitive to location, critical time and initiation or control by the user: information, security, payment services to automatic product retailers, and logistics network management services;

– sensitive to location, critical time and initiation or control by the service provider: announcement of promotional coupons when the user is close to a store, verification of the location of a child if he or she is no longer in the prescribed area;

2 Warp and woof are textile terms referring to the two main components in weaving. The warp is the stationary set of threads through which the woof (or weft) is passed back and forth to weave the fabric (see https://en.wikipedia.org/wiki/Warp_and_weft).

– sensitive to location, non-critical time and initiation or control by the user: use of GPS to find your way around, information on nearby points of sale and the yellow pages;

– sensitive to location, non-critical time and initiation or control by the service provider: satellite mapping of farmers' fields and management services;

– insensitive to location, critical time and initiation or mastery by the user: request for information on stock exchange quotations, participation in virtual auctions;

– insensitive to location, critical time and initiation or control by the service provider: alert in the event of a change in share price, alert in the event of a promotion for air fares;

– insensitive to location, non-critical time and initiation or control by the user: access to a music library, download applications on the mobile phone;

– insensitive to location, non-critical time and initiation or control by the service provider: software update.

It is remarkable that in 2002, we could imagine what became commonplace many years later.

5.1.2.4. *Pricing strategies in m-commerce*

Pricing in commerce can be set according to the principle of minimum differentiation (Hotelling 1929) and this is still possible in m-commerce if we always imagine the consumer statically, for example at home and in physical shops. But, on the one hand, this individual may also be on the move, and on the other hand the products may be sent directly to him. The attraction of the mobile consumer near the physical store can be achieved by using prices that are necessarily lower than those charged at the point of sale, but with the possibility of selecting targeted consumers according to their profile. There remains the problem of contact with the consumer, which can now be solved by means of geofencing. But practicing this type of price discrimination can lead to difficulties, as these "special" prices can then be disseminated by the beneficiary and thus quickly become "normal" prices. In the case of home delivery of products purchased with a mobile phone, the price must be both more attractive than those of competitors and at least as attractive as that charged in the store (in the case of a "click and mortar" company, which is a retailer with a transactional site and one or more points of sale). It can therefore be seen that this initial conception of m-commerce is strongly aware of the importance not only of time aspects, but also of spatial and at the same time dynamic considerations in the case of mobile consumers. The stage is set.

5.1.3. *Mobile marketing*

The arrival of the smartphone in 2007 further upset the situation and enabled mobile marketing to develop. But what is mobile marketing or m-marketing? The expression is certainly ambiguous. Is it mobility marketing or marketing related to the use of tools such as smartphones or touch pads: probably both? One thing is certain: when we talk about m-marketing, it concerns marketing first and foremost, and therefore the company. However, m-marketing is linked to m-commerce, communication on smartphones and tablets, and m-shopping. For m-marketing, we can therefore use the definition of marketing: "a social and managerial process by which individuals and groups obtain what they need and want through creating, offering, and exchanging products of value with others" (Kotler 1991, p. 4) using, in any case, the m-marketing of a mobile or smartphone.

The difficulty of m-marketing for companies lies in the need to include in their pricing or communication strategies what some consider to be a new marketing channel (Kleijnen *et al.* 2007), namely the smartphone in addition to other electronic channels, the personal computer or the tablet, which consumers do not use in the same way and especially not in the same places and at the same times. However, all these channels must be coordinated in addition to the usual physical channels. It is no longer a question of practicing multi-channel with its silos, but of cross-channel, which consists in playing music across all these channels in a coherent way to serve the wishes of the customer while making this architecture profitable (Achabal *et al.* 2005). On the other hand, the consumer, as a smart or wise shopper, increasingly practices omnichannel, in other words, the possibility of using one or the other of these channels according to time and/or space convenience (Cliquet *et al.* 2013), which further reinforces the need for cross-channel.

The comparison between the various uses of the smartphone, personal computer or tablet leads us to consider the places and times of these uses, which are theoretically translated into the concepts of temporal and spatial convenience synthesized under the term ubiquity (Okazaki and Mendez 2013) giving rise to the idea of ubiquitous consumption (Cox 2004). These notions are summarized by ATAWAD (anytime, anywhere, any device) or even ATAWADAC (anytime, anywhere, any device, any content). A neologism has also emerged, "mobiquity", to emphasize that this ubiquity goes hand in hand with mobility. Shopping with a smartphone is very different from shopping without a favorite device. It is certainly a question of saving time, but above all of making better use of time, of moving from *chronos* to *kaïros*, an evolution applied to the return of local trade (Gahinet 2018). While *chronos* is a time that we measure, the *kaïros* is a time that we *feel*, especially as an opportunity that we must not let pass.

Companies, whether commercial or industrial, must keep in mind the three major strategic advantages of mobile marketing (Berman 2016):

– mobile marketing tools (tablets and smartphones) are always open, always connected, and always with the consumer, that is the actual or potential customer;

– it is necessary to be able to create offers linked to the location of the consumer (location-sensitive);

– you must be able to send him relevant and personalized messages and offers.

Therefore, the link between m-marketing and space marketing can clearly be seen. It can even be said that mobile marketing is largely spatial. Today, we speak of geolocation to more precisely refer to the marketing informed of the customer's location (location-aware marketing), which is not without its privacy problems (Heng 2011). Indeed, in order to know, on the one hand, the location of a customer and, on the other hand, his spatial habits, it is necessary to develop a technology capable of identifying the places where consumers are supposed to be and large spatial databases (Spann *et al*. 2016) to understand their behavior. This is how companies, especially in the retail sector, can offer location-based advertising to customers passing by a store. These location-based services (LBS) (Barnes 2003) have been criticized and sometimes replaced by context-aware services (CAS) (Schilit and Theimer 1994), in other words, by services that can take into account not only geolocation but also the context of the place in which the consumer is traveling.

5.2. Mobile spatial marketing

Marketing has never been very concerned with spatial considerations outside the traditional problems of locating points of sale. Now, with the arrival of smartphones, spacial marketing, which is developing thanks to the methods explained throughout this book, is also becoming mobile with the new geolocation technologies. We can therefore talk about mobile spatial marketing. Indeed, it is now possible to identify an individual through a system of GPS or Galileo global positioning when deployed and which will be more accurate than GPS, because it will be able to locate an individual with a margin of error of 4 meters, this accuracy can even be increased for those who agree to pay more. In order to fully understand the challenges of this geolocation, we need to develop several important concepts:

– proximity;

– mobility and geolocation;

– omnichannel;

– spatial databases.

5.2.1. *Proximity*

The idea of proximity has already been mentioned and even used many times in this book. This concept is at the heart of debates among both marketers and economists (Torre and Talbot 2018). In terms of m-marketing, it takes on a very particular resonance and is propelled into the center of the reflections: on the one hand, what is meant by the spatial, but also relational, proximity of the consumer, and on the other hand, what is proximity for a business? The same question could be asked of an industrialist, especially since he knows that he is further away from his customers than the retailers who are in some way a screen between him and the end consumers. The concept of proximity suffers from a real polysemy. Indeed, one can distinguish among the main options (Gahinet 2014):

– geographical (Pecqueur and Zimmermann 2002) or spatial (Bouba-Olga and Grossetti 2008) proximity, which may be permanent or temporary given the increasing mobility of individuals (Rallet and Torre 2004);

– temporal proximity (Baray and Cliquet 2007) often very relative depending on the individuals who evaluate it (Becker 1965; Croizean and Vyt 2015);

– functional proximity and access proximity (Bezawada *et al.* 2009);

– relational proximity (Bezawada *et al.* 2009), which can also be permanent or temporary given the increasing mobility of individuals;

– cultural proximity (Vant 1998), which is often used by companies (mainly Anglo-Saxon) to choose their first locations abroad;

– the material proximity which refers to the use values according to whether one is close or far away;

– immaterial proximity, which refers to the values of life according to whether one is near or far (Laut 1998), etc.

When targeting the mobility of individuals with smartphones and seeking to provide them with information, often in the form of promotional offers, it is necessary to use not only geographical proximity (of a point of sale) with the temporality problems associated with this mobility in space (Block 1998), but also functional proximity and proximity of access, sometimes with attention to intangible or even cultural proximity, in order to maintain relationship proximity. It can therefore be said that geographical and relational proximity are two of the pillars of promotional actions, essential for mobile marketing, designed to attract consumers either close to a place, close to a store, or ready to receive an offer from the store or a pure player, in other words from a web actor without a point of sale or from a click and mortar company.

5.2.2. *Mobility and geolocation*

The increasing mobility of individuals is a phenomenon that is rooted not only in the technical progress of transport modes, but also in the evolution of societies.

5.2.2.1. *Mobility and motility*

Transport modes underwent an unprecedented revolution in the 19th Century. King Charles X had ordered the maintenance and improvement of roads and highways in France in 1826 (Caron 1999). This would later result in giving this country one of the densest road networks in the world. The arrival of the railways not only transformed the way people traveled, but also changed the way they saw the world by expanding it, and above all accelerated the economic dynamics of the territories, not to mention the emergence of a new science, management, resulting from the need to coordinate the American rail network between competing companies (Chandler 1977). The 20th Century was the century of the automobile and the airplane. But we know how much transport modes influence purchasing behavior (Desse 2001): trying to impose public transport on consumers to make their purchases could lead to a negative impact on consumption. The evolution of societies and human relations has also increased the mobility of individuals. Paid holidays, the five-day week, and more recently the 35-hour week and the famous RTT (Reduced Working Time) have increased the desire for freedom and mobility (Viard 2011). A recent study by the consulting firm PricewaterhouseCoopers (PwC) showed that mobility will increase very strongly in the coming years. Many individuals would prefer personalized mobility opportunities, including "robotaxis", especially those referred to as millennials, which represent nearly half of the world's population: these people appear to be more or less indifferent on the one hand to vehicle performance and on the other hand to the brand (Bourassi 2019).

For a couple, finding a job in the same city has become a puzzle, resolved thanks to the "imperative" use of the car with its cortège of traffic jams that only an efficient and effective urban transport network can attempt to solve (Kaufmann 2011). This exacerbated mobility of *Homo Mobilis* (Gerber and Carpentier 2016) responds to the desire for ubiquity (see Chapter 2), born not only of natural curiosity and sometimes of the desire to appear to know everything, but also more recently of economic difficulties, family recompositions and of course the digital revolution. Not all individuals have the same mobility practices (Delage and Hani 2014), and it is important to differentiate them if we want to be able to meet their needs at the right time and in the right place (*kaïros*) (Gahinet and Cliquet 2018). We can add that they are not equal in terms of mobility and some hesitate or even give up when faced with an effort that seems insurmountable to them or an unbearable separation from their relatives, their culture, their past: we then distinguish mobility from motility as the ability to move either spontaneously or following stimuli. However,

this capacity cannot always be implemented for all kinds of reasons and lack of mobility remains a barrier and one of the major causes of social inequalities (Kaufmann *et al.* 2015).

With new mobile information and communication technology (ICT), we are talking about neo-nomadism based on physical, digital and mental mobility (Abbas 2011). This free or forced neo-nomadism transforms relationships between individuals and forces, among other things, a rethinking of urban planning.

But what about consumer mobility?

5.2.2.2. *Smartphone, mobile geolocation and shopping*

The mobile phone and even moreso the smartphone has made it possible to distribute GPS to the masses by making it easier for everyone to find their way around. It has been shown how to visit New York using a GPS and GIS-based method (Gong *et al.* 2012); it is becoming a new territorial marketing technique (see Chapter 4) to facilitate city visits, and some cities are already using it.

The use of the smartphone is increasing day by day to the point of sometimes becoming a real addiction (Darcin 2016). Its acceptance was modeled using a TAM (technology acceptance model) to which was added the perceived pleasure that has an impact on the intention to use it and the satisfaction after use that obviously only affects buyers (Agrebi and Jallais 2015). Other studies have shown, and this is of interest to marketers, that mobile ICT has improved the pleasure of shopping for some consumers who are also "mobile users", in other words, smartphone enthusiasts (Pantano and Naccarato 2010). There was a significant and positive link between the perceived pleasure and hedonic value of mobile shopping and between mobile shopping and the intention to use the smartphone for this type of shopping. From a more utilitarian point of view, there is a significant and positive relationship between spatial and temporal commodities and the utilitarian value of m-storage as well as between the user's (consumer) mastery of the technique and this utilitarian value, which in turn is in significant and positive relationship with this utilitarian value (Cliquet *et al.* 2013). The smartphone seems to add to the temporal convenience that had been shown to be associated with the intention to use the traditional mobile phone (Kleijnen *et al.* 2007), the spatial convenience associated with simple GPS use, although this statement needs to be confirmed by other studies. It can therefore be argued that m-storage can improve both utility and hedonic value for the consumer without posing difficulties in terms of cognitive effort, privacy concern and perceived risks (financial, technical or lack of performance; Cliquet *et al.* 2013).

But what is geolocation? Geographers define it as follows:

> A process [...] that automatically assigns a geographical position to an individual or object in real time through its connection to a network during a transaction or communication. (Joliveau 2011)

This concept, initially based on an extremely sophisticated American technology, GPS, makes it possible to track individuals' journeys as long as they keep their smartphone powered on. Such monitoring does not proceed without raising serious ethical issues. GPS is one of the fundamental elements of smartphone success, as it allows both individuals and sites to be geolocated, whether fixed (sites) or mobile (individuals). Understanding the concept of geolocation requires knowledge of the uses related to smartphone geolocation. Consumers mainly use geolocation for space applications such as, among others:

– assistance with walking and driving routes;

– shop and restaurant locators.

A comparative study between young Japanese and French people based on semi-structured interviews sought the "how and why" of the experiences of smartphone users, knowing that Japan has the highest penetration rate of these tools called "keitai" in Japan, where we speak of a real "keitai culture". A qualitative methodology was implemented to address this issue based on semi-structured interviews (Cliquet *et al.* 2014). Eight uses of the smartphone were identified during the interviews: in management of daily life, as a shopping companion, for geolocation, socialization (through social networks), professional productivity (agenda, emails, apps, etc.), information and fun. The results show that, in real life, the smartphone is mainly used as an information, communication and location tool. Some young Japanese and French people use the smartphone as a shopping companion in two ways: first, as a pre-purchase aid in the form of information about the product to buy and their price and possible store locations, and second, to take advantage of promotions, pay and write recommendations.

It therefore appears that the value of using a smartphone is all the greater because it meets the needs of the consumer at the right time, in the right place and in the right situation; there are many good reasons to make this tool an essential element of marketing, hence the development of mobile marketing.

The increasing use of smartphones by consumers in their shopping experience is forcing companies, regardless of the sector in which they operate, to develop applications related to geolocation. We have seen why. It remains to be seen how.

5.2.3. *Omnichannel*

The physical store has not yet surrendered its weapons in the face of the advance of digitalization and the pure players themselves tend to invest themselves in the physical stores to orient themselves towards click and mortar. The reason is not only the desire to strengthen its image and brand capital with the help of real visible points of sale, nor to be able to sell everyday products, because the physical stores are still the best (Brynjolfsson *et al.* 2013). Indeed, consumers are increasingly making their shopping trips through an increasing number of marketing channels, or rather points of sale for these channels: first, through traditional retail in stores or any form of real point of contact where the customer can experience and enjoy its hedonic value; secondly, through advice from a qualified salesperson who can guide them in their decision-making process and allow them to obtain their product immediately (Huré *et al.* 2017); thirdly, through e-commerce at home on his computer or m-commerce using his smartphone or tablet (Melero *et al.* 2016). This form of experience is called "omnichannel" (Fulgoni 2014).

It is not always easy, in the discourses of researchers (Beck and Rygl 2015; Ailawadi and Farris 2017) as in those of practitioners, to distinguish between multi-channel, cross-channel and omnichannel. While multi-channel is generally related to the idea of separate and unconnected silos, here cross-channel is considered as the organization that connects all channels in a cost-effective way (Achabal *et al.* 2005), which is obviously difficult to achieve. It should be recalled that Amazon, which for a long time managed only one channel, has only been profitable for two years since its creation in 1994. We can then understand the difficulties of industrial, commercial or service companies, which must manage or target one or more networks of points of sale while ensuring an efficient presence on the Internet through various media: computer screens, tablets and smartphones, all using more or less different computer techniques. In particular, the tablet and smartphone are equipped with GPS. Local authorities are not to be outdone, as they must now offer m-services (mobile services on smartphones) in order to improve their reputation and attract tourists; we are now even talking about m-tourism (Bourliataux-Lajoinie and Rivière 2013).

The omnichannel is considered here as specific to consumer activity to describe shopping trips that can use different marketing channel points of sale. The company must then implement a cross-channel organization capable of responding to this omnichannel desire. In order to provide the consumer with the best possible support, if at all, the company must not only be able to manage its offers on all media, but also to know as precisely as possible the consumer's characteristics, tastes and purchasing habits while guiding him/her through geolocation applications in order to show him/her the stores close to his/her position at the time the message is received. The idea of a "phygital" store (Fornerino *et al.* 2018) is emerging, in other words, both physical and digital, where the customer's experience begins before the trip,

continues during the visit to the point of sale and is accompanied at the end by relationships through social networks with the brand and/or fascia. All this forms the customer's omnichannel experience and is based as much on the in-store experience as on the follow-up using the smartphone.

5.2.4. *Spatialized Big Data databases and their risks*

Without claiming to develop techniques related to "spatialized Big Data" databases, a few remarks are necessary to fully understand that, if the complicity between trade and mobility makes it possible to better understand individuals' consumption patterns (Delage and Hani 2014), monitoring consumers to make them promotional offers may encounter technical, financial and legal difficulties.

Technically, designing a database of "spatialized Big Data" requires know-how that only highly specialized organizations can master. These are not spatial databases for map design (Servigne and Libourel 2006), but "spatialized data" databases built from the storage of data related to consumer spatial behavior and retrieved from various sources such as retailer loyalty cards, website navigation data, or consumer paths recorded from their smartphones, etc. This allows huge amounts of data (Big Data) to be obtained that are spatialized to the extent that these consumers accept to receive information during their shopping trips or peregrinations. Here again, it takes a very strong skill to design these databases and above all to have a data recovery system as is the case with Internet browsers. Indeed, the analysis of spatial data can only be carried out if the data collected are homogeneous, the problem being identical to that of GIS (Getis 1994). If the company, whether industrial or commercial, wants to attract a consumer located at a given time in a place near a store, it must define a distance between this potential customer and the point of sale, in other words a perimeter around this point of sale: this is called "geofencing". This operation is not always so simple and can involve geomarketing and the choice of a gravity model (Streed *et al.* 2013). Good geo-referencing then makes it possible to target consumers using located advertising. The implementation of a pricing policy can then attract regular customers as soon as they pass by the store, provided it meets consumer expectations, hence the need to work from "spatialized Big Data" collected by smartphone applications; these data can also be used to help retailers better locate their stores (Spann *et al.* 2016).

