The impact of e-commerce on final deliveries: alternative parcel delivery services in France and Germany

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Abstract

In Europe, shopping habits have changed fast during the last decade and a high percentage of consumers now shop online. E-commerce for physical goods generates a significant demand for dedicated delivery services, and results in increasingly difficult last mile logistics. In particular home delivery services, which are usually the preferred option by the online consumers, contribute to the atomization of parcel flows thus causing particular problems within the urban areas. However, alternative delivery solutions are growing fast, especially in metropolitan areas. The purpose of this article is to compare the alternatives to home delivery that have been developed by French and German parcel delivery operators which developed pick-up points in stores and automated lockers networks. The paper includes an analysis of the key drivers of the development of the two emblematic delivery services (pick-up points and lockers), with reference to the strategies of service providers and e-commerce firms as well as consumer preferences.

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Selection and peer-review under responsibility of Technische Universität München

Keywords: E-commerce; final deliveries; parcels delivery; France; Germany.

1. Introduction

In many European countries, shopping habits are changing fast. In the last decade, the use of e-commerce has become very common following the spread of IT systems such as laptops, tablets and smartphones. Today, about 45%...
of all European consumers shop online. More precisely, 60% of German consumers and 44% of French consumers purchased physical and virtual goods online at least once in 2013 as described by European Commission (2013).

Apart from the United Kingdom, France and Germany are the largest European distance selling market, respectively €37.7 billion and €35 billion, as shown in Table 1. During the last five years, e-commerce has accounted for a steeply rising share of total turnover in both countries, for example in 2010-2011 e-commerce increased by 17% in Germany and 22% in France, cf. FEVAD (2012). In 2013, e-commerce in France accounted for 7% of the retail market, which is close to the German figure of 6.4% (BHV, 2014).

Table 1. The position of e-commerce in different European countries. Source: data for online turnover: ECommerce Europe (2013); data for GDP per capita: Eurostat (2013).

<table>
<thead>
<tr>
<th>Member State</th>
<th>Turnover of online and mail-order shopping in 2011 (million €)</th>
<th>Per capita online turnover</th>
<th>Per capita GDP (€)</th>
<th>Online spending per capita - share of per capita GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU27</td>
<td>234,000 (EU28)</td>
<td>496</td>
<td>25,600</td>
<td>1.7%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>84,107</td>
<td>1,248</td>
<td>27,900</td>
<td>4.5%</td>
</tr>
<tr>
<td>France</td>
<td>37,700</td>
<td>577</td>
<td>30,600</td>
<td>1.9%</td>
</tr>
<tr>
<td>Germany</td>
<td>42,100</td>
<td>433</td>
<td>31,700</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

In the case of physical goods, the spread of online shopping has generated significant demand for dedicated delivery services to the end consumer. This has resulted in the increasing fragmentation of shipments in the “last mile”, as described in reports on postal services in different countries (ARCEP, 2012; AT Kearney, 2012).

However, data on the volume and frequency of e-shopping for physical goods is currently scarce or, in some cases, non-existent. This affects investigation in the field of city logistics for e-commerce and limits researchers’ understanding of potential developments concerning the delivery process both nationally and internationally. Indeed discrepancies with regard to categories of delivery services (what is defined as a standard shipment, express delivery, pickup point delivery, etc.) impede straight comparisons and mean that prudence is required when analysing national figures.

The data that relate to parcel flows at national level clearly represent an obstacle when comparing the impact of e-commerce on final deliveries in France and Germany. In both countries e-commerce accounts for about 7% of the retail market and generates most of the distance selling shipments (FEVAD, 2013). However, according to the available figures for 2011, the flow of standard shipments in Germany is three times greater than in France. About 900 million parcels were recorded for B2C in Germany, of which 95% were standard shipments (Granzow, 2013; AT Kearney, 2012). In France, 300 million parcels were delivered to end consumers as standard shipments (ARCEP, 2012). A number of factors help to explain this discrepancy, here we shall focus on two: (i) differences in the classification of standard shipments versus express or non-standard deliveries (based on weight, volume, deadline, etc.); and (ii) national shopping preferences, in particular the German habit of ordering fashion items in different sizes and colours, buying the preferred one and then returning the others (BHV, 2013).