Financially, the operation is extremely expensive and that is why firms prefer to partner with these data providers, as Auchan did in China with Alibaba and Walmart in the United States with Google (Chateau 2017). But any company can start building its own database of "spatialized Big Data" by being well aware of the technical and financial risks.

There is a risk that must also be taken into account: the legal risk. Indeed, consumers are beginning to realize that these "spatialized Big Data" are dangerous to their privacy. Location-aware marketing systems are openly criticized by consumers (Xu *et al.* 2011). But curiously, these same individuals can use the data they provide through smartphone apps as a real bargaining chip; firms are advised to use the smartphone as a "concierge" and not as a "stalker" (Ghose 2017, p. 125). Another risk, both technical and legal, may arise if the store decides to allow its customers to use mobile payment (m-payment). The customer has to pay with his smartphone (Slade *et al.* 2013). Various techniques have been proposed (Crowe *et al.* 2010), some of which are based on customer geolocation (NFC for Near Field Communication) (Kahn 2012). Some are already being used, with the complicity of banks, to carry out this operation, which is always delicate for consumers who want to avoid having their personal data distributed at all costs, especially when they are financial (Park *et al.* 2019).

Companies that collect and sell this considerable amount of consumer data can develop competitiveness strategies and are sometimes referred to as info-firms (Dolfsma and Van der Eijk 2018). These strategies have been insufficiently studied if not forgotten, and American and now Chinese firms are in a strong market position, and a considerable number of companies now depend on their Big Data.

5.3. Mobile space marketing and space management by organizations

While mobile spatial marketing is making life easier for consumers in their shopping experience, it tends to accentuate the difficulties already experienced by companies with the development of e-commerce: it requires seamless logistics, expecting to receive orders at any time and from anywhere, especially for the click and collect or drive system, and managing the possible overlap of shopping areas between franchised stores and between these stores and the franchise's transactional sites. But it also offers unique opportunities to develop by differentiating oneself.

5.3.1. *Space marketing and logistics: the "last mile" issue*

Given the speed with which firms must react to consumers' omnichannel paths, how can companies today reasonably separate marketing and logistics? Logistics has become so important in some companies that work on the Internet that it has gradually become their main activity. Major carriers such as DHL, UPS, FedEx, ChronoPost, Geodis, etc. have noted that the growth in their turnover has for several years been due more to their deliveries to individuals than to companies (Boyer *et al.* 2009). The crucial link between the consumer's order placed over the Internet and the delivery of the product to that customer is often referred to as the "last mile"

problem (Esper 2003). Regardless of the distance to deliver a customer, or for the customer to pick up a product, the "last mile" problem arises everywhere in terms of costs, which can be very high (Scheibe *et al.* 2006), and also in terms of the carbon footprint for distribution companies and consumers. The most critical factors are the number of items purchased per shopping trip for customers or items delivered for retailers and the need to group activities with shopping or deliveries (Edwards *et al.* 2010). This problem is one of the greatest challenges of e-commerce (Punakivi *et al.* 2001) and m-commerce today.

The solutions are based on a logistics report (as up to date as possible), dematerialization and information exchange, the strength of an existing logistics network and physical contact points (Lee and Whang 2001). The aim is to reduce costs and the carbon footprint. The pooling of deliveries for reasons of both economic and ecological efficiency (Durand *et al.* 2013) shows that these objectives are not incompatible. Tracking deliveries with platforms accessible to mobile communication technologies makes it possible to stay in touch with the customer wherever he or she is, with the possibility of picking up the item at a dedicated kiosk, in a store (Kyo 2012), or in a closet open to the outside world, allowing the delivery person to leave the items in the absence of the homeowner (Punakivi *et al.* 2001), as already exists in real estate programs in the London region.

Another solution is to integrate a GIS into a decision support system to solve the "last mile" problem or to introduce a decision support system into a GIS, which is technically simpler. A spatial decision support system has been developed with wireless communication expertise, a topography of the area to be studied, its demographics and the willingness to pay for services to help logisticians locate equipment to inform customers as quickly as possible to maximize profits or minimize "last mile" costs (Scheibe *et al.* 2006). Finally, when expanding the logistics system, it is important not to neglect the possibility for the customer to return the product, and therefore the company must organize reverse logistics. This is often done through collection and delivery points (Weltevreden 2008) and has become one of the main activities for product returns after Christmas.

5.3.2. *Click and collect or drive*

The major food retailers have developed a system called "drive" in France (click and collect; see Chapter 4). Prices are generally the same as those in stores. "Drive" is considered to involve the participation of the customer (Marouseau 2013) in a new service model (Eiglier and Langeard 1987) while the e-market delivers to the home. However, if the customer's participation consists in picking up his goods at the store, there is nothing new. On the other hand, in the self-service store, the customer is forced to do everything himself, push his cart, look for the products, put

them in the cart, go to the checkout to pay. With "drive", it is the retailer who does the work again and this has consequences. Concerning home delivery, which could be an alternative to "drive", this system has never been profitable (Marouseau 2013) even if it is still used by retailers in some cases. In large urban centers, traffic is such that scheduling a time slot to satisfy a customer who is at home at the time is a challenge despite efforts to organize this schedule (Agatz *et al.* 2011). However, proposals for logistics systems have been put forward for cities such as Hamburg or Beijing based on maps and analyses of both distance and population and order density (Huang *et al.* 2018).

It was a British commercial firm, Argos, a subsidiary of Home Retail Group, that opened the first contact points for its click and collect system in the early 2000s. But the real pioneer, and the first one who really succeeded, was the British retailer Tesco (Cochoy 2011). In France, it was Auchan who first embarked on this adventure with Chronodrive, but without any link with the group's stores. These "drive" warehouses are "remote" because they are not located near a store, otherwise we speak of adjacent "drives" when they are installed near a store. The E. Leclerc distribution centers then took advantage of this innovation by opening their first "drive" in Toulouse in 2007. Since then, they have continued to cover French territory; their competitors have followed and today there are more than 4,500 "drives" in metropolitan France, much more than hypermarkets, some of these "drives" being adjacent and others deported. Not all customer segments are interested in "drive", far from it, and not all trading areas allow a *priori* to consider a sufficient market (Picot-Coupey *et al.* 2009). It seems that this new commercial formula is mainly to the taste of young women with young children. After a period of skepticism on the part of European retailers, there has been a development of the "drive" in Germany (Real) and Italy (Unicoop Firenze) in addition to the British, Irish and French examples (Rittinger and Zentes 2012).

But the system is not cost-effective (Vyt *et al.* 2017) and there are several reasons for this. The opening of a "drive" requires the installation of an automatic product search system costing between 1 and 3 million euros. The interested customer segments are relatively limited. And above all, if the self-service system, developed by Clarence Saunders in 1916 for the retail trade, was a real revolution (Thil 1966), it was because it made it possible to transfer most of the work into the hands of the customer, and thus to increase productivity for the retailer. However, if the trader does the work of researching the products and preparing the "box" or cardboard, it is the consumer who recovers the productivity and retailer the costs. How then can this service be made profitable with prices similar to those charged in the store (adjacent or not)?

However, if it seems difficult to make this type of operation profitable for the retailer, it is a service that he can no longer neglect at the risk of losing customers

who are often very regular: and some major retailers such as Carrefour have paid a high price for this negligence. We can then question the usefulness of these "drives". An analysis of the spatial coverage of these sales units shows, using a relative entropy measure (see Chapter 4), that French retailers have not made any territorial gains (Vyt *et al.* 2017). In fact, in addition to offering a new service to meet a specific need of a particular clientele, some French retailers use their "drives" as a tactical weapon against their competitors: we see E. Leclerc drives installed in front of Carrefour or Intermarché stores, whereas we know that these retailers act as sworn enemies. Mimicry is also one of the main reasons for this type of equipment: "My competitors are opening some, why not me?"

But the real question that remains to be answered is this: how to get the consumer back in the store once he has tasted and enjoyed the "drive" service? There is a great risk that the store will become a kind of showroom or exhibition store, hence the expression of danger of "showroomization" of points of sale. ROBO (research online buying offline; Kalyanam and Tsay 2013) could turn around and become research *offline* buying *online* and make the store obsolete in its configuration. This is why chains have decided to transform some of these stores into showrooms and to deliver the customer to his home once he has made his choice, often on terminals. The promise is as follows: "A 10% price reduction with fast delivery." And in some countries, there is a struggle to deliver within the hour; we are once again confronted with the problem of home delivery and its corollary, the "last mile".

An obvious advantage in some retail sectors is that stores display more products in the same sales area, as only one reference is offered per product, which greatly increases the width of the assortment. With the smartphone, the retailer can no longer be satisfied with the above: the customer must be able to place his order using his mobile ICT tool, just as he must be able to track his order to its destination, which requires flawless logistics to ensure that the product is received immediately by the customer, a condition considered essential (Huré *et al.* 2017).

5.3.3. *Cannibalization and overlapping of sales areas*

Cannibalization of sales is a typical problem of spatial marketing management, even if this phenomenon also concerns remanufactured products, in other words products that have undergone some changes and whose sales cannibalize those of the previous version of the same product (Guide Jr. and Li 2010). In terms of spatial marketing, we are entering into a classic problem of commercial networks, whether they are networks of salesmen or retail and service points of sale. Cannibalization of sales is a risk for all companies that operate in a given territory. Indeed, if the sales areas of the sellers are poorly defined spatially, or if the points of sale are located

too close to each other, two salespeople or two stores may have a part of the clientele in common. This results in, on the one hand, a cannibalization of sales, that is the same customers are targeted by salespeople of the same company or stores of the same brand, and on the other hand, in the case of a network of stores, an overlap of trading areas which, in the context of a franchise network, may lead the franchisee to bring an action against the franchisor if the franchisee benefits contractually from a territorial exclusivity zone.

Cannibalization of sales concerns all companies using a sales force composed of salesmen or medical representatives for the pharmaceutical industry. The arrival of the Internet often leads to changes that are often very poorly perceived by the sales force. This translates into an increased sense of insecurity in the work of salespeople, as the Internet cannibalizes their business and customer relationships, which has a negative influence, especially among younger employees, on their efforts, satisfaction and performance at work (Sharma *et al.* 2010). The use of relational capital, that is more trust, mutual respect and reciprocity, helps to mitigate these effects (Kale *et al.* 2000). However, as we have seen (see Chapter 3) on the pharmaceutical market, the situation is deteriorating very quickly for these medical representatives who are competing with doctors consulting laboratory websites, and the threat of dismissal is real (AFP 2015).

As far as retail and service points of sale networks are concerned, the problem of cannibalization of sales is also present.

Implementing new points of sale is always a risky and difficult decision, especially since we are now talking more about restructuring networks, in other words, closing points of sale rather than opening them. Models show a decrease in cannibalization as distance increases; for example, in the United States, it has been estimated that when the distance between two stores increases by one mile, sales lost due to cannibalization decrease by 28% (Pancras *et al.* 2012). But these problems are very local. Spatial coverage models (Daskin 1983) offer a solution to limit cannibalization by preventing stores in the same network from covering their trading areas. With the Internet, the whole network is affected, because opening a transactional site is like setting up stores everywhere. And all the sales units in the network are impacted.

In a branch network, the problem is legally less significant: it is up to the network manager to react or not, if he considers that the overlap of trading areas is a way to stimulate store managers.

The issue is much more sensitive when dealing with a franchised network, whether it is a pure franchise network or a plural form network, in other words a network composed of franchised units and own units. While models have been

designed, based on gravity models, to avoid conflicts in franchised networks (Kaufmann and Rangan 1990) and cannibalization of sales in these same networks (Ghosh and Craig 1991), the issue of overlapping trading areas, called encroachment, with the appearance of sales websites is of an even more complex nature. This encroachment problem has been developed both legally (Emerson 2010) and managerially (Vincent 1998; Kalnins 2003). But it only concerned situations where one franchisee was located too close to another, or where the franchisor opened a branch too close to a franchisee. With the Internet and transactional sites, the issue is much more important because, all of a sudden, the whole network is impacted; here we are referring to e-encroachment. Research in the United States (Kaufmann *et al.* 2010) has shown that, since most networks are mixed, the higher the proportion of franchisees in a network, the less likely the franchisor is to launch its sales website: this trend is statistically significant in the United States, but also in France (Cliquet and Voropanova 2016). This situation has prompted the networks, most of which are franchised, to devise strategies to improve acceptance of the opening of transactional sites by franchisees. The solutions to these difficulties of encroachment are diverse. Food retailers have chosen the drive in France. Other networks, for example in clothing, preferred to do the following (Cliquet and Voropanova 2016):

– ask for the consumer's address, when he does not have a loyalty card, in order to be able to assign the sale on the franchisor's transactional site to the franchisee, or to the nearest directly operated store;

– involve their franchisees by sending the product to the point of sale closest to the consumer's home and thus immediately credit the sale to that franchisee or employee manager if the store belongs to the franchisor; this also allows the consumer to visit the store.

The problem becomes more acute when mobile consumers buy, on the franchisor's sales site, a product seen in a franchisee's store, especially if that store is far from the customer's home. We can immediately see the role of pricing policy knowing that a franchisee is an independent trader on whom it is illegal to impose a price, but if his own is higher than that of the franchisor? But what franchisor wants to prevent its franchisees from doing business?

We have seen how the arrival of the Internet has disrupted not only the spatial behavior of consumers, but also retailers' responses and how spatial issues can impact marketing management, especially in terms of space organization, and in particular when allocating sales areas to salespeople or franchisees. But the smartphone is bringing about a real revolution in shopping practices and the management of retail activities. This tool now offers a real concierge service for all its users. He can inform brands and retailers of where the user is, who is also a potential buyer, where he wants to go, where he has just left and everything nearby,

not to mention who he is, what will happen, what he needs, what he has already bought, what he is interested in and what he is responding to (Ghose 2017); some retailers who have deployed both loyalty and credit cards even know his income.

5.4. Conclusion

The arrival of mobile technologies (smartphone and touch tablet: mobile ICT) is revolutionizing both shopping methods and customer marketing management. One of the main consequences is the exponential development of a Big Data market and geomarketing cannot remain indifferent. Interactive maps will have to take into account the data provided by smartphones. This is an unprecedented opportunity to reshuffle the cards and create new business models and perhaps new growth (Rochet and Volle 2015), even if it is also a source of problems for many companies that have to adapt their methods and organization to this new situation. But the domination of a few very large American and Chinese companies, sometimes called info-firms (Dolfsma and Van der Eijk 2018) over these Big Data could have economic consequences not only on the spatial management of firms' marketing, but also on consumers' private lives. Real vigilance and dynamism for healthy and efficient reactions will be necessary.

Conclusion

This book was initially intended to develop the field of spatial marketing. At the end of this development, it can be argued that spatial marketing includes several sub-domains:

– geomarketing, which is based on geomatics mapping techniques;

– localized marketing, which aims to adapt offers in different areas;

– strategic spatial marketing, which not only strengthens the elements of the marketing mix (geomerchandising, geopricing, geo-advertizing, etc.) but also increases the strategic capacity of decision makers by helping them to better understand the characteristics of local markets as well as national markets compared to others;

– georetailing, which does not only include store location issues, but also point of sale management in increasingly turbulent environments;

– location-aware marketing, which integrates issues related to the spatial behavior of consumers equipped with mobile ICT (smartphone or tablet) and in a mobile situation.

The advantages of this spatial (or spatialized) marketing, in other words, taking into account space, are as follows:

– greater precision in market analysis at a time of increasing competition;

– a significant increase in the capacity of decision-makers to adapt their strategies to increasingly changing environments through dynamic monitoring;

– an ability to control not only the location of physical units (factories, stores, agencies, etc.), but also that of individuals in mobility.

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For years, geomarketing has been able to constitute the main part of spatial marketing by visualizing the space of physical entities such as factories or stores. Moving forward, geolocation techniques that facilitate the tracking of individuals and vehicles give it a dynamic that it lacked. This extensive spatial marketing, which can be called now location-based marketing, is not free from criticism and must strive to respect the privacy of individuals, even if they sometimes have paradoxical attitudes in this area.

References

Aaker, D., Jones, M. (1971). Modeling store choice behavior. *Journal of Marketing Research*, 8, 38–42.

Abbas, Y. (2011). *Le néo-nomadisme*. FYP, Limoges.

Aboolian, R., Berman, O., Krass, D. (2008). Optimizing pricing and location decisions for competitive service facilities charging uniform price. *Journal of the Operational Research Society*, 59(11), 1506–1519.

Achabal, D.D., Gorr, W.L., Mahajan, V. (1982). MULTILOC: A multiple store location decision model. *Journal of Retailing*, 58, 5–25.

Achabal, D.D., Kalyanam, K., Chu, J., Bladgett, M. (2005). Cross-channel optimization. Document, IBM Institute for Business Value/IBM Global Services, New York.

Adams, J.S. (1963). Towards an understanding of inequity. *Journal of Abnormal and Social Psychology*, 67, 422–436.

AFP (2015). Les visiteurs médicaux, une profession menacée, contrainte d'évoluer [Online]. *L'Express*, 17 December. Available at: http://lexpansion.lexpress.fr/actualites/1/actualites/les-visiteurs-medicaux-une-profession-menacee-contrainte-d-evoluer_1746698.html.

Agatz, N., Campbell, A., Fleischmann, M., Savelsbergh, M. (2011). Time slot management in attended home delivery. *Transportation Science*, 45(3), 435–449.

Agrawal, J., Kamakura, W.A. (1999). Country of origin: A competitive advantage?. *International Journal of Research in Marketing*, 16, 255–267.

Agrawal, M. (1995). Review of a 40-year debate in international advertising, Practitioner and academician perspectives to the standardization/adaptation issue. *International Marketing Review*, 12(1), 26–48.

Agrebi, S., Jallais, J. (2015). Explain the intention to use smartphones for mobile shopping. *Journal of Retailing and Consumer Services*, 22, 16–23.

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Ailawadi, K.L., Farris, P.W. (2017). Managing multi- and omni-channel distribution: Metrics and research directions. *Journal of Retailing*, 93(1), 120–135.

Albert, W.S., Golledge, R.G. (1999). The use of spatial cognitive abilities in geographical information systems: The map overlay operation. *Transactions in GIS*, 3(1), 7–21.

Alcaide, J.C., Calero, R., Hernandez, R. (2012). *Geomarketing: Marketing territorial para vender y fidelizar más*. Libros Profesionales de Empresa, Madrid.

Alderson, W. (1965). *Dynamic marketing behavior: A functionalist theory of marketing*. Richard D. Irwin, Homewood.

Allemand, S. (2001). Les enjeux des mobilités quotidiennes. *Sciences Humaines*, June, 46–62.

Alpert, M. (1971). Identification of determinant attributes: A comparison of methods. *Journal of Marketing Research*, 8(2), 184–91.

Amaduzzi, S. (2011). *Geomarketing. I sistemi informativi territoriali (SIT-GIS) a supporto delle aziende e della pubblica amministrazione*. EPC Editore, Rome.

Amar, G. (2010). *Homo mobilis. Le nouvel âge de la mobilité, éloge de la reliance*. FYP, Limoges.

Amblard, F., Phan, D. (2006). *Modélisation et simulation multi-agents : applications pour les Sciences de l'Homme et de la Société*. Hermes-Lavoisier, Paris.

Amouche, N., Zaccour, G. (2009). A shelf-space-dependent wholesale price when manufacturer and retailer brands compete. *OR Spectrum*, 31, 361–383.

Anderson, E.E. (1986). Image differentiation and locational proximity among retail firms. *Managerial and Decision Economics*, 7, 63–68.

Anderson, S.P., Palma (de), A. (1988). Spatial price discrimination with heterogeneous products. *Review of Economic Studies*, 55(4), 573–592.

Anderson, S.T., Kellogg, R., Salant, S.W. (2018). Hotelling under pressure. *Journal of Political Economy*, 126(3), 984–1026.

Andrieu, F., Badot, O., Macé, S. (2004). Le West Edmonton Mall : un échafaudage sensoriel au service d'une cosmogonie populaire?. *Revue Française du Marketing*, 196(1), 63–86.

Aoyama, Y. (2007). Oligopoly and the structural paradox of retail TNCs: An assessment of Carrefour and Wal-Mart in Japan. *Journal of Economic Geography*, 7(4), 471–490.

Applebaum, W. (1965). Measuring retail market penetration for a discount food supermarket: A case study. *Journal of Retailing*, 41(2), 1–15.

Applebaum, W. (1966). Methods for determining store trade areas and market equilibrium. *Journal of Marketing Research*, 3(2), 127–141.

Applebaum, W. (1968). *Guide to Store Location Research*. Addison-Wesley, Boston.

Applebaum, W., Cohen, S. (1961). The dynamics of store trading areas and market equilibrium. *Annals of the Association of the American Geographers*, 51(1), 73–101.

Arnold, S.E. (2009). Google and Salesforce: Composite applications for better enterprise lift. *KM World*, July-August, 18–20.

Arzoumanian, M. (2005). Why retail is rising? *Official Board Markets*, 81(19), 1–8.

Ascher, F. (2000). *Ces événements nous dépassent, feignons d'en être les organisateurs*. Éditions de l'Aube, La Tour d'Aigues.

Ash, J., Kitchin, R., Leszczynski, A. (2016). Digital turn, digital geographies? *Progress in Human Geography*, 42(1), 25–43.

Ash, J., Kitchin, R., Leszczynski, A. (2018). *Digital Geographies*. Sage Publishing, London.

Aubert-Gamet, V., Cova, B. (1999). Servicescape: From modern non-places to postmodern common places. *Journal of Business Research*, 44, 37–45.

Aubril, S. (2014). La loi Duflot sur l'aménagement du territoire encadrant l'urbanisme commercial est adoptée. *LSA*, 21 April.

Aurier, P. (1991). Recherche de variété : un concept majeur de la théorie en marketing. *Recherche et applications en Marketing*, 6(1), 85–106.

Badot, O., Lemoine, J.-F. (2013). Du paradigme dichotomique de l'expérience d'achat au paradigme ubiquitaire. *Recherche et applications en Marketing*, 28(13), 3–13.

Bailly, A. (1984). *Les concepts de la géographie humaine*. Masson, Paris.

Balasubramanian, S., Peterson, R.A., Jarvenpaa, S.L. (2002). Exploring the implications of m-commerce for markets and marketing. *Journal of the Academy of Marketing Science*, 30(4), 348–361.

Banos, A., Lang, C., Marilleau, N. (2015). *Agent-Based Spatial Simulation with NetLogo 1*. ISTE Press, London, and Elsevier, Oxford.

Baños, R., Wandosell, G., Parra, M.C. (2016). Web GIS to enhance relational capital: the case of general merchandise retailers. *Journal of Knowledge Management*, 20(3), 578–593.

Barabel, M., Mayol, S., Meier, O. (2010). Les médias sociaux au service du marketing territorial : une approche exploratoire. *Management & Avenir*, 32, 233–253.

Baray, J. (2003a). Optimisation de la localisation commerciale : une application du traitement du signal et du modèle p-médian. *Recherche et applications en Marketing*, 18(3), 31–44.

Baray, J. (2003b). An application of signal processing combined with the p-median model for the location of micro-facilities: An application to the facility locations of a subway station in Paris?. In *Congrès INFORMS*. Atlanta.

Baray, J. (2008). Marketing territorial : appréciation du rayonnement international des villes et des régions du monde par le nombre de leurs références sur les moteurs de recherche web. *Revue des Sciences de Gestion*, 234, 27–35.

Baray, J. (2010). *Géomarketing : zones de chalandise & méthodes d'implantation*. EEEA, Paris.

Baray, J., Cliquet, G. (2007). Delineating and analyzing trade areas through morphological analysis. *European Journal of Operational Research*, 182(2), 886–898.

Baray, J., Cliquet, G. (2013). Optimizing the maternity locations in France: A dual maximum covering/p-median hierarchical model. *Journal of Business Research*, 66(1), 127–132.

Baray, J., Lestrade, S. (2014). Commerce et modélisation d'implantation : optimization des localisations commerciales, théories et nouveaux développements pratiques. In *Le commerce dans tous ses états : espaces marchands et enjeux de société*, Gasnier, A., Lemarchand, N. (eds). Presses Universitaires de Rennes, Rennes.

Baray, J., Cliquet, G., Pelé, M. (2014). Geomarketing mix optimization using a fuzzy spatial and multiscale segmentation. In *World AMS Conference*. Lima.

Barkholz, D. (2015). Geofencing identifies shoppers' locations. *Automotive News*, 89, July.

Barnes, J.S. (2003). Known by the network: The emergence of location-based mobile commerce. In *Advances in mobile commerce technologies*, Lim, E.-P., Siau, K. (eds). Idea Group, Hershey, 171–189.

Barnes, T., Christophers, B., Newman, K., Peck, J., Poon, J., Yeung, H. (2018). Rediscovering space: Environment and Planning enters its second half century. *Environment and Planning A: Economy and Space*, 50(1), 3–4.

Barry, C.L., Bandara, S., Arnold, K.T., Pintor, J.K., Baum, L.M., Niederdeppe, J., Karaca-Mandic, P., Fowler, E.F., Gollust, S.E. (2018). Assessing the content of television health insurance advertising during three open enrollment periods of the ACA. *Journal of Health Politics, Policy and Law*, 43(6), 961–984.

Basaille-Gahitte, A., Mathieu-Nicot, B. (1991). Le modèle de Hotelling : contributions et limites. Application au cas où les variables stratégiques sont les localisations et les prix. Working document, Institut de mathématique économique, Université de Bourgogne, Dijon.

Bass, F. (1969). A new product growth for model consumer durables. *Management Science*, 15(5), 215–227.

Bass, F.M., Krishnan, T.V., Jain, D.C. (1994). Why the bass model fits without decision variables. *Marketing Science*, 13(3), 203–223.

Basset, G. (2018). L'urbanisme commercial : un édifice complexe et instable. In *Retailing et localisation : une approche multidisciplinaire*, Perrigot, R. (ed.). Presses Universitaires de Provence, Aix-en-Provence.

Basu, A.K., Mazumdar, T. (1995). Using a menu of geographic pricing plans: A theoretical investigation. *Journal of Retailing*, 71(2), 173–202.

Baudin, G. (2007). De la proximité comme analyseur. *L'Homme et la Société*, 165–166, 117–132.

Baumol, W.J., Ide, W. (1956). Variety in retailing. *Management Science*, 3(1), 93–101.

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

Baye, M.R., Morgan, J., Scholten, P. (2004). Price dispersion in the small and in the large: Evidence from an internet price comparison site. *Journal of Industrial Economics*, 52(4), 463–496.

Baynast (de), A., Lendrevie, J. (2014). *Publicitor*. Dunod, Paris.

Beck, N., Rygl, D. (2015). Categorization of multiple channel retailing in multi-, cross-, and omni-channel retailing for retailers and retailing. *Journal of Retailing and Consumer Services*, 27(4), 170–178.

Becker, G.-S. (1965). A theory of the allocation of time. *The Economic Journal*, 75(299), 493–517.

Belaud, S. (2019). Les dessous du GPS cerebral [Online]. *La lettre no. 47 du Journal en ligne du CNRS*. Available at: https://lejournal.cnrs.fr/newsletters/la-lettre-ndeg47.

Bellanger, F., Marzloff, B. (1996). *Transit. Les lieux et les temps de la mobilité*. Éditions de l'Aube, La Tour-d'Aigues.

Benabdallah, M., Jolibert, A. (2013). L'acculturation : influence des sous-cultures d'origine et de la distance culturelle. *Décisions Marketing*, 72, 179–205.

Bergadaà, M. (1988). Le temps et le comportement de l'individu (première partie). *Recherche et applications en Marketing*, 3(4), 57–72.

Bergadaà, M. (1989). Le temps et le comportement de l'individu (deuxième partie). *Recherche et applications en Marketing*, 4(1), 37–55.

Bergadaà, M., Del Bucchia, C. (2009). La recherche de proximité par le client dans le secteur de la grande consommation alimentaire. *Management & Avenir*, 21, 121–135.

Berman, B. (2016). Planning and implementing effective mobile marketing programs. *Business Horizons*, 59, 431–439.

Berry, B.J.L. (1967). *Geography of Market Centers and Retail Distribution*. Prentice Hall, Upper Saddlle River.

Bertalanffy (von), L. (1968). *General System Theory*. George Braziller, New York.

Bertrand, J. (1883). Théorie des richesses. Recension de "Théorie mathématique de la richesse sociale" par Léon Walras et de "Recherches sur les principes mathématiques de la richesse" par Augustin Cournot. *Journal des Savants*, September, 499–508.

Beswick, C.A., Cravens, D.W. (1977). A multistage decision model for salesforce management. *Journal of Markeling Research*, 14(2), 135–144.

Beugelsdijk, S., Kostova, T., Kunst, V.E., Spadafora, E., Essen (van), M. (2018). Cultural distance and firm internationalization: A meta-analytical review and theoretical implications. *Journal of Management*, 44(1), 89–130.

Bezawada, R., Balachander, S., Kannan, P.K., Shankar, V. (2009). Cross-category effects of Aisle and display placements: A spatial modeling approach and insights. *Journal of Marketing*, 73(2), 99–117.

Bhattacharjee, A., Cai, L., Maiti, T. (2017). Functional regression over irregular domains: variation in the shadow price of living space. *Spatial Economic Analysis*, 12(2–3), 182–201.

Bianchi, F. (2017). Le français Big Fernand devient anglais, non sans amertume [Online]. *BFM Business*, 23 May. Available at: https://bfmbusiness.bfmtv.com/entreprise/le-francais-big-fernand-devient-anglais-non-sans-amertume-1170024.html.

Billon, M., Ezcurra, R., Lera-lopez, F. (2008). The spatial distribution of the internet in the European Union: Does geographical proximity matter?. *European Planning Studies*, 16(1), 119–142.

Bloch, F., Manceau, D. (1999). Persuasive advertising in Hotelling's model of product differentiation. *International Journal of Industrial Organization*, 17, 557–574.

Block, R. (1998). Psychological time and the processing of spatial information. In *Spatial and Temporal reasoning in Geographic Information Systems*, Egenhofer, M.J., Golledge, R.G. (eds). Oxford University Press, Oxford.

Bock, G.-W., Lee, S.-Y.T., Li, H.Y. (2007). Price comparison and price dispersion: products and retailers at different internet maturity stages. *International Journal of Electronic Commerce*, 11(4), 101–124.

Bodur, H.O., Klein, N.M., Arora, N. (2015). Online price search: Impact of price comparison sites on offline price evaluations. *Journal of Retailing*, 91(1), 125–139.

Bonnin, G. (2003). La mobilité du consommateur en magasin : une étude exploratoire de l'influence de l'aménagement spatial sur les stratégies d'appropriation des espaces de grande distribution. *Recherche et applications en Marketing*, 18(3), 7–29.

Boots, B., South, R. (1997). Modeling retail trade areas using higher-order multiplicatively weighted Voronoi diagrams. *Journal of Retailing*, 73(4), 519–536.

Bouba-Olga, O., Grossetti, M. (2008). Socio-économie de proximité. *Revue d'économie régionale et urbaine*, 3, 311–328.

Boulding, K. (1966). *Economic Analysis*. *Vol. 1: Microeconomics*. Harpers, New York.

Bourassi, N. (2019). Mobilités : une croissance exponentielle attendue jusqu'en 2030. *La Tribune*, 7 March.

Bourbonnais, R., Usunier, J.-C. (2017). *Prévision des ventes*. Economica, Paris.

Bourliataux-Lajoinie, S., Rivière, A. (2013). L'enjeu des m-services en marketing touristique territorial : proposition d'un cadre d'analyse. *Recherches en Sciences de Gestion*, 95(2), 65–82.

Böventer (von), E. (1962). Towards a unified theory of spatial economic structure. *Papers of the Regional Science Association*, 10, 163–187.

Boyer, K.K., Prud'homme, A.M., Chung, W. (2009). The last mile challenge: evaluating the effects of customer density and delivery window patterns. *Journal of Business Logistics*, 30(1), 185–2001.

Bradach, J.L. (1997). Using the plural form in the management of restaurant chains. *Administrative Science Quarterly*, 42, 276–303.

Bradach, J.L. (1998). *Franchise Organizations*. Harvard Business School Press, Boston.

Brafman, N. (2008). Prix alimentaires : législation rigide et forte concentration gonflent la facture. *Le Monde*, 9/10 mars.

Braudel, F. (1986). *L'identité de la France*. Arthaud, Paris.

Bregeras, G. (2014). Leclerc surveille de manière "excessive" les salariés d'un centre commercial [Online]. *LSA*, 5 February. Available at: https://www.lsa-conso.fr/leclerc-surveille-de-maniere-excessive-les-salaries-d-un-centre-commercial.

Brémond, R. (2002). Perception et émotion [Online]. Report. Available at: http://perso.lcpc.fr/roland.bremond/documents/cours_Berthoz02.pdf.

Brewer, P.A. (2007). Operationalizing psychic distance: A revised approach. *Journal of International Marketing*, 15(1), 44–66.

Broniarczyk, S.M., Hoyer, W.D., McAlister, L. (1998). Consumer's perception of assortment offered in a grocery category: The influence of number of items and heuritics. *Journal of Marketing Research*, 35(2), 166–176.

Brooks, C.M., Kaufmann, P.J., Lichtenstein, D.R. (2004). Travel configuration on consumer trip-chained store choice. *Journal of Consumer Research*, 31, 241–248.

Brooks, C.M., Kaufmann, P.J., Lichtenstein, D.R. (2008). Trip chaining in multi-destination shopping trips: A field experiment and laboratory replication. *Journal of Retailing*, 84(1), 29–38.

Brown, L.A. (1981). *Innovation diffusion: A new perspective*. Methuen, London.

Brunet, R. (1974). Espace, perception et comportement. *L'Espace Géographique*, 3, 189–204.

Brunet, R., Dollfus, O. (1990). *Géographie universelle : mondes nouveaux.* Hachette, Paris.

Brunner, J.A., Mason, J.L. (1968). The influence of driving time upon shopping center preference. *Journal of Marketing*, 32(2), 57–61.

Brynjolfsson, E., Hu, Y.J., Rahman, M.S. (2013). Competing in the age of omnichannel retailing. *MIT Sloan Management Review*, 54(4), 23–29.

Bucklin, L.P. (1967). The concept of mass in intra-urban shopping. *Journal of Marketing*, 31, 37–42.

Bucklin, L.P. (1971). Trade area boundaries: Some issues in theory and methodology. *Journal of Marketing Research*, 8(1), 30–37.

Bucklin, L.P. (1993). Modeling the international gray market for public policy decision. *International Journal of Research in Marketing*, 10, 387–405.

Bultez, A., Naert, P. (1975). Consistent sum-constrained models. *Journal of the American Statistical Association*, 70(351), 529–535.

Bultez, A., Naert, P. (1988). S.H.A.R.P.: Shelf allocation for retailers' profit. *Marketing Science*, 7, 211–231.

Bultez, A., Naert, P., Gijsbrechts, E., Vanden Abeele, P. (1989). Asymmetric cannibalism in retail assortments. *Journal of Retailing*, 65, 153–192.

Bunde, A., Havlin, S. (1996). *Fractals and Disordered Systems*. Springer, Berlin.

Cadwallader, M.T. (1981). Towards a cognitive gravity model: The case of consumer spatial behavior. *Regional Studies*, 15, 275–284.

Cadwallader, M.T. (1995). Interaction effects in models of consumer spatial behavior. *Applied Geography*, 15(2), 135–145.

Cairncross, F. (1997). *The Death of Distance*. Harvard Business School Press, Boston.

Camborde, P. (1997). L'installation de Félix Potin à Paris : le choix d'un métier. In *La révolution commerciale en France : du "Bon Marché" à l'hypermarché*, Marseille, J. (ed.). Le Monde Éditions, Paris, 71–90.

Campo, K., Gijsbrechts, E., Goosens, T., Verhetsel, A. (2000). The impact of location factors on the attractiveness and optimal space shares of product categories. *International Journal of Research in Marketing*, 17, 255–279.

Campo, K., Gijsbrechts, E., Nisol, P. (2000). Towards understanding consumer response to stock-outs. *Journal of Retailing*, 76(2), 219–42.

Cantrell, J., Kreslake, J.M., Ganz, O., Pearson, J.L., Vallone, D., Anesetti-Rothermel, A., Xiao, H., Kirchner, T.R. (2013). Marketing little cigars and cigarillos: Advertising, price, and associations with neighborhood demographics. *American Journal of Public Health*, 103(10), 1902–1909.

Cardinali, S. (2010). *Geomarketing e nuove metriche per un differente approccio alla competizione. Prospettive di ricerca e strumenti di gestione*. Esculapio economia, Bologna.

Carlbäck, M. (2012). Strategic entrepreneurship in the hotel industry: The role of chain affiliation. *Scandinavian Journal of Hospitality & Tourism*, 12(4), 349–372.

Caron, C. (2017). *Géobusiness : la géomatique dans le monde affaires*. ISTE Editions, London.

Caron, F. (1999). *Histoire économique de la France, XIX^e^-XX^e^ siècles*. Armand Colin, Paris.

Carpenter, G.S., Cooper, L.G., Hanssens, D.M., Midgley, D.F. (1988). Modeling asymmetric competition. *Marketing Science*, 7, 393–412.

Cassou, F., Cliquet, G., Perrigot, R. (2016). L'importance de la solidarité au sein des réseaux de vente au détail : le cas du commerce de détail coopératif et associé à dominante alimentaire. *Management & Avenir*, 89, 153–174.

Chabot, G. (1938). La détermination des courbes isochrones – géographie urbaine. In *Congrès international de Géographie*. Amsterdam.