Basis of the available data, this study aims to assess the impact of e-commerce on the urban freight system and final delivery operations. The paper focuses on the deployment of alternative options to home delivery. In particular, we propose a comparison between Germany and France, which, with the United Kingdom, have Europe’s leading e-commerce industries. In Sections 2 and 3 we shall examine the main features of the e-commerce market: consumer habits and the strategies of online selling firms. Then in Section 4 we shall present the impact of e-commerce on parcel delivery services in the selected countries. The final delivery systems in Germany and France are detailed respectively in Section 5. Finally, in the conclusion, we generalize our findings to the wider context of city logistics studies.
2. The impact consumer habits on deliveries

2.1. E-shoppers’ preferences

If we consider the categories of purchases that require physical delivery, the use of e-commerce for fashion and entertainment (i.e. DVDs and CDs) is becoming more popular in Europe. However, the homeware, food and drink, and electronics sectors are faring poorly. More precisely, European consumers are more likely to buy clothes or shoes online (48%), than electronic equipment (31%). Around one in four have purchased each of the following: CDs or DVDs of music or films (24%), household equipment (23%) and magazines, newspapers, or books (22%). Other types of product, such as groceries (9%) and medicine (7%) are less commonly bought online, cf. Eurobarometer (2013).

According to Eurobarometer (2013), the problems experienced with online shopping are mostly related to delivery rather than the product itself. The study reports that 39% of e-consumers have experienced problems such as: delivery at home when nobody was there (15%), a delay in the delivery (13%), delivery costs that were too high (7%), the lack of a way of tracking delivery status (5%), and the need to collect the product from a distant collection point (3%). The problems with e-commerce are slightly different in Germany: in particular, consumers emphasize negative experiences involving delivery delays (29%) and damaged goods (20%) (BITKOM, 2013).

2.2. Returns

Although France and Germany have some common characteristics as regards the most favoured articles for e-commerce, online purchase practices differ in the two countries. The most important difference relates to returns.

In most countries, more than half of all online shoppers have returned an online purchase (UPS survey, 2013). The highest incidence is in Germany where 77% of online shoppers have made a return. From the retailers’ point of view, a distributor survey from BHV has reported that more than a third of all German distributors have an average return rate of over 20%. The rate for some products is even higher, for example, the return rate for fashion articles reaches 40% (BHV, 2013).

The high return rate in Germany is favoured by the fact that most returns are free of charge, especially in the fashion segment. Many consumers frequently order more products than needed, i.e. in the case of fashion articles, different sizes are often ordered from the outset (ibi research, 2013). This results in high volumes of deliveries and returns for the fashion segment, accounting for more than 18% of all parcels in 2013 (MRU, 2013).

2.3. Mode of payment

Another important factor is the mode of payment: two-thirds of all German online orders are made on account. This means that customers are used to paying for the product only once they have decided to purchase it. This practice is unique to Germany. Retailers assume that customers will order more than they will finally buy. Consequently, on average about 40% of all shipments are returned. In France, 90% of online customers pay before they receive the product. The return rate is less than half of that in Germany, cf. Kolbrück and Werner (2013).
2.4. The growth of m-commerce

Almost half of EU citizens state they have purchased products or services online in the last 12 months (European Commission, 2013b) and this proportion is expected to increase as mobile phones with internet access become more common because these can be used for online shopping (m-commerce). At present, about 51% of all German mobile phone owners and 53% of all French mobile phone owners have a smartphone, cf. ComScore (2013) and Böhm, (2013).

Currently, smartphones and tablets are primarily used for information searches. The commonest searches relate to: 1) information about local retailers, and 2) information about prices (Eckstein and Halbach, 2012). But more and more products are bought via smartphones and tablets. A recent study indicated that 62% of smartphone and tablet owners had already bought something online with their device (BITKOM, 2013: pp.6, 28). The most purchased articles are electronic items, books and clothes. The use of m-commerce is increasing in Germany, and it now accounts for about 12% of e-commerce turnover (Tagesschau, 2013). So far, however, it is not clear what impact this will have on deliveries, except that they are likely to increase in number.