Chadule (Groupe) (1997). *Initiation aux pratiques statistiques en géographie*, 4th edition. Armand Colin, Paris.

Chandler Jr., A.D. (1977). *The Visible Hand: The Managerial Revolution in American Business*. Harvard University Press, Cambridge.

Chandon, J.-L. (2000). Élaboration du plan média. In *La publicité. Théories, acteurs et méthodes*, Vernette, E. (ed.). La Documentation française, Paris, 133–167.

Chapouille, P. (1973). *Planification et analyse des expériences*. Masson, Paris.

Charre, J. (1995). *Statistique et territoire*. Reclus, Montpellier.

Chasco, C., Fernandez-Avilez, G. (2009). *Analisis de Datos Espacio-Temporales Para La Economa y El Geomarketing*. Netbiblo, La Coruña.

Chateau, P. (2017). Walmart s'associe à Google dans le commerce en ligne. *Le Figaro*, 23 August.

Chebat, J.-C., Dubé, L. (2000). Evolution and challenges facing retail atmospherics: The apprentice sorcerer is dying. *Journal of Business Research*, 49(2), 89–90.

Choi, J., Contractor, F.J. (2016). Choosing an appropriate alliance governance mode: the role of institutional, cultural and geographical distance in international research & development (R&D) collaborations. *Journal of International Business Studies*, 47(2), 210–232.

Christaller, W. (1933). *Central Places in Southern Germany*. Englewood Cliffs, New Jersey. Prentice Hall Inc.

Clauzel, A., Riché, C. (2015). Rencontre de service et rôle de la distance sociospatiale : le cas des restaurants. *Recherche et applications en Marketing*, 30(2), 4–29.

Cliff, A.D., Ord, J.K. (1973). *Spatial Autocorrelation*. Pion, London.

Cliff, A.D., Ord, J.K. (1975). Space-time modelling with an application to regional forecasting. *Institute of British Geographers*, 64, 119–128.

Cliquet, G. (1988). Les modèles gravitaires et leur évolution. *Recherche et applications en Marketing*, 3(3), 39–52.

Cliquet, G. (1990). La mise en œuvre du modèle interactif de concurrence spatiale (MICS) subjectif. *Recherche et applications en Marketing*, 5(1), 3–18.

Cliquet, G. (1992). *Management stratégique des points de vente*. Dalloz-Sirey, Paris.

Cliquet, G. (1995). Implementing a subjective MCI model: An application to the furniture market. *European Journal of Operational Research*, 84, 279–291.

Cliquet, G. (1997a). L'attraction commerciale : fondement de la localisation différentielle. *Revue Belge de Géographie*, 121, 57–70.

Cliquet, G. (1997b). La localisation d'un magasin de meubles : application d'un modèle interactif de concurrence spatiale (MICS) subjectif. *Revue belge de Géographie*, 121, 261–273.

Cliquet, G. (1998). Integration and territory coverage of the hypermarket industry in France: A relative entropy measure. *The International Review of Retail, Distribution and Consumer Research*, 8(2), 205–224.

Cliquet, G. (2000). Plural forms in store networks: A proposition of a model for store network evolution. *International Review of Retail Distribution and Consumer Research*, 10(4), 369–87.

Cliquet, G. (2006). *Geomarketing: Methods and Strategies in Spatial Marketing*. ISTE Ltd, London.

Cliquet, G. (2002b). La localisation commerciale? In *Stratégies de localisation des entreprises commerciales et industrielles : de nouvelles perspectives*, Cliquet, G., Josselin, J.-M. (eds). De Boeck, Brussels.

Cliquet, G. (2003). Éditorial : introduire l'espace dans la recherche et les décisions marketing. *Recherche et applications en Marketing*, 18(3), 1–6.

Cliquet, G. (2008). New challenges for store location in plural form networks: An exploratory study. In *Strategy and Governance of Networks*, Henrikse, G., Cliquet, G., Tuunanen, M., Windsperger, J. (eds). Springer, Heidelberg.

Cliquet, G., Rulence, D. (1998). Les opérations d'acquisition des distributeurs en France : mesure de la couverture spatiale des réseaux de points de vente. *Décisions Marketing*, 15, 17–27.

Cliquet, G., Fady, A., Basset, G. (2006). *Le management de la distribution*. Dunod, Paris.

Cliquet, G., Burt, S. (2011). Interactions between globalisation and retail productivity: Some governance issues. In *Globalisation, Governance and Ethics: New Managerial and Economic Insights*, Aurifeille, J.-M., Medlin, C.J., Tisdell, C.A., Lafuente, J.G., Gil Aluja, J.G. (eds). Nova Science Publishers, Hauppauge.

Cliquet, G., Guillo, P-A. (2013). Retail network spatial expansion: An application of the percolation theory to hard discounters. *Journal of Retailing and Consumer Services*, 20, 173–181.

Cliquet, G., Gonzalez, C., Huré, E., Picot-Coupey, K. (2013). From mobile phone to smartphone: What's new about m-shopping?. In *Academy of Marketing Science Conference*. Monterey.

Cliquet, G., Picot-Coupey, K., Huré, E., Gahinet, M.-C. (2014). Shopping with a smartphone: A French-Japanese perspective. *Marketing ZFP – Journal of Research and Management*, 36(2), 96–106.

Cliquet, G., Voropanova, E. (2016). E-commerce and encroachment: Evidence from French franchise networks. *Journal of Marketing Channels*, 23(3), 114–128.

Cliquet, G., Picot-Coupey, K., Basset, G. (2018). *Retailing : marketing et management du commerce de détail*. Dunod, Paris.

Cochoy, F. (2011). *Sociologie d'un "curiositif" : Smartphone, code-barres 2D et self-marketing*. Le Bord de l'Eau, Paris.

Colbert, F., Côté, R. (1990). *Localisation commerciale*. Gaëtan Morin, Quebec.

Colla, E., Dupuis, M. (1997). *Le défi mondial des bas prix*. Publi-Union, Paris.

Colla, E., Lapoule, P. (2011). Facteurs-clés de succès des cybermarchés : les enseignements du cas Tesco.com. *Décisions Marketing*, 61, 35–45.

Collin-Lachaud, I., Vanheems, R. (2016). Naviguer entre espaces virtuel et réel pour faire ses achats : exploration de l'expérience de shopping hybride. *Recherche et applications en Marketing*, 31(2), 43–61.

Converse, P.D. (1949). New laws on retail gravitation. *Journal of Marketing*, 14(4), 339–384.

Conway, P., Janod, V., Nicoletti, G. (2005). Product market regulation in OECD countries: 1998 to 2003. OECD working document no. 419, OCDE, Paris.

Cooper, L. (1963). Location-allocation problems. *Operations Research*, 11, 331–43.

Cooper, L. (1964). Heuristic methods for location-allocation problems. *SIAM Review*, 6, 37–53.

Cooper, L.G. (1993). Market-share models. *Handbook in Operation Research and Management Science*, 5, 259–314.

Cooper, L.G., Finkbeiner, C.T. (1983). A composite MCI model for integrating attribute and importance information. *Advances in Consumer Research*, 109–13.

Cooper, L.G., Nakanishi, M. (1983). Standardizing variables in multiplicative choice models. *Journal of Consumer Research*, 10, 96–108.

Cooper, L.G., Nakanishi, M. (1988). *Market-Share Analysis: Evaluating Competitive Marketing Effectiveness*. Kluwer Academic Publisher, Dordrecht.

Cooper, W.W., Seiford, L.M., Tone, K. (2006). *Introduction to Data Envelopment Analysis and Its Uses with DEA-Solver Software and References*. Springer, New York.

Copeland, M. (1923). Relation of consumers buying habit to marketing methods. *Harvard Business Review*, 1(3), 282–89.

Corstjens, M., Doyle, P. (1981). A model for optimizing retail space allocations. *Management Science*, 27(7), 822–833.

Coutau-Bégarie, H. (2011). *Traité de stratégie*. Economica, Paris.

Cox, J. (2004). Ubiquitous consumption and the marketing mix. *Journal of Internet Commerce*, 3(2), 21–32.

Cox, J., Mason, C. (2007). Standardisation versus adaptation: Geographical pressures to deviate from franchise formats. *The Service Industries Journal*, 27(8), 1053–1072.

Crague, G. (2014). *Entreprise, management et territoire : le management des implantations territoriales à l'ère de l'entreprise réseau*. Presses de l'Université Laval, Quebec.

Craig, C.S., Ghosh, A., McLafferty, S. (1984). Model of retail location process: A review. *Journal of Retailing*, 60(1), 5–36.

Crawford, A., Humphries, S., Geddy, M. (2015). McDonald's: A case study in glocalization. *Journal of Global Business Issues*, 9(1), 11–18.

Croizean, J.-P., Vyt, D. (2015). Temps subjectif et temps mesuré : faut-il revoir la définition des zones de chalandise ?. *Géographie, économie et société*, 17, 201–224.

Crossland, M.D., Wynne, B.E., Perkins, W.C. (1995). Spatial decision support systems: An overview of technology and a test of efficacy. *Decision Support Systems*, 14, 219–235.

Croué, C. (1994). *Marketing international*. De Boeck Université, Brussels.

Crowe, M., Rysman, M., Stavins, J. (2010). Mobile payments at the retail point of sale in the United States: Prospects for adoption. *Review of Network Economics*, 9(4), 1–29.

Daams, M.N., Sijtsma, F.J., Van der Vlist, A.J. (2016). The effect of natural space on nearby property prices: Accounting for perceived attractiveness. *Land Economics*, 92(3), 389–410.

Damasio, A.R. (1994). *Descartes' Error: Emotion, Reason, and the Humain Brain*. Avon Books, New York.

Dang, V.M., Cliquet, G. (2012). Les relations coopératives dans les canaux marketing : proposition d'un modèle pour le Vietnam. *Revue française du Marketing*, 237/238(2–3/5), 9–26.

Darcin, A.E., Kose, S., Noyan, C.O., Nurmedov, S., Yılmaz, O., Dilbaz, N. (2016). Smartphone addiction and its relationship with social anxiety and loneliness. *Behaviour & Information Technology*, 35(7), 520–525.

Darke, P.R., Brady, M.K., Benedicktus, R.L., Wilson, A.E. (2016). Feeling close from afar: The role of psychological distance in offsetting distrust in unfamiliar online retailers. *Journal of Retailing*, 92(3), 287–299.

Darr, E.D., Argote, L., Epple, D. (1995). The acquisition, transfer and depreciation of knowledge in service organizations: Productivity in franchises. *Management Science*, 41, 1750–1762.

Darr, E.D., Kurtzberg, T.R. (2000). An investigation of partner similarity dimensions on knowledge transfer. *Organizational Behavior and Human Decision Processes*, 82, 28–44.

Daskin, M.S. (1983). A maximum expecting covering location model: Formulation, properties and heuristic solution. *Transportation Science*, 17(1), 48–70.

David, P.A., Foray, D. (1993). Percolation structures, Markov random fields and the economics of EDI standard diffusion. In *Global telecommunication strategies and technological change*, Pogorel, G. (ed.). Elsevier, Amsterdam.

Davidson, W.R., Sweeney, D.J., Stampfl, R.W. (1988). *Retailing Management*. Wiley, New York.

Davis, G. (1993). Patterns in cross shopping for groceries and their implications for co-operation in retail location. *British Journal of Management*, 4, 91–101.

De Palma, A., Droesbeke, J.-J., Lefèvre, C. (1991). *Modèles de diffusion en marketing*. PUF, Paris.

Decaudin, J.-M. (1991). *Stratégies de publicité internationale*. Liaisons, Paris.

Delage, M., Hani, M. (2014). Commerce et mobilités, le cas du Havre. In *Le commerce dans tous ses états, espaces marchands et enjeux de société*, Gasnier, A., Lemarchand, N. (ed.). Presses universitaires de Rennes, Rennes, 235–245.

Dellaert, B.G.C., Arentze, T.A., Bierlaire, M., Borgers, A.W.J., Timmermans, H.J.P. (1998). Investigating consumer's tendency to combine multiple shopping purposes and destinations. *Journal of Marketing Research*, 35(2), 177–88.

Deluzarche, C. (2014). Les aliments les plus surconsommés par département : la carte 2014 [Online]. *Journal du Net*, 6 February. Available at: http://www.journaldunet.com/economie/distribution/consommation-alimentaire-en-france.shtml.

Desmet, P. (1991). Estimation de la relation surface-ventes pour la vente par catalogue. *Recherche et applications en Marketing*, 6(2), 67–81.

Desmet, P. (2000). Politiques de prix sur Internet. *Revue française du Marketing*, 177–178(2–3), 49–68.

Desmet, P. (2003). *Marketing direct : concepts et méthodes*. Dunod, Paris.

Desmet, P., Renaudin, V. (1998). Estimation of product category sales responsiveness to allocated shelf space. *International Journal of Research in Marketing*, 15, 443–457.

Desmet, P., Zollinger, M. (1997). *Le Prix : de l'analyse conceptuelle aux méthodes de fixation*. Economica, Paris.

Desmet, P., Zollinger, M. (2006). Price and geographic information. In *Geomarketing: Methods and Strategies in Spatial Marketing*, Cliquet, G. (ed). ISTE Ltd, London, and John Wiley & Sons, New York.

Desrochers, M., Solomon, F.M. (1989). A column generation approach to the urban transit crew scheduling problem. *Transportation Science*, 23, 1–13.

Desse, R.-P. (2001). *Le nouveau commerce urbain – dynamiques spatiales et stratégies des acteurs*. Presses Universitaires de Rennes, Rennes.

Devaux, N., Dubé, J. (2016). About the influence of time on spatial dependence: A meta-analysis using real estate hedonic pricing models. *Journal of Real Estate Literature*, 24(1), 31–66.

Dicke, T.S. (1992). *Franchising in America: The Development of a Business Method 1840-1980*. The University of North Carolina Press, Chapel Hill.

Didelon, C. (2009). Cartes des goûts, cartes du monde [Online]. *Confins : revue Franco-Brésilienne de Géographie*, 6. Available at: https://journals.openedition.org/confins/5863.

Didier, C., Daragon, B. (2017). Télévision : les Français "zappent" la publicité [Online]. *Le Parisien*, 18 October. Available at: http://www.leparisien.fr/culture-loisirs/tv/television-les-francais-zappent-la-publicite-18-10-2017-7339344.php.

Dion, D., Cliquet, G. (2006). Consumer spatial behavior. In *Geomarketing: Methods and Strategies in Spatial Marketing*, ISTE Ltd, London.

Dirichlet, G.L. (1850). Uber die Reduktion der Postiven Quadratischen Formen mit Drei Unbestimmten Ganzen Zahlen. *Journal für die Reine und Angewandte Mathematik*, 40, 216.

Dolfsma, W., Van der Eijk, R. (2017). Network position and firm performance: The mediating role of innovation. *Technology Analysis & Strategic Management*, 29(6), 558–566.

Dolfsma, W., Van der Eijk, R. (2018). How info-firms use big data to target customers. *Journal of Business Strategy*, 39(6), 50–55.

Douard, J.-P. (2002). *Le géomarketing : outils et applications*. Eska, Paris.

Douard, J.-P., Heitz, M. (2004). *Le géomarketing : au service de la démarche marketing*. Dunod, Paris.

Douard, J.-P., Heitz, M., Cliquet, G. (2015). L'attraction commerciale revisitée : de la gravitation aux flux d'achat, une application du géomarketing. *Recherche et applications en Marketing*, 30(1), 110–129.

Douglas, S.P., Wind, Y. (1986). Le mythe de la globalisation. *Recherche et applications en Marketing*, 2(3), 5–26.

Draganska, M., Hartmann, W.R., Stanglein, G. (2014). Internet versus television advertising: A brand-building comparison. *Journal of Marketing Research*, 51(5), 578–590.

Duan, J.A., Mela, C.F. (2009). The role of spatial demand on outlet location and pricing. *Journal of Marketing Research*, 64(2), 260–278.

Duan, K., Mishra, T., Parhi, M. (2018). Space matters: Understanding the real effects of macroeconomic variations in cross-country housing price movements. *Economics Letters*, 163, 130–135.

Duke, R. (1991). Post-saturation competition in UK grocery retailing. *Journal of Marketing Management*, 7(1), 63–75.

Dupuis, M. (1986). *Distribution, la nouvelle donne*. Éditions d'Organisation, Paris.

Durand, B., Mahjoub, S., Senkel, M.-P. (2013). Delivering to urban online shoppers: The gains from "Last-Mile" pooling. *Supply Chain Forum An International Journal*, 14(4), 22–31.

Durand, C., Helleu, B., Ravenel, L. (2005). *Le basket professionnel français : approche stratégique et géomarketing*. Presses universitaires du sport, Rouen.

Easingwood, C.J., Mahajan, V., Muller, E. (1983). Un modèle de diffusion des produits nouveaux intégrant un effet d'imitation variable. *Recherche et applications en Marketing*, 2(3), 17–33.

Eaton, B., Lipsey, R. (1975). The principle of minimum differentiation reconsidered: Some new developments in the theory of spatial competition. *Review of Economic Studies*, 42(1), 27–49.

Eaton, B., Lipsey, R. (1976). The non uniqueness equilibrium in the Löschian location model. *American Economic Review*, 66(1), 77–93.

Eaton, B., Lipsey, R. (1979a). Comparison shopping and the clustering of homogeneous firms. *Journal of Regional Science*, 19(4), 421–435.

Eaton, B., Lipsey, R. (1979b). The theory of market pre-emption: The persistence of excess capacity and monopoly in growing spatial markets. *Economica*, 46, 149–158.

Eaton, B., Lipsey, R. (1982). An economic theory of central places. *The Economic Journal*, 92, 56–72.

Edwards, J.B., McKinnon, A.C., Cullinane, S.L. (2010). Comparative analysis of the carbon footprints of conventional and online retailing: A "last mile" perspective. *International Journal of Physical Distribution & Logistics Management*, 40(1/2), 103–123.

Eiglier, P., Langeard, E. (1987). *Servuction, le marketing des services*. McGraw-Hill, New York.

Emerson, R.W. (2010). Franchise encroachment. *American Business Law Journal*, 47(2), 191–290.

Engel, J.F., Blackwell, R.D. (1982). *Consumer Behavior*. The Dryden Press, Chicago.

Eppli, M.J., Shilling, J.D. (1996). How critical is a good location to a regional shopping center? *Journal of Real Estate Research*, 12(3), 459–468.

Esper, T.L., Jensen, T.D., Turnipseed, F.L., Burton, S. (2003). The last mile: An examination of effects of online retail delivery strategies on consumers. *Journal of Business Logistics*, 24(2), 177–203.

Evans, C., Richardson, M. (2007). Strategy in action: assessing the environment. *British Journal of Administrative Management*, 60, 1–3.

Evans, J., Mavondo, F.T. (2002). Psychic distance and organizational performance: An empirical examination of international retailing operations. *Journal of International Business Studies.* 33(3), 515–532.