3. Main features of e-commerce firms

The United Kingdom, Germany and France have Europe’s largest online markets, which together accounted for 71% of European e-commerce in 2011 (Kelkoo, 2012). The proportion of companies that sells via the Internet is increasing and they take a variety of forms, online-only distributors (internet pure-players), multi-channel retailers (click & mortar), mail-order businesses with an online-platform, online marketplaces, teleshopping, and manufacture-shippers. About 22% of German sellers and 11% of French sellers offer online shopping options (Eurostat, 2013). In France 120,000 websites are registered as e-commerce firms (FEVAD, 2013).

German e-commerce is made up of 44% internet pure players, 16% mail-order companies, 9% manufacturer-shippers and around a third of the firms have their origin in the (over-the-counter) retail trade (Nitt-Drießelmann, 2013). In Germany, the well-established mail-order sector, with the key players Arcandor and Otto, led to the early development of clothing and footwear retailing on the web, as both companies transferred their home shopping activities to the internet. In France, similar trends are observed. During the 1990s, the two largest mail-order firms - 3 Suisses and Rue du Commerce - adopted new technologies for distance selling, first with Minitel and then...
the online market. Meanwhile large retailers both from France and abroad appeared on the French market, which is currently dominated by Amazon, Cdiscount and Fnac (FEVAD, 2013).

3.1. Limited e-grocery growth

Management and delivery costs constitute an obstacle to the growth of e-groceries. Some food products are perishable and require cold chain technology and specific handling procedures. These constraints greatly increase the operational costs for food deliveries, which usually have a limited economic value.

In France, hypermarket internet sales have been fairly stagnant during the last five years. In reaction to this, some retail chains have turned to new formats which feature online sales. France’s third largest retailer, Casino, has rapidly increased its internet retail sales by setting up a subsidiary, Cdiscount.com, selling non-food products including consumer electronics. By comparison, its’ rival Carrefour (France’s premier retailing brand, and second in the world after Walmart) has a very cautious internet retailing strategy, with modest sales, as delivery services are still restricted to a few major cities. In France, supermarkets are also creating “click and collect” spots, so-called Drives. These permit on-line shopping for groceries and reduce the time customers spend in the sales area.

In Germany, Metro is a late entrant in internet retailing. It launched an online shop for its Real hypermarket division in May 2010, in a move which should help to improve the chain’s performance, following the stagnation of its hypermarket sales in 2008 and 2009. The largest discounter operator in Germany, Aldi, still offers no internet retailing services for physical products, although it offers a range of services including flower delivery, holidays, mobile phone vouchers and photo printing. Venturing into internet retailing could offer growth opportunities for Aldi in Germany, to offset the maturity of the discounter’s channel and the limited potential for network expansion (Euromonitor, 2010).

The involvement of most discounters in this channel is small-scale or non-existent, and their websites serve more to advertise promotional offers. In France, only Leader Price offers online shopping, with a “click and collect” service. In Germany, Lidl has had a small-scale internet retailing presence since November 2008, following tests conducted in 2006. It offers a selection of non-food products, such as clothes, consumer electronics, homeware and stationery, alongside services such as flower delivery, photo processing and holiday booking. In 2009, Lidl started to advertise its online products in small catalogues available in its German stores. Thanks to the high growth forecast in internet retailing in Germany and the popularity of the Lidl.de site among consumers in order to check the weekly offers, it is likely that Lidl will acquire a considerably stronger internet presence (Euromonitor, 2010).

4. Impact of e-commerce on deliveries

E-retailers consider that delivery services are one of the fundamental factors that determine a consumer's decision to shop with them (European Commission, 2013a) and they have developed a wide range of services which offer flexible hours, reduced prices and fast deliveries. Currently, e-shoppers and e-retailers are concerned by delivery problems and costs. It thus stands to reason that delivery plays a fundamental role in enhancing e-commerce.

The importance of the last mile deliveries related to online sales has been noticed by European Union institutions, which wish to promote a free e-commerce market. Consumer surveys and market analysis show that the delivery services offered by e-retailers are one of the fundamental factors influencing a consumer's decision to shop with them. The European Commission has thus drafted a study on e-commerce (European Commission, 2013c), targeting the physical delivery of goods ordered online as one of the key factors for the growth of e-commerce. However the impact of e-commerce on goods flows and urban traffic is little known.

4.1. E-commerce and the fragmentation of final deliveries

Delivery services to the end consumer related to online shopping have resulted in the increasing fragmentation of shipments in the “last mile” (as the final segment of the supply chain is known) (Esser, and Kurte 2013; Schewel and Schipper, 2012). From a city logistics point of view, home deliveries constitute the most problematic solution in terms of service costs and organization, however this option is usually preferred by online shoppers (CREDOC, 2010), who seek express, arranged and reliable services.
The main problem currently facing delivery operators is the last mile (Lenz, 2004). Transport operators are developing a number of ways of avoiding deliveries which fail on the first attempt. One, admittedly expensive, possibility is flexible deliveries, e.g. identifying the day of delivery in advance. Other possibilities in this area include deliveries to a favoured neighbour or to a secret place on the recipient’s land (known only to the consumer and the service provider) (DHL, 2013), or offering a PP delivery network.

Three main categories of key delivery operators have been identified:
- national postal operators;
- global integrators;
- couriers and other express and parcel transport specialists.

For several years, the volume of mail handled by La Poste has been decreasing whereas the volume of parcels generated by the parcel/express division has been increasing (except in 2009 due to the economic downturn). Between 2006 and 2012, the volume of mail decreased, reducing the turnover by 10.9% whereas the volume of parcels transported by La Poste increased and the turnover generated by the parcel division increased by 24.7% (Brune, 2013).

In Germany the total volume of standard, express and courier deliveries increased by 3.5% in volume and 3.7% in turnover from 2011 to 2012. In 2012 the sector’s turnover of the sector was €15.5 billion, more than half of it generated by standard deliveries. Between 2000 and 2012 there was an increase of 51% in volume and 55% in turnover. It is interesting to note that B2C accounts for a constantly growing proportion of deliveries and accounted for 50% of national standard deliveries in 2012 (Esser and Kurte, 2013).

4.2. The impact of e-commerce along the supply chain

The growth of on-line sales has also led to significant new demand for large e-fulfilment facilities, led by pure-play
retailers. We can distinguish between five types of e-commerce facilities:

- mega e-fulfilment centres - where merchandise is stored and selected in order to make up the order;
- parcel sorting centres (hubs) - where parcels are sorted before being forwarded to local parcel delivery centres;
- local parcel delivery centres - for ‘last mile’ fulfilment;
- local urban logistics depots - to ensure rapid order fulfilment particularly to service major cities;
- return processing centres - to process returned items.

Amazon has eight facilities in Germany totalling 762,000 sq. m including four mega centres of 110,000 sq. m each. Zalando started with a 7,300 sq. m distribution center south of Berlin, initially selling only shoes. The company’s first expansion, with almost 69,000 sq. m, was to Brieselang, west of Berlin in 2011. This was mainly due to product diversification. In 2012 Zalando opened new facilities with large surface areas of 128,000 sq. m in Erfurt (Thuringia) and 134,000 sq. m Mönchengladbach (North-Rhine Westfalia).

5. Innovative solutions for e-commerce deliveries

Apart from home delivery services, automated parcel stations (APS) equipped with lockers, and pick-up points (PP), which are stores providing parcel drop-off and pick-up services, are fast-growing solutions. The costs of APS and PP deliveries are lower than for home deliveries, and the risk of missed deliveries is avoided. These alternatives are offered by online retailers and provided by shipper companies and transport operators, combining both consumer demand for flexibility and firms’ need to optimize parcel distribution through consolidated shipments.