Evrard, Y., Pras, B., Roux, E. (2009). *Market : fondements et méthodes des recherches en marketing*. Dunod, Paris.

Ewing, R. (2019). Rugosity as a new planning paradigm. *Planning*, 85(1), 46–47.

Eymann, A. (1995). *Consumers' spatial choice behavior*. Physica-Verlag, Berlin.

Eymann, A., Ronning, G. (1997). Micro-economic models of tourists' destination choice. *Regional Science and Urban Economics*, 27, 735–761.

Fady, A., Renaudin, V., Vyt, D. (2007). *Le merchandising*. Vuibert, Paris.

Faivre, J.-P., Palmer, J. (1976). Protocoles et arbres de décision : application des théories du traitement de l'information au comportement du consommateur. *Revue Française du Marketing*, 63, 11–30.

Ferrari, G., Laureti, T., Mostacci, F. (2005). Time-space harmonization of consumer price indexes in euro-zone countries. *International Advances in Economic Research*, 11, 359–378.

Figliozzi, M.A. (2017). Lifecycle modeling and assessment of unmanned aerial vehicles (Drones) CO_2e emissions. *Transportation Research Part D*, 57, 251–261.

Filser, M. (1994). *Le comportement du consommateur*. Dalloz, Paris.

Fine, L.V. (1954). *Retail trade area analysis: A guide to effective use of retail trade area studies*. University of Wisconsin, Madison.

Fischer, G.N. (1981). *La psychosociologie de l'espace*. PUF, Paris.

Fischer, G.N. (1997). *Psychologie de l'environnement social*. Dunod, Paris.

Fischer, P.M., Zeugner-Roth, K.P. (2017). Disentangling country-of-origin effects: The interplay of product ethnicity, national identity, and consumer ethnocentrism. *Marketing Letters*, 28, 189–204.

Floch, J.-M. (1989). La contribution d'une sémiotique structurale à la conception d'un hypermarché. *Recherche et applications en Marketing*, 4(2), 37–63.

Florio, A.M., Feillet, D., Hartl, R.F. (2018). The delivery problem: Optimizing hit rates in e-commerce deliveries. *Transportation Research Part B*, 117, 455–472.

Forest, C. (2019). La fermeture des salles va s'accélerer. *Ouest-France*, 15 January.

Fornerino, M., Rivet, C.F., Reghem, J. (2018). Explorer l'expérience de shopping dans un magasin phygital. *Décisions Marketing*, 91.

Fotheringham, A.S. (1983). A new of spatial interaction models: The theory of competing destination. *Environment and Planning A*, 15, 15–36.

Fotheringham, A.S. (1985). Spatial competition and agglomeration in urban modelling. *Environment and Planning A*, 17, 213–230.

Fotheringham, A.S. (1988). Consumer store choice and choice set definition. *Marketing Science*, 7(3), 99–310.

Fotheringham, A.S. (1993). Chain image and store-choice modeling: The effects of income and race. *Environment and Planning A*, 25, 179–196.

Fourquet, J. (2019). *L'archipel français : naissance d'une nation multiple et divisée*. Le Seuil, Paris.

Freeman, R.E. (1984). *Strategic Management: A Stakeholder Approach*. Pitman, Boston.

Freeman, R.E., Wicks, A.C., Parmar, B. (2004). Stakeholder theory and "the corporate objective revisited". *Organization Science*, 15(3), 364–69.

Fréry, F. (1997). La chaîne et le réseau. In *Dedans, dehors*, Besson, P. (ed.). Vuibert, Paris.

Fressin, J.-J. (1975). Le comportement du consommateur-client de la grande entreprise de distribution et le choix du lieu d'achat. *Revue française du Marketing*, 58, 27–61.

Frisbie Jr., G.A. (1980). Ehrenberg's negative binomial model applied to grocery store trips. *Journal of Marketing Research*, 17(3), 385–390.

Fulgoni, G.M. (2014). "Omni-channel" retail insights and the consumer's path-to-purchase. *Journal of Advertising Research*, 54(4), 377–380.

Gahinet, M.-C. (2014). Les nouveaux formats alimentaires de proximité : regards croisés des distributeurs et des consommateurs. *Management & Avenir*, 71, 153–168.

Gahinet, M.-C. (2018). Les dimensions de la proximité appliquées aux achats alimentaires. *Revue d'économie régionale & urbaine*, 2018(5–6), 1367–1390.

Gahinet, M.-C., Cliquet, G. (2018). Convenience store patronage: Kaïros more than chronos. *Journal of Retailing and Consumer Services*, 43, 1–9.

Galante, J., Preda, M. (2009). *Introduzione al GeoMarketing*. EduCatt, Milan.

Gallopel, K. (2006). Advertising policy and geographic information. In *Geomarketing: Methods and Strategies in Spatial Marketing*, Cliquet, G. (ed.). ISTE Ltd, London.

Gallopel, K., Cliquet, G. (2002). Géomarketing et espace publicitaire. *Décisions Marketing*, 26, 47–54.

Garber, T., Goldenberg, J., Libai, B., Muller, E. (2004). From density to destiny: Using spatial dimension of sales data for early prediction of new product success. *Marketing Science*, 23(3), 419−428.

Gasnier, A. (2007). Les temps de mobilité des consommateurs au cœur des nouvelles logiques d'implantation de l'offre commerciale. *Espace Populations Sociétés*, 2/3, 243–254.

Gatignon, H., Eliashberg, J., Robertson, T.S. (1989). Modeling multinational diffusion patterns: An efficient methodology. *Marketing Science*, 8(3), 231–247.

Gautschi, D.A. (1981). Specification of patronage models of retail center choice. *Journal of Marketing Research*, 18, 162–174.

Geary, R.C. (1954). The contiguity ratio and statistical mapping. *The Incorporated Statistician*, 5(3), 115–145.

Gerber, P., Carpentier, S. (2016). *Mobilités et modes de vie*. Presses universitaires de Rennes, Rennes.

Getis, A. (1994). Spatial dependence and heterogeneity and proximal databases. In *Spatial Analysis and GIS*, Fotheringham, S., Rogerson, P. (eds). Taylor and Francis, London.

Ghose, A. (2017). *TAP: Unlocking the Mobile Economy*. MIT Press, Cambridge.

Ghosh, A. (1984). Parameter nonstationarity in retail choice models. *Journal of Business Research*, 12, 425–436.

Ghosh, A. (1986). The value of a mall and other insights from a revised central place model. *Journal of Retailing*, 62(1), 79–97.

Ghosh, A., Craig, C.S. (1983). Formulating retail location strategy in a changing environment. *Journal of Marketing*, 47(3), 56–68.

Ghosh, A., Craig, C.S. (1986). An approach to determining optimal locations for new services. *Journal of Marketing Research*, 23, 354–362.

Ghosh, A., Craig, C.S. (1991). FRANSYS: A franchise distribution system location model. *Journal of Retailing*, 67(4), 466–495.

Ghosh, A., McLafferty, S.L. (1982). Locating stores in uncertain environments: A scenario planning approach. *Journal of Retailing*, 58(4), 5–22.

Ghosh, A., McLafferty, S.L. (1987). *Location Strategies for Retail and Service Firms*. Lexington books, Lanham.

Ghosh, A., Rushton, G. (1987). *Spatial Analysis and Location-Allocation Models*. Van Nostrand Reinhold, New York.

Gijsbrechts, E., Campo, K., Goossens, T. (2003). The impact of store flyers on store traffic and store sales: A geo-marketing approach. *Journal of Retailing*, 79, 1–16.

Gil-Pareja, S. (2003). Pricing to market behavior in European car markets. *Economic Review*, 47(6), 945–962.

Gini, C. (1921). Measurement of inequality of income. *Economic Journal*, 31, 22–43.

Giorgi, G.M., Gigliarano, C. (2017). The Gini concentration index: A review of the inference literature. *Journal of Economic Surveys*, 31(4), 1130–1148.

Giraud, L. (1960). L'attraction commerciale et la loi de Reilly. *Cahiers de l'ISEA*, 11–17.

Goes, P.B. (2014). Big Data and IS research. *MIS Quarterly*, 38(3), iii–viii.

Goldberg, P.K., Verboven, F. (2004). Cross-country price dispersion in the euro era: A case study of the European car market. *Economic Policy*, 19(40), 484–521.

Golledge, R.G. (1999). *Wayfinding Behavior: Cognitive Mapping and Other Spatial Processes*. Johns Hopkins University Press, Baltimore.

Golledge, R.G., Stimson, R.J. (1997). *Spatial Behavior: A Geographic Perspective*. Guilford Press, New York.

Golledge, R.G., Briggs, R., Demko, D. (1997). The configurations of distances in intra-urban space. *Proceedings of the Association of American Geographers*, 1, 60–65.

Gomez, M., Okazaki, S. (2009). Estimating store brand shelf space. *International Journal of Market Research*, 51(2), 243–266.

Gong, H., Chen, C., Bialostozky, E., Lawson, C.T. (2012). A GPS/GIS method for travel mode detection in New York City. *Computers, Environment and Urban Systems*, 36, 131–139.

Gonzàlez-Benito, O. (2000). Geodemographic and socioeconomic characterization of the retail attraction of leading hypermarket chains in Spain. *International Review of Retail, Distribution and Consumer Research*, 12(1), 81–103.

Gonzàles-Benito, O., Greatorex, M., Muñoz-Gallego, P.A. (2000). Assessment of potential retail segmentation variables: An approach based on a subjective MCI resource allocation model. *Journal of Retailing and Consumer Services*, 7(3), 171–79.

Gonzàlez-Benito, O., Bustos-Reyes, C.A., Muñoz-Gallego, P.A. (2007). Isolating the geodemographic characterisation of retail format choice from the effects of spatial convenience. *Marketing Letters*, 18, 45–59.

Goujon, A. (2016). En quoi le géomarketing peut-il aider une enseigne à optimiser les leviers de génération de trafic en point de vente ? [Online]. Available at: https://www.cospirit.com/magazine/geomarketing-enseigne-leviers-generation-trafic/.

Graillot, L. (2001). La sémiotique comme analyse des comportements touristiques. *Revue française du Marketing*, 181, 7–27.

Granbois, D. (1984). Predicting temporal and spatial patterns of aggregate consumer demand. *Advances in consumer Research*, 11, 396–399.

Grasekamp, D., Frech, I., Frech, K. (2007). *Geomarketing mit Microsoft MapPoint: Ein praxisorientierter Einstieg in Business Geographics mit MapPoint und Office*. Microsoft Press, Redmont.

Green, P.E., Rao, V.R. (1971). Conjoint measurement for quantifying judgmental data. *Journal of Marketing Research*, 8(3), 355–363.

Green, P.E., Srinivasan, V. (1990). Conjoint analysis in marketing: New developments with implications for research and practice. *Journal of Marketing*, 54(4), 3–19.

Grégory, P. (1994). *Marketing, Publicité*. Dalloz, Paris.

Grether, E.T. (1983). Regional-spatial analysis in marketing. *Journal of Marketing*, 47(4), 36–43.

Grewal, D., Levy, M., Mehrotra, A., Sharma, A. (1999). Planning merchandising decisions to account for regional and product assortment differences. *Journal of Retailing*, 75(3), 405–424.

Grewal, D., Roggeveen, A.L., Nordfält, J. (2017). The future of retailing. *Journal of Retailing*, 93(1), 1–6.

Groupe Chadule (1986). *Initiation aux pratiques statistiques en géographie*. Masson, Paris.

Guide Jr., V.D.R., Li, J. (2010). The potential for cannibalization of new products sales by remanufactured products. *Decision Sciences*, 41(3), 547–572.

Guido, P. (1971). Vérification expérimentale de la formule de Reilly en tant que loi d'attraction des supermarchés. *Revue française de Marketing*, 39, 101–107.

Guillo, P.-A. (2007). Le développement spatial d'un réseau d'enseigne : une application de la théorie de la percolation dans le commerce associé discompte. Thesis, Université de Rennes 1, Rennes.

Gullstrand, J., Jörgensen, C. (2012). Local price competition: The case of Swedish food retailers. *Journal of Agricultural & Food Industrial Organization*, 10(1), 1–25.

Gurhan-Canli, Z., Maheswaran, D. (2000a). Cultural variations in country of origin effects. *Journal of Marketing Research*, 37(3), 309–317.

Gurhan-Canli, Z., Maheswaran, D. (2000b). Determinants of country-of-origin evaluations. *Journal of Consumer Research*, 27, 96–116.

Gussen, B.F. (2015). Is subsidiarity a condition sine qua non for sustainability?. *Policy Studies*, 36(4), 384–398.

Hägerstrand, T. (1967). *Innovation Diffusion as a Spatial Process*. University of Chicago Press, Chicago.

Hakimi, S.L. (1964). Optimum location of switching centers and the absolute centers and medians of a graph. *Operations Research*, 12, 450–459.

Hall, E.T. (1966). *The Hidden Dimension*. Doubleday, New York.

Hall, E.T. (1968). Proxemics. *Current Anthropology*, 9(2–3), 83–95.

Hands, D.W. (2014). Paul Samuelson and revealed preference theory. *History of Political Economy*, 46(1), 85–116.

Hansen, M.H., Weinberg, C.B. (1979). Retail market share in a competitive environment. *Journal of Retailing*, 55, 37–46.

Hansen, P., Mladenović, N. (1997). Variable neighborhood search for the p-median. *Location Science*, 5, 207–226.

Haynes, K.E., Fotheringham, A.S. (1984). *Gravity and Spatial Interaction Models*. *Vol. 2: Scientific Geograph*y. Sage Publications, Thousand Oaks.

Haynes, M., Thompson, S. (2014). Hit and run or sit and wait? Contestability revisited in a price-comparison site-mediated market. *International Journal of the Economics of Business*, 21(2), 165–190.

He, Z., Wang, S., Cheng, T.C.E. (2013). Competition and evolution in multi-product supply chains: An agent-based retailer model. *International Journal of Production Economics*, 146(1), 325–336.

Heilbrunn, B. (2009). Le marketing territorial de Benoît Meyronin Vuibert. *Décisions Marketing*, 54, 77.

Heitz, M., Douard, J.-P., Bernarde, E. (2010). Une méthode d'évaluation du coût carbone lié aux déplacements des consommateurs à l'intérieur d'une aire de marché. In *Colloque Étienne Thil*. La Rochelle, 2–4 October.

Helle, C. (1993). Essai de mesure de la rugosité de l'espace : application à l'espace vauclusien. *Espace géographique*, 22(4), 346–352.

Heng, X., Xin, L., Carroll, J.M., Rosson, M.B. (2011). The personalization privacy paradox: An exploratory study of decision making. *Decision Support Systems*, 51, 42–52.

Heppenstall, A.J., Harland, K., Ross, A.N., Olner, D. (2013). Simulating spatial dynamics and processes in a retail gasoline market: An agent-based modeling approach. *Transactions in GIS*, 17(5), 661–682.

Héronnière (de la), L. (2015). Pour la première fois depuis des décennies, McDonalds rétrécit aux États-Unis [Online]. *Slate*, 20 June. Available at: http://www.slate.fr/story/103241/mcdonalds-retrecit-etats-unis.

Herter, M., Mühlbauer, K.-H. (2007). *Handbuch Geomarketing*. Wichmann Verlag, Berlin.

Hetzel, P. (2002). *Planète Conso : marketing expérientiel et nouveaux univers de consommation*. Eyrolles, Paris.

Heudin, J.-C. (1997). *La vie artificielle*. Hermes, Paris.

Hlavac Jr., T.E. Little, J.D.C. (1966). A geographic model of an urban automobile market. In *Proceedings of the 4th International Conference on Operational Research*, Herz, D., Meese, J. (eds). John Wiley & Sons, Hoboken, 303–311.

Hodgson, M.J. (1990). A flow capturing location–allocation model. *Geographical Analysis*, 22, 270–279.

Hoffmann, S., Müller, S. (2009). Consumer boycotts due to factory relocation. *Journal of Business Research*, 62, 239–247.

Hofstede, F.T., Wedel, M., Steenkamp, J.B.E.M. (2002). Identification de segments spatiaux pour des marchés internationaux. *Recherche et applications en Marketing*, 18(3), 81–103.

Hollander, S.C. (1965). *Restraints upon Retail Competition*. Michigan State University, East Lansing.

Horst, T. (2011). *Le monde en cartes. Gérard Mercator et le premier atlas du monde*. Fonds Mercator, Bruxelles.

Hotelling, H. (1929). Stability in Competition. *The Economic Journal*, 39, 41–57.

Houston, F.S., Stanton, J. (1984). Evaluating retail trade areas for convenience stores. *Journal of Retailing*, 60(1), 124–136.

Huang, Y., Savelsbergh, M., Zhao, L. (2018). Designing logistics systems for home delivery in densely populated urban areas. *Transportation Research Part B*, 115, 95–125.

Huang, Z., Benyoucef, M. (2013). From e-commerce to social commerce: A close look at design features. *Electronic Commerce Research and Applications*, 12, 246–259.

Hubbard, R. (1978). A review of selected factors conditioning consumer travel behavior. *Journal of Consumer Research*, 5, 1–21.

Hubert, J.-P. (2009). Dans les grandes agglomérations, la mobilité quotidienne des habitants diminue, et elle augmente ailleurs. *INSEE Première*, 1252.

Huff, D.L. (1963). A probabilistic analysis of shopping center. *Land Economics*, 39, 81–90.

Huff, D.L. (1964). Defining and estimating a trading area. *Journal of Marketing*, 28(3), 34–38.

Huff, D.L., Batsell, R.R. (1975). Conceptual and operational problems with market share models of consumer spatial behavior. *Advances in Consumer Research*, 2, 165–172.

Huff, D.L., Batsell, R.R. (1977). Delimiting the areal extent of a market area. *Journal of Marketing Research*, 14(4), 581–85.

Hui, S.K., Fader, P.S., Bradlow, E.T. (2009). Path data in marketing: An integrative framework and prospectus for model building. *Marketing Science*, 28(2), 320–335.

Hunneman, A., Verhoef, P.C., Sloot, L.M. (2017). The moderating role of shopping trip type in store satisfaction formation. *Journal of Business Research*, 78, 133–142.

Hunt, I., Watts, A., Bryant, S.K. (2018). Walmart's international expansion: Successes and miscalculations. *Journal of Business Strategy*, 39(2), 22–29.

Huré, E., Vo, T.L.H., Cliquet, G., Durand, B. (2012). *E-supply chain* et productivité : le cas de la distribution alimentaire. *Revue Française de Gestion Industrielle*, 32(1), 27–45.

Huré, E., Picot-Coupey, K., Ackermann, C.L. (2017). Understanding omni-channel shopping value: A mixed-method study. *Journal of Retailing and Consumer Services*, 39, 314–330.

Hussain, D., Perrigot, R., Mignonac, K., El Akremi, A., Herrbach, O. (2013). Determinants of multi-unit franchising: An organizational economics framework. *Managerial and Decision Economics*, 34, 161–169.

Hussain, D., Sreckovic, M., Windsperger, J. (2018). An organizational capability perspective on multi-unit franchising. *Small Business Economics*, 50(4), 717–727.

Iacobucci, D., Hopkins, N. (1992). Modeling dyadic interactions and networks in marketing. *Journal of Marketing Research*, 29(1), 5–17.

Jain, A.K., Mahajan, V. (1979). Evaluating the competitive environment in retailing using multiplicative competitive interactive models. In *Research in Marketing*, Sheth, J. (ed.). Conn. JAJ Press, Greenwich, 217–235.

Jallais, J., Orsoni, J., Fady, A. (1994). *Marketing du commerce de détail*. Vuibert, Paris.

Jank, W., Kannan, P.K. (2005). Understanding geographical markets of online firms using spatial models of customer choice. *Marketing Science*, 24(4), 623–634.

Jayet, H. (2001). *Économétrie et données spatiales – Une introduction à la pratique*. INRA, Paris, 58–59, 105–129.

Johanson, J., Vahlne, J.-E. (1977). The internationalization process of the firm – A model of knowledge development and increasing foreign market commitments. *Journal of International Business Studies*, 8(1), 25–34.

Johanson, J., Wiedersheim-Paul, F. (1975). The internationalization of the firm – four Swedish cases. *Journal of Management Studies*, 12(3), 305–322.

Johnson, E.L. (1989). Modeling and strong linear programs for mixed integer programming (1989). In *Algorithms and Model Formulations in Mathematical Programming*, Wallace, S.W. (ed.). Springer, Berlin, 1–43.

Johnson, R.M. (1974). Trade-off analysis of consumer values. *Journal of Marketing Research*, 11, 121–127.

Johnson, R.M. (1997). The application of geodemographics to retailing: Meeting the needs of the catchment. *Journal of the Market Research Society*, 39, 203–224.

Johnston, M.W., Varadarajan, P. "Rajan", Futrell, C.M., Sager, J. (1987). The relationship between organizational commitment, job satisfaction, and turnover among new salespeople. *Journal of Personal Selling & Sales Management*, 7(4), 29–38.

Jolibert, A., Alexandre, D. (1981). L'utilisation du modèle gravitaire généralisé dans la localisation des agences bancaires. *Techniques Economiques*, 123, 31–44.

Jolibert, A., Hermet, G. (1979). Les critères de choix d'une banque : segmentation du marché des PMI. *Revue Française de Marketing*, 77(2), 87–100.

Jolibert, A., Jourdan, P. (2006). *Marketing Research*. Dunod, Paris.

Joliveau, T. (2010). Le GéoWeb pour les nuls [Online]. *Monde géonumérique*. Available at: http://mondegeonumerique.wordpress.com/2010/06/24/le-geoweb-pour-les-nuls/.

Joliveau, T. (2011). Le géoweb, un nouveau défi pour les bases de données géographiques. *L'Espace géographique*, 40(2), 154–163.

Jung, K., Cho, Y.C., Lee, S. (2014). Online shoppers' response to price comparison sites. *Journal of Business Research*, 67, 2079–2087.

Kahn, B.E., Schmittlein, D.C. (1989). Shopping trip behavior: An empirical investigation. *Marketing Letters*, 1(1), 55–69.

Kahn, B.E., Schmittlein, D.C. (1992). The relationship between purchase made on promotion and shopping trip behavior. *Journal of Retailing*, 68(3), 294–315.

Kahn, W. (2012). Mobile payments strategy. *Journal of Payments Strategy & Systems*, 6(3), 210–218.

Kale, P., Singh, H., Perlmutter, H. (2000). Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic Management Journal*, 21(3), 217–238.

Kalnins, A. (2003). Hamburger prices and spatial econometrics. *Journal of Economics & Management Strategy*, 12(4), 591–616.

Kalnins, A. (2004). An empirical analysis of territorial encroachment within franchised and company-owned branded chains. *Marketing Science*, 23(4), 476–489.

Kalyanam, K., Putler, D.S. (1997). Incorporating demographic variables in brand choice models. *Marketing Science*, 16(2), 166–181.

Kalyanam, K., Tsay, A.A. (2013). Free riding and conflict in hybrid shopping environments: Implications for retailers, manufacturers, and regulators. *The Antitrust Bulletin*, 58(1), 19–68.

Kan, G., Cliquet, G., Puelles, M. (2014). The effect of country image on hypermarket patronage intention: A cross-cultural study in China and Spain. *International Journal of Retail and Distribution Management*, 42(2), 106–130.

Kaufmann, P.J., Dant, R.P. (1996). Multi-unit franchising: Growth and management issues. *Journal of Business Venturing*, 11, 343–58.

Kaufmann, P.J., Eroglu, S. (1998). Standardization and adaptation in business format franchising. *Journal of Business Venturing*, 14, 69–85.

Kaufmann, P.J., Rangan, V. (1990). A model for managing conflict during franchise expansion. *Journal of Retailing*, 66(2), 155–73.

Kaufmann, P.J., Donthu, N., Brooks, C.M. (2000). Multi-unit retail site selection processes: Incorporating opening delays and unidentified competition. *Journal of Retailing*, 76(1), 113–27.

Kaufmann, P.J., Donthu, N., Brooks, C.M. (2007). An illustrative application of multi-unit franchise expansion in a local retail market. *Journal of Marketing Channels*, 14(4), 85–106.

Kaufmann, P.J., Cliquet, G., Achabal, D.D. (2010). Implementing multi-channel strategies: Issues and opportunities for franchise system websites. In *24th ISoF Conference*. University of New South Wales, Sydney.

Kaufmann, V. (2011). *Les paradoxes de la mobilité*. Presses Polytechniques/Universitaires Romandes, Lausanne.

Kaufmann, V., Ravalet, E., Dupuit, E. (2015). *Motilité et mobilité : Mode d'emploi*. Alphil-Presses Universitaires Suisses, Neuchatel.

Keane, M. (1989). Function and competition along urban centers. *Journal of Regional Science*, 29(2), 265–276.

Kehl, L. (2010). *Anwendungen von Methoden des Geomarketings: Fragestellungen im Zusammenhang mit der demografischen Entwicklung*. VDM Verlag Dr. Müller AG & Co. KG, Sarrebruck.

Kemperman, A.D.A.M., Borgers, A.W.J., Oppewal, H., Timmermens, H.J.P. (2000). Consumer choice of theme parks: A conjoint model of seasonality effects and variety seeking behavior. *Leisure Science*, 22(1), 1–18.

Khan, R.J., Jain, D.C. (2005). An empirical analysis of price discrimination mechanisms and retailer profitability. *Journal of Marketing Research*, 42(4), 316–524.

Kim, S., Park, H. (2013). Effects of various characteristics of social commerce (s-commerce) on consumers' trust and trust performance. *International Journal of Information Management*, 33, 318–332.

Kimes, S.E., Fitzsimmons, J.A. (1990). Selecting profitable hotel sites at La Quinta motor inns. *Interfaces*, 20(2), 12–20.

Kinnard Jr., W.N., Messner, S.D. (1972). Obtaining competitive locations for small retailers in shopping centers. *Journal of Small Business Management*, 10(1), 21–26.

Kjeldgaard, D., Askegaard, S. (2006). The glocalization of youth culture: The global youth segment as structures of common difference. *Journal of Consumer Research*, 33, 231–247.

Kleijnen, M., Ruyter (de), K., Wetzels, M. (2007). An assessment of value creation in mobile service delivery and the moderating role of time consciousness. *Journal of Retailing*, 83(1), 33–46.

Klein, M. (1967). A primal method for minimal cost flows with applications to the assignment and transportation problems. *Management Science*, 14, 205–220.

Koças, C. (2005). A model of internet pricing under price-comparison shopping. *International Journal of Electronic Commerce*, 10(1), 111–134.

Köhler, J., Wietschel, M., Whitmarsh, L.E., Keles, D., Schade, W. (2010). Infrastructure investment for a transition to hydrogen automobiles. *Technological Forecasting and Social Change*, 77(8), 1237–1248.

Kohsaka, H. (1984). An optimization of the central place system in terms of multipurpose shopping trips. *Geographical Analysis*, 6, 250–29.

Kollat, D.T., Willett, R.P. (1967). Customer impulse purchasing behavior. *Journal of Marketing Research*, 4(1), 21–31.

Kong, N., Schaefer, A.J., Hunsaker, B., Roberts, M.S. (2010). Maximizing the efficiency of the U.S. liver allocation system through region design. *Management Science*, 56(12), 2111–2122.

Koschate-Fischer, N., Diamantopoulos, A., Oldenkotte, K. (2012). Are consumers really willing to pay more for a favorable country image? A study of country-of-origin effects on willingness to pay. *Journal of International Marketing*, 20(1), 19–41.

Kotler, P., Dubois, B. (1981). *Marketing Management*, 4th edition. Publi-Union, Paris.

Kotler, P., Dubois, B. (1990). *Marketing Management*, 7th edition. Publi-Union, Paris.

Kotler, P. (1991). *Marketing Management: Analysis, Planning, Implementation, & Control*, 7th edition. Prentice-Hall, Englewood Cliffs (NJ).

Krishnan, T.V., Bass, F.M., Jain, D.C. (1999). Optimal pricing strategy for new products. *Management Science*, 45(12), 1650–1663.

Kroll, J. (2010). *Geomarketing: Mikrogeografie im B2C-Direktmarketing*. Diplomica Verlag, Hamburg.

Kuby, M., Lim, S. (2005). The flow-refueling location problem for alternative-fuel vehicles. *Socio-Economic Planning Sciences*, 39, 125–145.

Kung, M., Monroe, K.B., Cox, J.L. (2002). Pricing on the internet. *Journal of Product and Brand Management*, 11(5), 274–287.

Kyo, S., Smith, T., Linhoff, M. (2012). Leveraging socially networked mobile ICT platforms for the last-mile delivery problem. *Environmental Science & Technology*, 46(17), 9481–9490.

Lafontaine, F. (1992). Agency theory and franchising: Some empirical results. *Rand Journal of Economics*, 23, 263–283.

Lafontaine, F., Shaw, K.L. (2005). Targeting managerial control: Evidence from franchising. *Rand Journal of Economics*, 36(1), 131–150.

Lakshmanan, T.R., Hansen, W.G. (1965). Retail market potential model. *Journal of the American Institute of Planners*, 31, 134–43.

Lambin, J.-J. (1970). *Modèles et programmes de marketing*. PUF, Paris.

Lampóna, J.F., Lago-Peñas, S., González-Benito, J. (2015). International relocation and production geography in the European automobile components sector: The case of Spain. *International Journal of Production Research*, 53(5), 1409–1424.

Lancaster, K.J. (1966). A new approach to consumer theory. *Journal of Political Economy*, 74(2), 132–157.

Lancaster, K.J. (1990). The economics of product variety: A survey. *Marketing Science*, 9(3), 189–206.

Langlois, A., Phipps, M. (1997). *Les automates cellulaires : application à la simulation urbaine*. Hermes, Paris.

Larson, J.S., Bradlow, E.T., Fader, P.S. (2005). An exploratory look at supermarket shopping paths. *International Journal of Research in Marketing*. 22(4), 395–414.

Larsson, J.P., Öner, Ö. (2014). Location and co-location in retail: A probabilistic approach using geo-coded data for metropolitan retail markets. *Annals of Regional Science*, 52, 385–408.

Latour, P., Le Floc'h, J. (2001). *Géomarketing : Principes, méthodes et applications*, Editions d'Organisation, Paris.

Lauer, A. (1998). Les déplacements des Français. In *La France redécoupée*, Benoit, J.-M., Benoit, P., Pucci, D. (eds). Belin, Paris.

Laulajainen, R. (1987). *Spatial Strategies in Retailing*. D. Reidel/Kluwer Academic Publishers, Dordrecht.

Laut, J.-L. (1998). Proximité et commerce : pour l'éclairage du concept. *Communication et langages*, 116(1), 92–107.

Lawrence, P.R., Lorsch, J.W. (1967). *Organization and Environment: Managing Differentiation and Integration*. Harvard University, Boston.

Lécluse, S. (2016). A Lille Carrefour géolocalise ses clients pour les guider jusqu'à la promo. *Capital*, 14 October.

Lee, H.L., Whang, H. (2001). Winning the last mile of e-commerce. *MIT Sloan Management Review*, 15 July.

Lefebvre, H. (2000). *La production de l'espace*, 4th edition. Economica, Paris.

Lefebvre, J.-L. (2017). *Space Strategy*. ISTE Ltd, London, and Wiley, New York.

Legohérel, P., Poutier, E. (2011). *Revenue Management*. Dunod, Paris.

Legouet, L. (2010). L'encadrement légal et réglementaire de la relation distributeur-producteur. *Banque/Banque Magazine*, 729, 34–35.

Lenormand, M., Louail, T., Cantú-Ros, O.G., Picornell, M., Herranz, R., Murillo Arias, J., Barthelemy, M., San Miguel, M., Ramasco, J.J. (2015). Influence of sociodemographic characteristics on human mobility. *Scientific Reports*, 5(10075), 1–13.

Léo, P.-Y., Philippe, J. (2000). Centres-villes et périphéries commerciales : le point de vue des consommateurs. *Cahiers de Géographie du Québec*, 44(123), 363–97.

Levitt, T. (1983). The globalization of markets, *Harvard Business Review*, 61(3), 92–101.

Levy, A. (1996). Pour une socio-sémiotique et l'espace. Problématique et orientation de recherche. In *Sociologie en ville*, Ostrowetsky, S. (ed.). L'Harmattan, Paris, 61–77.

Levy, M., Weitz, B., Grewal, D. (2018). *Retailing Management*, 10th edition. McGraw-Hill Education, New York.

Lewison, D.M., DeLozier, M.W. (1986). *Retailing*. Merril Publishing Company.

Li, J., Sheng, Z. (2011). A multi-agent model for the reasoning of uncertainty information in supply chains. *International Journal of Production Research*, 49(19), 5737–5753.

Li, Y.M., Wu, C.-T., Lai, C.-Y. (2013). A social recommender mechanism for e-commerce: Combining similarity, trust, and relationship. *Decision Support Systems*, 55, 740–752.

Lillis, C.M., Hawkins, D.I. (1974). Retail expenditure flows in contiguous trade areas. *Journal of Retailing*, 50(2), 30–42.

Lösch, A. (1941). *Die Räumliche Ordnung der Wirtschaft*. Fisher, Iéna.

Lösch, A. (1954). *Economics of Location*, translation. Yale University Press, New Haven.

Louail, T., *et al*. (2014). From mobile phone data to the spatial structure of cities. *Science Reports*, 4(5276).

Louvière, J. (1974). Predicting the response to real stimulus objects from an abstract evaluation of their attributes: The use of trout streams. *Journal of Applied Psychology*, 59, 572–577.

Luce, R.D. (1959). *Individual Choice Behavior: A Theoretical Analysis*. John Wiley & Sons, New York.

Lusch, R.F. (1979). Erase distribution channel from vocabulary, add marketing channel. *Marketing News*, 13(2), 12–13.

Maamar, Z. (2003). Commerce, e-commerce and m-commerce: What comes next?. *Communications of the ACM*, 46(12), 251–257.

Macé, S. (2000a). *La politique marketing du point de vente*. Vuibert, Paris.

Macé, S. (2000b). Le micro-marketing du point de vente et l'efficacité des promotions. In *Etudes et recherches sur la distribution*, Volle, P. (ed.). Economica, Paris, 247–267.

Mahajan, V., Jain, A., Ratchford, B. (1978). Use of binary attributes in the multiplicative competitive integrative choice model. *Journal of Consumer Research*, 5, 210–215.

Mahajan, V., Peterson, R.A. (1979). Integrating time and space in technological substitution models. *Technological Forecasting and Social Change*, 14(3), 231–241.

Mahajan, V., Peterson, R.A., Jain, A.K., Malhotra, N. (1979). A new product growth model with a dynamic market potential. *Long Range Planning*, 12(4), 51–58.

Mahajan, V., Muller, E., Kerin, R.A. (1984). Introduction strategy for new products with positive and negative word-of-mouth. *Management Science*, 30(12), 1389–1404.

Mahajan, V., Sharma, S., Srinivas, D. (1985). An application of portfolio analysis for identifying attractive retail locations. *Journal of Retailing*, 61(4), 19–34.

Mahajan, V., Muller, E., Srivastava, R.K. (1990). Determination of adopter categories by using innovation diffusion models. *Journal of Marketing Research*, 27(1), 37–50.

Mahajan, V., Muller, E., Bass, F.M. (1995). Diffusion of new products: Empirical generalizations and managerial uses. *Marketing Science*. 14(3), 79–88.

Maillet, G. (1967). L'attraction des grandes surfaces de vente : étude d'un modèle. *Revue de Statistique Appliquée*, 15(3), 5–29.

Maity, M., Dass, M. (2014). Consumer decision-making across modern and traditional channels: E-commerce, m-commerce, in-store. *Decision Support Systems*, 61, 34–46.

Malhotra, N.K., (1983). A threshold model of store choice. *Journal of Retailing*, 59(2), 3–21.

March, J.G., Simon, H.A. (1958). *Organizations*. John Wiley & Sons, New York.

Maricourt (de), R. (2015). *La prévision des ventes*. PUF, Paris.

Marouseau, G. (2013). Le *Click and Collect* : La logistique participative du client dans les drive. *Logistique et Management*, 21(3), 31–39.

Martimort, D., Pouyet, J., Ricci, F. (2018). Extracting information or resource? The Hotelling rule revisited under asymmetric information. *RAND Journal of Economics*, 49(2), 311–347.

Martini, A., Spataro, L. (2018). The principle of subsidiarity and the ethical factor in Giuseppe Toniolo's thought. *Journal of Business Ethics*, 153, 105–119.

Marzloff, B., Bellanger, F. (1996). *Les nouveaux territoires du marketing : Enquête sur les réponses des médias au géomarketing et au marketing relationnel*. Liaisons, Paris.

Marzloff, B., Le Carpentier, T. (1999). Parcours et escales : une approche cinétique du consommateur et des lieux. In *2e Colloque Etienne Thil*. Université de La Rochelle, La Rochelle, 338–344.

Mattioli, D., Bustillo, M. (2012). Can texting save stores? *Wall Street Journal*, 259(108), B1-B9.

Matusitz, J., Leanza, K. (2011). ASDA: Organic growth of a retailer in the United Kingdom? *Journal of International Food & Agribusiness Marketing*, 23, 128–150.

McCarthy, E.J. (1960). *Basic Marketing: A Managerial Approach*. Richard D. Irwin Inc., Homewood.

McFadden, D. (1974). Conditional logit analysis of qualitative choice behavior. In *Frontier of econometrics*, Zarembka, P. (ed.). Academic Press, New York, 105–142.

McIntyre, S.H., Miller, C.M. (1999). The selection and pricing of retail assortment: An empirical approach. *Journal of Retailing*, 75(3), 295–318.