Alternative delivery networks have recently been set up in all European countries, especially in the north. The Swedish operator PostNord provides about 5,000 distribution points to end consumers in Sweden, Norway, Finland and Denmark. Currently, in Europe, the number of locker and pickup point networks is growing, as shown in Table 2.
The largest APS network is the Packstation network operated by DHL/Deutsche Post in Germany (2,500 locations around the country). Locker box networks have a limited presence in France, as witnessed by the very small network of 33 kiosks run by La Poste under the name of Cityssimo. New operators such as ByBox (originally from the UK) are likely to extend these services in Europe in the coming years.

As far as pickup points in Germany are concerned, five service providers share the market: DHL/DAPG, Hermes (t), DPD, GLS and UPS. All together more than 36,000 pick-up points are available throughout the country. In France, four competing providers are growing rapidly and managing increasing volumes of parcels through pickup point networks, with a total of 18,000 PP locations.

5.1. Final deliveries in Germany

Germany’s internet penetration is quite high, 83% of individuals have access to the internet and about 60% of all people buying online (Eurobarometer, 2013; AT Kearney: p13). Furthermore, Germany’s internet shopping market is expected to grow by 12% per year until 2017. With a growing e-commerce market, the issue of final assumes greater importance.

Besides 13,000 branch offices, DHL offers “Paketshops” where packages can be picked up and dropped off, cf. DHL fact sheet (2013) and Pieringer (2013). In addition to these pick-up points which are located in a large variety of shops (e.g. press kiosks, bakeries, internet cafés) DHL operates automated packing stations. The first packing stations were introduced in 2001/2002. The network has been increasing steadily since then, reaching 2,500 in 2013. According to DHL, today, 90% of the German population is within 10 minutes of a packing station (DHL, 2009). Currently, an average packing station has about 76 lockers, but the actual number depends on the location. Most of the stations are located in urban areas.
According to information of DHL, 70% of all packages are collected within 24 hours (DHL, 2011). With around 14,000 pick-up points in stores/shops in Germany, Hermes dominates the PP market. In 2009 Der Aktionär reports that Hermes earned € M1,018 with its core business parcel service, mail service, info service, furniture service and its bulky goods segment. In total 252 million consignments were registered for the business year 2007/2008. The 252 million consignments were carried for B2C (e.g. mail order companies and online stores) and C2C. Already in 2008, there were 14,000 pick-up points (Der Aktionär, 2009). The average distance to a pick-up point in cities is 600m and in rural areas 3km (Packmee, 2014). GLS has the second largest network, with 5,000 parcel shops in Germany. It offers parcel recipients the option of collecting their delivery from their nearest parcel shop if they were not at home when GLS made the first delivery attempt.

Although Germany has quite a dense pick-up point network, about 90% of all consumers ask for deliveries to their home (Fig. 3).

Studies carried out in 2006 in Cologne (population one million, 29 stations) reveal that in that city alone the Packstation scheme saves 35,000 trip-km annually. This is due to less delivery traffic and fewer stops, as well as a reduction in the need for private car trips to collect shipments from postal outlets or depots, as locker box collections are integrated with the client’s daily routine (Forkert and Eichhorn, 2007).

### 5.2 Final deliveries in France
A tendency for networks to become denser has been observed in France, where the aggregate number of ventures serving as a PP rose from 10,900 in 2008 to 18,200 in 2012, i.e. an increase of 67%. The French system of point relais (reception-points) has atypical features, such as its early development, which began 30 years ago to manage mail-order deliveries, and the large number of players, with different shareholding structures. In France there are four competing PP network operators (Mondial Relay, Kiala, Relais Colis and Pickup Services), whose network development is similar (see below).

Locker box networks have a limited presence, as witnessed by the very small network of 33 kiosks run by La Poste under the name of Cityssimo. New operators such as ByBox (originally from the UK) are likely to extend these services (all over Europe) in the coming years. This modest presence of APS in France is mainly related to security regulations, i.e. the Vigipirate antiterrorism measures, which prohibited the leaving of unattended parcels in automated lockers. The law has recently been revised and automated parcel stations are now allowed in certain areas.