McKay, D.B. (1973). A spectral analysis of the frequency of supermarket visits. *Journal of Marketing Research*, 10(2), 84–90.

McKay, D.B., Olshavsky, R.W. (1975). Cognitive maps and retail locations. *Journal of Consumer Research*, 2(4), 197–205.

McKenzie, S.B. (1989). Retail gravity model. *The Appraisal Journal*, 57(2), 166–172.

Melero, I., Sese, F.J., Verhoef, P.C. (2016). Recasting the customer experience in today's omni-channel environment. *Universia Business Review*, 50, 18–37.

Melnyk, V., Klein, K., Volckner, F. (2012). The double-edged sword of foreign brand names for companies from emerging countries. *Journal of Marketing*, 76(4), 21–37.

Menne, P. (2009). *Potential of Geo-Marketing-Tools for the development of advanced Online-Marketing business models*. Grin, Norderstedt.

Merenne-Schoumaker, B. (2002). *La localisation des industries : enjeux et dynamiques*. Presses Universitaires de Rennes, Rennes.

Meyer, E. (2015). *The Culture Map: Decoding how People Think, Lead, and Get Things Donr across Cultures*. PublicAffairs, New York.

Meyronin, B. (2015). *Marketing territorial : Enjeux et pratiques*. Vuibert, Paris.

Michaud-Trevinal, A. (2013). Le magasinage dans un centre commercial : une typologie de quatre parcours. *Recherche et applications en Marketing*, 28(3), 14–44.

Michaud-Trevinal, A., Cliquet, G. (2002). Localisation commerciale et mobilité du consommateur. In *5e Colloque Etienne Thil*. Institut de Gestion La Rochelle, La Rochelle.

Miller, F.P., Vandome, A.F., McBrewster, J. (2010). *Géomatique : Information géographique, Photographie aérienne, Géomarketing, Géographie, Aménagement du territoire, Gestion des risques*. Alphascript Publishing, Beau Bassin (Maurice).

Miller, H.J. (1996). Pricing policy reactions to agglomeration in a market with spatial search. *Journal of Regional Science*, 36(3), 393–415.

Minkler, A.P. (1990). An Empirical analysis of a firm's decision to franchise. *Economics Letters*, 34, 77–82.

Minsky, M.L. (1986). *Society of Mind*. Simon & Schuster Inc., New York.

Mintzberg, H. (1994). *The Rise and Fall of Strategic Planning*. Simon & Schuster, New York.

Mintzberg, H. (2004). *Managers not MBAs: A Hard Look at the Soft Practice of Managing and Management Development*. Berrett-Koehler Publishers, Oakland.

Misner, C.W., Thorne, K.S., Wheeler, J.A. (1973). *Gravitation*. W.H. Freeman Company, New York.

Moati, P. (2001). *L'avenir de la grande distribution*. Odile Jacob, Paris.

Moati, P. (2011). *La nouvelle révolution commerciale*. Odile Jacob, Paris.

Moiseeva, A., Timmermans, H. (2010). Imputing relevant information from multi-day GPS tracers for retail planning and management using data fusion and context-sensitive learning. *Journal of Retailing and Consumer Services*, 17, 189–199.

Monmonier, M.S. (2018). *How to Lie with Maps*, 3rd edition. University of Chicago Press, Chicago.

Monroe, K.B. (1979). *Pricing: Making Profitable Decisions*. McGraw-Hill, New York.

Monroe, K.B., Guiltinan, J.P. (1975). A path-analytic exploration of retail patronage influences. *Journal of Consumer Research*, 2, 19–28.

Montello, D.R. (1998). A new framework for understanding the acquisition of spatial knowledge in large-scale environments. In *Spatial and Temporal reasoning in Geographic Information Systems*, Egenhofer, M.J., Golledge, R.G. (ed.). Oxford University Press, Oxford.

Montgomery, A.L. (1997). Creating micro-marketing pricing strategies using supermarket scanner data. *Marketing Science*, 16(4), 315–337.

Montoya, R.M., Horton, R.S. (2014). A two-dimensional model for the study of interpersonal attraction. *Personality and Social Psychology Review*, 18(1), 59–86.

Moran, P.A.P. (1950). Notes on continuous stochastic phenomena. *Biometrika*, 37, 17–33.

More, T. (1516). *Utopia*. Dover Thrift Edition, Mineola.

Moreno Jiménez, A. (2001). *Geomarketing con sistemas de informacion geográfica*. Universidad Autónoma de Madrid, Madrid.

Mulder, M. (1958). *Group Structure, Motivation and Group Performance*. Commissie voor Opvoering van Productiviteit and Moulton, La Haye.

Mulhern, F.J., Williams, J.D., Leone, R.P. (1998). Variability of brand price elasticities across retail stores: Ethnic, income, and brand determinants, *Journal of Retailing*, 74, 3, 427–446.

Murray, A.T. (2016). Maximal coverage location problem: Impacts, significance, and evolution. *International Regional Science Review*, 39(1), 5–27.

Murray, C.C., Talukdar, D., Gosavi, A. (2010). Joint optimization of product price, display orientation and shelf-space allocation in retail category management. *Journal of Retailing*, 86(2), 125–136.

Murray, C.C., Chu, A.G. (2015). The flying sidekick traveling salesman problem: Optimization of drone-assisted parcel delivery. *Transportation Research Part C*, 54, 86–109.

Myers, J.H., Warner, W.G. (1968). Semantic properties of selected evaluation adjectives. *Journal of Marketing Research*, 5 (4), 409–11.

Naert, P., Bultez, A. (1973). Logically consistent market share models. *Journal of Marketing Research*, 10(3), 334–340.

Nagae, T., Akamatsu, T. (2006). Dynamic revenue management of a toll road project under transportation demand uncertainty. *Network Spatial Economics*, 6, 345–357.

Nakanishi, M. (1972). Measurement of sales promotion effect at the retail level – A new approach. In *Proceedings Fall Conference AMA*. American Marketing Association, Chicago, 338–343.

Nakanishi, M., Cooper, L.G. (1974). Parameter estimation for a multiplicative competitive interaction model: Least squares approach. *Journal of Marketing Research*, 11(3), 303–311.

Nakanishi, M., Cooper, L.G., Kassarjian, H.H. (1974). Voting for a political candidate under conditions of minimal information. *Journal of Consumer Research*, 1, 36–43.

Neubome, E. (2000). E-tailers: Deliver or die. *Business Week*, 23 October, 16.

Nevin, J.R., Houston, M.J. (1980). Image as a component of attraction to intraurban shopping areas. *Journal of Retailing*, 56(1), 77–93.

Nguyen, H.T.H., Cao, J. (2015). Trustworthy answers for top-k queries on uncertain Big Data in decision making. *Information Sciences*, 318, 73–90.

Ngwe, D. (2017). Why outlet stores exist: Averting cannibalization in product line extensions. *Marketing Science*, 36(4), 523–541.

Nigel, G., Doran, J. (1994). *Simulating Societies: The Computer Simulation of Social Phenomena*. UCL Press, London.

Noin, D. (1989). *L'espace français*. Armand Colin, Paris.

Norman, G. (1981). Uniform pricing as an optimal spatial pricing policy. *Economica*, 48, 87–91.

Nystuen, J.D. (1967). A theory and simulation of intraurban travel. In *Quantitative geography, Part I: Economic and cultural topics*, Garrison, W.L., Marble, D.F. (eds). Northwestern University Press, Evanston, 54–83.

O'Keefe, J., Burgess, N., Jeffery, K.J. (1998). *The Hippocampal and Parietal Foundations of Spatial Cognition*. Oxford University Press, Oxford.

O'Kelly, M. (1981). A model of demand for retail facilities incorporating multistop, multipurpose trips. *Geographical Analysis*, 13, 134–148.

OECD (2009). Renforcer la concurrence pour accroître l'efficacité et l'emploi [Online]. In *Études économiques de l'OCDE*, 5. Éditions de l'OCDE, Paris. Available at: https://www.cairn.info/revue-etudes-economiques-de-l-ocde-2009-5-page-113.htm.

Ohlin, B. (1931). *Interregional and International Trade*. Harvard University Press, Boston.

Ohmae, K. (1982). *The Mind of the Strategist*. McGraw-Hill, New York.

Ohta, H. (1993). Introduction: In honour of Melvin L. Greenhut. In *Does Economic Space Matter: Essay in Honour of Melvin L. Greenhut*, Ohta H., Thisse J.F. (eds). Palgrave Macmillan, Basingstoke, 1–18.

Okazaki, S., Mendez, F. (2013). Perceived ubiquity in mobile services. *Journal of Interactive Marketing*, 27(2), 98–111.

Oliveau, S. (2011). L'espace compte ! Mesurer les structures spatiales du changement social [Online]. *HAL*. Available at: https://halshs.archives-ouvertes.fr/tel-01139493/document.

Oliveau, S. (2017). Autocorrélation spatiale [Online]. *Hypergéo*. Available at: https://hal.archives-ouvertes.fr/hal-01448724.

Orfeuil, J.-P. (2001). L'évolution de la mobilité quotidienne. *INRETS*, 37.

Ozimec, A.-M., Natter, M., Reutterer, T. (2010). Geographical information systems-based marketing decisions: Effects of alternative visualizations on decision quality. *Journal of Marketing*, 74(4), 94–110.

Palos-Sanchez, P., Saura, J.R., Reyes-Menendez, A., Vásquez Esquivel, I. (2018). Users acceptance of location-based marketing apps in tourism sector: An exploratory analysis. *Journal of Spatial and Organizational Dynamics*, 6(3), 258–270.

Pancras, J., Sriram, S., Kumar, V. (2012). Empirical investigation of retail expansion and cannibalization in a dynamic environment. *Management Science*, 58(11), 2001–2012.

Panori, A., Psycharis, Y. (2018). The impact of economic crisis on poverty and welfare in Athens. In *Localisation et inégalités de revenus : Nouveaux défis pour les territoires urbains*, Psycharis, Y., Bourdin, S. (eds). L'Harmattan, Paris.

Pantano, E., Naccarato, G. (2010). Entertainment in retailing: The influences of advanced technologies. *Journal of Retailing and Consumer Services*, 17, 200–204.

Paolanti, M., Liciotti, D., Pietrini, R., Mancini, A., Frontoni, E. (2017). Modelling and forecasting customer navigation in intelligent retail environments. *Journal of Intelligent & Robotic Systems*, 91(2), 165–180.

Paquot, T. (2011). Qu'est-ce qu'un "territoire" ? *Vie sociale*, 2(2), 23–32.

Park, J., Amendah, E., Lee, Y., Hyun, H. (2019). M-payment service: Interplay of perceived risk, benefit, and trust in service adoption. *Human Factors & Ergonomics in Manufacturing & Service Industries*, 29(1), 31–43.

Parker, R.D. (2007). Provincial and territorial on-line tourism: How Canadian provinces and territories are using the Internet for travel marketing and promotion. *Academy of Marketing Studies Journal*, 11(2), 39–55.

Payne, J.W., Easton Ragsdale, E.K. (1978). Verbal protocols and direct observation of supermarket shopping behavior: Some findings and a discussion of methods. *Advances in Consumer Research*, 5(1), 571–577.

Pecqueur, B., Zimmermann, J.-B. (2002). Les fondements d'une économie de proximités. Working document, GREQAM, Marseille, 23.

Peres, R., Muller, E., Mahajan, V. (2010). Innovation diffusion and new product growth models: A critical review and research directions. *International Journal of Research in Marketing*, 27, 91–106.

Peterson, R.A., Jolibert, A. (1995). A meta-analysis of country-of-origin effects. *Journal of International Business Studies*, 26(4), 883–899.

Petr, C. (2006). Direct marketing and geographic information. In *Geomarketing: Methods and Strategies in Spatial Marketing*, Cliquet, G. (ed.). ISTE Ltd, London.

Pham, N.D. (2014). Store attraction management: an application of the MCI Model in Vietnam. PhD thesis, Université de Rennes 1, Rennes.

Philippeau, G. (1985). *Théorie des plans d'expérience : application à l'agronomie*. ITCF, Paris.

Philips, L. (1988). *The economics of imperfect information*. Cambridge University Press, Cambridge.

Piatier, A. (1957). L'attraction commerciale des villes – Une nouvelle méthode de mesure : l'enquête d'essai menée dans le Loir-et-Cher. *Revue Economique et Juridique du Sud-Ouest*, 4, 575–601.

Picot-Coupey, K. (2014). The pop-up store as a foreign operation mode (FOM) for retailers. *International Journal of Retail & Distribution Management*, 42(7), 643–670.

Picot-Coupey, K., Huré, E., Cliquet, G., Petr, C. (2009). Grocery shopping and Internet: Exploring French consumers' perceptions of the "hypermarket" and "cybermarket" formats. *The International Review of Retail Distribution and Consumer Research*, 19(4), 437–455.

Picot-Coupey, K., Burt, S.L., Cliquet, G. (2014). Retailers' expansion mode choice in foreign markets: Antecedents for expansion mode choice in the light of internationalization theories. *Journal of Retailing & Consumer Services*. 21(6), 976–991.

Picot-Coupey, K., Huré, E., Piveteau, L. (2016). Channel design to enrich customers' shopping experiences: Synchronizing clicks with bricks in an omni-channel perspective–the Direct Optic case. *International Journal of Retail & Distribution Management*, 44(3), 336–368.

Picq, P. (2019). *L'intelligence artificielle et les chimpanzés du futur – Pour une anthropologie des intelligences*. Odile Jacob, Paris.

Piller, F.T., Müller, M. (2004). A new marketing approach to mass customization. *International Journal of Computer Integrated Manufacturing*, 17(7), 583–593.

Pillet, M. (1992). *Introduction aux plans d'expériences par la méthode Taguchi*. Editions d'Organisation, Paris.

Pine, B.J. (1993). *Mass Customization*. Harvard Business School Press, Boston.

Piron, F. (2001). International retail leakages: Singaporeans outshopping in Malaysia. *Singapore Management Review*, 23(1), 35–58.

Plantin, J.-C. (2014). *Participatory Mapping*. ISTE Ltd, London, and Wiley, New York.

Poitou, J.-P. (1966). Théorie de la "réduction des distances psychologiques dans une hiérarchie de pouvoir" de Mulder. *L'Année psychologique*, 66(2), 475–493.

Ponsard, C. (1988). *Analyse économique spatiale*. PUF, Paris.

Pontalis, J.-B. (1990). *La force d'attraction*. Le Seuil, Paris.

Popkowski Leszczyc, P.T.L., Sinha, A., Sahgal, A. (2004). The effect of multi-purpose shopping on pricing and location strategy for grocery stores. *Journal of Retailing*, 80, 85–99.

Pornon, H. (1998). *Systèmes d'information géographique, pouvoir et organisations : Géomatique et stratégies d'acteurs*. L'Harmattan, Paris.

Pornon, H. (2015). *SIG : La dimension géographique du système d'information*, 2nd edition. Dunod, Paris.

Pouget, M., Mering, C., Andrianasolo H. (1990). *Images satellite et milieux terrestres en régions arides et tropicales*. ORSTOM, Paris, 287–299.

Pras, B. (1976). Échelles d'intervalles à supports sémantiques. *Revue Française du Marketing*, 61, 87–95.

Pras, B., Summers, J. (1975). A comparison of linear and nonlinear evaluation process models. *Journal of Marketing Research*, 12(3), 276–281.

Preble, J.F., Hoffman, R.C. (2006). Strategies for business format franchisors to expand into global markets. *Journal of Marketing Channels*, 13(3), 29–50.

Preston, C. (2000). The problem with micro-marketing. *Journal of Advertising Research*, 40(4), 55–58.

Proffitt, D.R., Stefanucci, J., Banton, T., Epstein, W. (2003). The role of effort in perceiving distance. *Psychological Science*, 14(2), 106–112.

Punakivi, M., Yrjölä, H., Holmström, J. (2001). Solving the last mile issue: Reception box or delivery box?. *International Journal of Physical Distribution & Logistics Management*, 31(6), 427–439.

Puzakova, M., Kwak, H., Bell, M. (2015). Beyond seeing McDonald's fiesta menu: The role of accent in brand sincerity of ethnic products and brands. *Journal of Advertising*, 44(3), 219–231.

Pyle, J.F. (1926). The determination of location standards for retail concerns. *Harvard Business Review*, 4(3), 303–312.

Raghubir, P., Krishna, A. (1996). As the crow flies: Bias in consumers' map-based distance judgments. *Journal of Consumer Research*, 23, 26–39.

Rallet, A., Torre, A. (2004). Proximité et localisation. *Économie Rurale*, 280, 25–41.

Recker, W.W., Schuler, H.J. (1981). Destination choice and processing spatial information: Some empirical tests with alternatives constructs. *Economic Geography*, 57, 373–383.

Reilly, W.J. (1931). *The law of retail gravitation*. Knickerbrocker Press, New York.

Renaudin, V. (2010). Allocation d'espace en magasin. Proposition d'utilisation de l'élasticité des ventes à l'espace des rayons. *Décisions Marketing*, 57, 31–42.

Renaudin, V., Vyt, D. (2018). *Merchandising: du category management à l'expérience client*. Vuibert, Paris.

ReVelle, C.S., Laporte, G. (1996). The plant location problem: New models and research prospect. *Operations Research*, 44(6), 864–874.

ReVelle, C.S., Eiselt, H.A. (2005). Location analysis: A synthesis and survey. *European Journal of Operational Research*, 165, 1–19.

Revzan, D.A. (1968). *A Geography of Marketing: Integrative Statement* and *A Geography of Marketing: Resource Bibliography*. Institute of Business and Economic Research/ University of California, Berkeley.

Reynolds, J. (1997). Retailing in computer-mediated environments: Electronic commerce across Europe. *International Journal of Retail & Distribution Management*, 25(1), 29–37.

Rigby, D.K., Vishwanath, V. (2006). Localization: The revolution in consumer markets. *Harvard Business Review*, 84(4), 82–92.

Rittinger, S., Zentes, J. (2012). Le comportement cross-canal des consommateurs : une comparaison entre les consomateurs français, allemands, italiens et britanniques. *Revue Française du Marketing*, 237/238 (2/3/5), 43–55.

Robert-Demontrond, P., Thiel, D. (2002). Apport des algorithmes génétiques pour l'optimisation des stratégies spatiales des firmes de distribution. In *Stratégies de localisation des entreprises commerciales et industrielles : de nouvelles perspectives*, Cliquet, G., Josselin, J.-M. (eds). De Boeck, Brussels, 129–148.

Robert-Demontrond, P., Thiel, D., Ferrandi, J.-M. (2018). Vers un merchandising multi-agents : définition conceptuelle et opérationnelle. In *Retailing et localisation*, Perrigot, R., (ed.). Presses Universitaires de Provence, Marseille.

Rochet, C., Volle, M. (2015). *L'intelligence iconomique : les nouveaux modèles d'affaires de la troisième révolution industrielle*. De Boeck, Louvain-La-Neuve.

Rodriguez, M., Camacho, J.A. (2008). The geography of public services employment in Europe: concentration or dispersion?. *The Service Industries Journal*, 28(3), 325–335.

Roger, P. (1984). Description of consumer spatial behaviour: A new approach. *International Journal of Research in Marketing*, 1(3), 171–181.

Rogers, E.M. (1962). *The diffusion of innovation*. Free Press, New York.

Rogers, E.M. (1983). *The diffusion of innovation*, 3rd edition. Free Press, New York.

Rosaci, D., Sarne, G.M.L. (2014). Multi-agent technology and ontologies to support personalization in B2C E-Commerce. *Electronic Commerce Research and Applications*, 13, 13–23.

Rosenbloom, B. (1976). The trade area mix and retailing mix: A retail strategy matrix. *Journal of Marketing*, 40(4), 58–66.

Rulence, D. (2003). Gestion des réseaux de points de vente : l'importance de la dimension spatiale. *Recherche et applications en Marketing*, 18(3), 65–80.

Russell, J.E. (2013). Using a retail location game to explore hotelling's principle of minimum differentiation. *Business Education Innovation Journal*, 5(2), 48–52.

Saarela, A.-M., Kantanen, T.T., Lapveteläinen, A.T., Mykkänen, H.M., Karppinen, H.A., Rissanen, R.L. (2013). Combining verbal analysis protocol and wireless audiovisual observation to examine consumers' supermarket shopping behavior. *International Journal of Consumer Studies*, 37, 577–584.

Samaraweeraa, M., Gelb, B.D. (2015). Formal salesforce controls and revenue production: A meta-analysis. *Journal of Personal Selling & Sales Management*, 35(1), 23–32.

Samuelson, P.A. (1938). A note on the pure theory of consumer behavior. *Economica*, 5, 61–71.

Sancerre, O. (2019). Amazon veut créer sa propre chaîne de supermarchés. *Le Journal de l'Economie*, 5 March.

Scemama, C. (2017). Hédiard : l'épicier de luxe en pleine déconfiture [Online]. *L'Express/L'Expansion*, 29 May. Available at: https://lexpansion.lexpress.fr/actualite-economique/epicerie-de-luxe-hediard-recit-d-une-deconfiture_19119 74.html.

Scheibe, K.P., Carstensen Jr., J.W., Rakesc, T.R., Rees, L.P. (2006). Going the last mile: A spatial decision support system for wireless broadband communications. *Decision Support Systems*, 42, 557–570.

Schilit, B.N., Theimer, M.M. (1994). Disseminating active map information to mobile hosts. *IEEE Network*, 8(5), 22–32.

Schmitt, J. (2009). Parcours, déplacements et actions face au rayon : mieux comprendre le comportement physique du consommateur en magasin. PhD thesis, HEC, Jouy-en-Josas.

Schmitt, J. (2010). Drawing association rules between purchases and in-store behavior: An extension of the market basket analysis. *Advances in Consumer Research*, 37, 899–901.

Schmittlein, D.C., Mahajan, V. (1982). Maximum likelihood estimation for an innovation decision model of new product acceptance. *Marketing Science*, 1(1), 57–78.

Schneider, K.C., Johnson, J.C., Sleeper, B.J., Rodgers, W.C. (1998). A note on applying retail location models in franchise systems: A view from the trenches. *Journal of Consumer Marketing*, 15(3), 290–296.

Schüssler, F. (2006). *Geomarketing: Anwendung Geographischer Informationssysteme im Einzelhandel*. Tectum, Baden-Baden.

Scott, P. (1970). *Geography and retailing*. Aldine, Chicago.

Sen, A. (1985). *Commodities and Capabilities*. Elsevier, Oxford.

Serra, D., ReVelle, C.S., Rosing, K. (1999). Surviving in a competitive spatial market: The threshold capture model. *Journal of Regional Science*, 39(4), 637–652.

Servigne, S., Libourel, T. (2006). *Fondements des bases de données spatiales*. Hermes-Lavoisier, Paris.

Severin, V., Louviere, J.J., Finn, A. (2001). The stability of retail shopping choices over time and across countries. *Journal of Retailing*, 77, 185–202.

Sevosi, A., Troiani, M. (1987). The banking system in Sicily: A territorial analysis for planning and marketing purposes. *European Journal of Operational Research*, 3, 55–67.

Shankar, V., Inman, J.J., Mantrala, M., Kelley, E., Rizley, R. (2011). Innovations in shopper marketing: Current insights and future research issues. *Journal of Retailing*, 87(1), 529–542.

Shannon, C.E., Weaver, W. (1949). *The Mathematical Theory of Communication*. University of Illinois Press, Urbana.

Sharma, D., Gassenheimer, J.B., Alford, B.L. (2010). Internet channel and cannibalization: An empirical assessment of sales agents' perspective. *Journal of Personal Selling & Sales Management*, 30(3), 209–221.

Sheldon, P.J., Var, T. (1985). Tourism forecasting: A review of empirical research. *Journal of Forecasting*, 4, 183–95.

Shi, Y., Sia, C.L., Chen, H. (2013). Leveraging social grouping for trust building in foreign electronic commerce firms: An exploratory study. *International Journal of Information Management*, 33, 419–428.

Simon, H.A. (1955). A behavioral model of rational choice. *Quarterly Journal of Economics*, 69, 99–118.

Simon, H.A. (1957). *Models of Man*. John Wiley, New York.

Siriex, L., (2000). L'influence de la recherche de variété sur la fidélité au magasin. In *Etudes et recherches sur la distribution*, Volle, P. (ed.). Economica, Paris.

Slade, E.L., Williams, M.D., Dwivedi, Y.K. (2013). Mobile payment adoption: Classification and review of the extant literature. *The Marketing Review*, 13(2), 167–190.

Sleight, P. (2004). An introductory review of geodemographic information systems. *Journal of Targeting, Measurement and Analysis for Marketing*, 12(4), 379–388.

Sorensen, H. (2003). The science of shopping: Location is important, but it's not everything. *Marketing Research*, 15(3), 30–35.

Souza, C.M.P., Bradley, F. (2006). Cultural distance and psychic distance: Two peas in a pod. *Journal of International Marketing*, 14(1), 49–70.

Spann, M., Molitor, D., Daurer, S. (2016). Tell me where you are and I'll tell you what you want: Using location data to improve marketing decisions. *GfK Marketing Intelligence Review*, 8(2), 30–37.

Spatialist (n.d.). De la détermination de potentiels à la démarche de prospection de clients [Online]. Available at: http://www.spatialist.fr/documents/publications/5-modelisation-marketing-operationnel/file.

Stanley, T., Sewal, M. (1976). Image inputs to a probabilistic model: Predicting retail potential. *Journal of Marketing*, 40, 48–53.

Stassen, R.E., Mittelstaedt, J.D., Mittelstaedt, R.A. (1999). Assortment overlap: Its effects on shopping patterns in a retail market when the distributions of prices and goods are known. *Journal of Retailing*, 75(3), 371–386.

Stauffer, D. (1985). *Introduction to Percolation Theory*. Taylor & Francis, Philadelphia.

Stern, L.W., El Ansari, A.I. (1988). *Marketing Channels*. Prentice-Hall, Upper Saddle River.

Steyer, A. (2005). Géométrie de l'interaction sociale : le modèle de diffusion en avalanches spatiales. *Recherche et applications en Marketing*, 20(3), 3–20.

Streed, O., Cliquet, G. (2007). Concept uniformity: Control versus freedom in business format franchising. In *Strategy and Governance of Networks*, Hendrikse, G., Tuunanen, M., Windsperger, J., Cliquet, G. (eds). Physica-Verlag, Heidelberg.

Streed, O., Kagan, A., Cliquet, G. (2013). Optimizing geofencing for location-based services: A new application of spatial marketing. In *18th Academy of Marketing Conference*. Monterey.

Suelflow, J.E. (1962). Market potential: Its theory and application. PhD thesis, University of Wisconsin, Madison.

Svensson, G. (2001). "Glocalization" of business activities: A "glocal strategy" approach. *Management Decision*, 39(1), 6–18.

Swinyard, W.R. (1997). Retailing trends in the USA: Competition, consumers, technology and the economy. *International Journal of Retail & Distribution Management*, 25(8), 244–255.

Swoboda, A., Nega, T., Timm, N. (2015). Hedonic analysis over time and space: The case of house prices and traffic noise. *Journal of Regional Science*, 55(4), 644–670.

Szmerekovsky, J.G., Tilson, V., Zhang, J. (2011). Analytical model of adoption of item level RFID in a two-echelon supply chain with shelf-space and price-dependent demand. *Decision Support Systems*, 51, 833–841.

Tapper, W. (2006). *Geomarketing in der Praxis*. Bernhard Harzer, Karlsruhe.

Tauber, E.M. (1972). Why do people shop? *Journal of Marketing*, 36(4), 46–59.

Temman, M. (2006). Les Coréens ne croiseront plus de Carrefour. *Libération*, 7 April.

Thil, E. (1966). *Les inventeurs du commerce moderne*. Arthaud, Paris.

Thiessen, A.H., Alter, J.C. (1911). Precipitation averages for large areas. *Monthly Weather Review*, 39, 1082–1084.

Thünen (von), J.H. (1826). *Der isolierte Staat in Beziehung auf Landwirthschaft und Nationalökonomie (l'État isolé en relation avec l'agriculture et l'économie nationale)*. Friedrich Perthes, Hamburg.

Timmermans, H. (1980). Consumer spatial choice strategies: A comparative study of some alternative behavioural spatial shopping models. *Geoforum*, 11, 123–131.

Tomassone, R., Lesquoy, E., Millier, C. (1983). *La régression : nouveaux regards sur une ancienne méthode statistique*, vol. 13. Masson, Paris.

Torre, A., Talbot, D. (2018). 25 ans de proximité. *Revue d'Économie Régionale et Urbaine*, HS, 5–6.

Toumi, A., Cliquet, G. (2019). Retailer's locational choice and chain positioning. In *RARCS (Recent Advances in Retailing and Consumer Services) Conference*. Radisson Blue Hotel, Tallinn.

Tranos, E., Nijkamp, P. (2013). The death of distance revisited: Cyber-place, physical and relational proximities. *Journal of Regional Science*, 53(5), 855–873.

Trespe, B. (2007). *Geomarketing: Eine Analyse der Erfolgspotenziale aus Sicht der deutschen Automobilhersteller*. Lang Peter, Frankfurt.

Tsai, L.S. (1932). *The Laws of Minimum Effort and Maximum Satisfaction in Animal Behavior*, vol. 1. National Institute of Psychology, Beijing.

Tu, W., Li, Q., Fang, Z., Shaw, S.-L., Zhou, B., Chang, X. (2016). Optimizing the locations of electric taxi charging stations: A spatial–temporal demand coverage approach. *Transportation Research Part C: Emerging Technologies*, 65, 172–189.

Tversky, A., Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Sciences*, 18, 1124–1131.

Tversky, A., Kahneman, D. (1991). Loss aversion in riskless choice: A reference-dependent model. *Quarterly Journal of Economics*, 106, 1039–61.

Tversky, A., Simonson, I. (1993). Context-dependent preferences. *Management Science*, 39, 1179–89.

Urban, G.L. (1969). Mathematical modeling approach to product line decision. *Journal of Marketing Research*, 6(1), 40–47.

Urban, T.L. (1998). An inventory-theoretic approach to product assortment and shelf-space allocation. *Journal of Retailing*, 74(1), 14–35.

Usunier, J.-C., Lee, J.A. (2013). *Marketing Across Cultures*, 6th edition. Pearson, London.

Van Watershoot, W., Van der Bulte, C. (1992). The 4P classification of the marketing mix revisited. *Journal of Marketing*, 56(4), 83–93.

Vant, A. (1998). Proximités et géographies. In *Approches multiformes de la proximité*, Bellet, M., Kirat, T., Largeron, C. (eds). Hermes, Paris.

Viard, J. (1994). *La société d'archipels ou les territoires du village global*. Éditions de l'Aube, La Tour-d'Aigues.

Viard, J. (2011). *Éloge de la mobilité : essai sur le capital temps libre et la valeur travail*. Éditions de l'Aube, La Tour-d'Aigues.

Vincent, W.S. (1998). Encroachment: Legal restrictions on retail franchise expansion. *Journal of Business Venturing*, 13, 29–41.

Vizard, S. (2013). Customers are mobile first, retailers must be too. *Marketing Week*, 24 October.

Volle, P. (2000). Du marketing des points de vente à celui des sites marchands : spécificités, opportunités et questions de recherche. *Revue Française du Marketing*, 177/178, 83–101.

Volle, P. (2006). Volle, P. (2006). Products and geographic information: Geo-merchandising. In *Geomarketing: Methods and Strategies in Spatial Marketing*, Cliquet, G. (ed). ISTE Ltd, London.

Vyt, D. (2005). Mesure de la performance en grande distribution alimentaire. *Décisions Marketing*, 40, 51–61.

Vyt, D. (2008). Retail network performance evaluation: A DEA approach considering retailers' geomarketing. *The International Review of Retail, Distribution and Consumer Research*, 18(2), 235–253.

Vyt, D., Cliquet, G. (2017). Towards a fairer manager performance measure: A DEA application in the retail industry. *The International Review of Retail, Distribution and Consumer Research*, 27(5), 450–467.

Vyt, D., Jara, M., Cliquet, G. (2017). Grocery pickup creation of value: Customers' benefits vs. spatial dimension. *Journal of Retailing and Consumer Services*, 39, 145–153.

Vyt, D., Jara, M., Cliquet, G. (forthcoming). Fusions et alliances dans le *retail* : de la couverture territoriale à la co-opétition. *Décisions Marketing*.

Walters, R.G., Jamil, M. (2003). Exploring the relationships between shopping trip type, purchases of products on promotion, and shopping basket profit. *Journal of Business Research*, 56, 17–29.

Wang, Y., Zhang, D., Liu, Q., Shen, F., Lee, L.H. (2016). Towards enhancing the last-mile delivery: An effective crowd-tasking model with scalable solutions. *Transportation Research Part E*, 93, 279–293.

Watson, R.T., Pitt, L.F., Berthon, P., Zinkhan, G.M. (2002). U-commerce: Expanding the universe of marketing. *Journal of the Academy of Marketing Science*, 30(4), 333–347.

Weber, A. (1909). *Über den Standort der Industrie*. Mohr, Tübingen.

Weber, A. (1929). *The Theory of the Location of Industry*. University of Chicago Press, Chicago.

Weisbrod, G.E., Percells, R.J., Kern, C. (1984). A disaggregate model for predicting shopping area market attraction. *Journal of Retailing*, 60(1), 65–83.

Weiss, D.L. (1968). The determinants of market share. *Journal of Marketing Research*, 5(3), 290–295.

Wellhoff, A. (2013). *Le Merchandising*, 13th edition. Dunod, Paris.

Weltevreden, J.W.J. (2008). B2C e-commerce logistics: The rise of collection-and-delivery points in The Netherlands. *International Journal of Retail and Distribution Management*, 36(8), 638–660.

White, L.A., Ellis, J.B. (1971). A system construct for evaluating retail market locations. *Journal of Marketing Research*, 8, 43–46.

Whyte Jr, W.H. (1954). The web of word of mouth. *Fortune*, 50(5), 140–143.

Widaningrum, D.L. (2015). A GIS–based approach for catchment area analysis of convenience store. *Procedia Computer Science*, 72, 511–518.

Wildt, A.R. (1974). Multifirm analysis of competitive decision variables. *Journal of Marketing Research*, 11(1), 50–62.

Wind, J., Green, P.E., Shifflet, D., Scarbrough, M. (1989). Courtyard by Marriott: Designing a hotel facility with consumer-based marketing models. *Interfaces*, 19(1), 25–47.

Wittink, D.R. (1977). Exploring territorial differences in the relationship between marketing variables. *Journal of Marketing Research*, 14(2), 145–155.

Wong, S., Yang, H. (1999). Determining market areas captured by competitive facilities: A continuous equilibrium modeling approach. *Journal of Regional Science*, 3(1), 51–72.

Wortmann, M. (2004). Aldi and the German model: Structural change in German grocery retailing and the success of grocery discounters. *Competition and Change*, 8(4), 425–41.

Xu, H., Luo, X.R., Carroll, J.M., Rosson, M.B. (2011). The personalization privacy paradox: An exploratory study of decision making process for location-aware marketing. *Decision Support Systems*, 51, 42–52.

Yaeli, A., Bak, P., Feigenblat, G., Nadler, S., Roitman, H., Saadoun, G., Ship, H., Cohen, D., Fuchs, O., Ofek-Koifman, S., Sandbank, T. (2014). Understanding customer behavior using indoor location analysis and visualization. *IBM Journal of Research and Development*, 58(5/6), 1–12.

Yang, Y.-J., Wang, C.-C., Chen, C.-C. (2017). Recent development trend of electronic commerce research: 2000 to 2016. *Contemporary Management Research*, 13(2), 131–142.

Yang, Z., Su, C., Fam, K.-S. (2012). Dealing with institutional distances in international marketing channels: Governance strategies that engender legitimacy and efficiency. *Journal of Marketing*, 76(2), 41–55.

Zhang, H., Hudson, R., Metcalf, H., Manahov, V. (2015). Identification of house price bubbles using user cost in a state space model. *Applied Economics*, 47(56), 6088–6101.

Zhang, Y., Bian, J., Zhu, W. (2013). Trust fraud: A crucial challenge for China's e-commerce market. *Electronic Commerce Research and Applications*, 12, 299–308.

Zhang, Y. (2015). Designing a retail store network with strategic pricing in a competitive environment. *International Journal of Production Economics*, 159, 265–273.

Zhou, L., Baldacci, R., Vigo, D., Wang, X. (2018). A multi-depot two-echelon vehicle routing problem with delivery options arising in the last mile distribution. *European Journal of Operational Research*, 265, 765–778.

Ziliani, C., Bellini, S. (2004). From loyalty cards to micro-marketing strategies: Where is Europe's retail industry heading? *Journal of Targeting, Measurement and Analysis for Marketing*, 12(3), 281–289.

Zipf, G.K. (1949). *Human Behavior and the Principle of Least Effort*. Addison-Wesley, Boston.

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Geomarketing

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Location-based Marketing outlines the main concepts, methods and strategies for implementing spatial marketing, also known as geomarketing. With an emphasis on the value of mapping in marketing decision-making, this book demonstrates the importance of a more spatialized view of these decisions, in order to best respond to market realities – whether local or international.

The main techniques of geomarketing are presented along with an understanding of the spatial behavior of consumers, both outside the point of sale and in stores. The book further introduces the idea of a "geomarketing mix", which spatializes product innovations, merchandising, pricing and various aspects of promotion. Finally, the book defines what real georetailing comprises and develops the concept of mobile marketing based on geolocation techniques.

Gérard Cliquet is Professor Emeritus at the University of Rennes 1, France. He is the author of numerous publications on marketing, retailing and franchising.

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