On the other hand, PP networks are widespread: the four competing providers are growing rapidly and managing increasingly large volumes of parcels. These middle-sized operators – Mondial Relay, Relais Colis, Kiala and Pickup Services – have developed standardized delivery solutions for the whole country and in 2013 each of the networks provided access to a pickup point in under 10 minutes by car or on foot (depending on the area) to 90% of the French population. Today, in France more than 20% of online shopping shipments are delivered through a PP instead of to home.

The initial rise of PP operators in France derives from the development of mail-order selling during the 1980s (Augereau and Dablanc, 2009). Sogep – known as Relais Colis – and Mondial Relay were created by two mail-order companies, respectively La Redoute and 3 Suisses, with the aim of improving the efficiency of their shipping services. These operators expanded their networks during the 1990s, driven by a sequence of postal strikes, and are now among the biggest players on the French market. The spread of e-commerce opened the way for two additional PP companies, the Belgian firm Kiala and Pickup Services, a French start-up created in 2004. The rise of these companies has not gone unnoticed by the major delivery and transport players, such as UPS and La Poste, which have shown particular interest in the IT system and e-logistics data networks set up by the two firms. UPS and La Poste have bought Kiala and Pickup Services respectively.

Figure 5 shows that the four current networks rely primarily on small independent local shops, such as florists, bars, tobacco shops and press kiosks. These networks have a quite similar spatial deployment and standard of service across France. Each of the operators provides online shoppers with between 4,000 and 5,500 pickup points across the country, i.e. a network which is almost a quarter the size of the network of post offices. In 2010, about 60 million parcels were delivered in France via PPs, i.e. approximately 20% of the total volume of parcels generated by distance selling.
The density of sites in each PP network has increased significantly for the whole population, from 5.9 (2008) to 7 PPs per 100,000 inhabitants (2012). However a growing number of consumers shop online and thus ask for delivery services in pickup points. PP networks all target the same type of location for new PPs: the most densely populated areas and transportation nodes (main train and subway stations, highway interchanges and road intersections).

At the French national level, PPs are now a well-established alternative to home deliveries and their presence covers urban, suburban and rural areas (Morganti et al., 2014). While PP density in remote areas decreases faster than population density, rural e-consumers’ accessibility to PP sites has reached a viable level. Discrepancies on pp’s accessibility raise important questions about the overall mobility (commercial and private) related to e-commerce in urban regions. In particular PP’s availability can influence shopping trips behaviour of e-consumers, and thus generate an impact on traffic at local level.

6. Conclusions

During the last decade, Germany and France have experienced a large increase in online sales, generating demand for delivery services, mainly to homes. Our analysis focused on alternative delivery services, i.e. automated parcels stations and pickup points, which provide two ways of reducing the fragmentation of final deliveries in the B2C sector, thereby helping to reduce the congestion and environmental pollution generated by urban freight trips. In particular, consolidated deliveries to parcel lockers and pickup points benefit transport operators by:

- increasing the number of successful first-time deliveries;
- optimising delivery rounds;
- lowering operational costs.

Our results show that, in both countries, alternative solutions have been recently developed and they now represent a delivery option for a growing number of e-consumers (20% in France – 7% in Germany). Based on the available data, we documented the recent development of alternative parcel delivery services to e-shoppers in Europe, and especially in France, which has the highest rate of PP use among the main European countries, and Germany, where there is the largest network of automated parcel stations – Packstation.

The scarcity of data and differences in the ways parcel shipments are classified pose problems for assessing the impact of e-commerce on city logistics and final deliveries. However, we can observe some important trends, such as the higher rate of returns in Germany, mainly due to e-consumers’ habit of ordering a wide range of fashion items then returning most of them.

According to our analysis, delivery services are amongst the top concerns of both e-shoppers and e-retailers in the EU. E-retailers themselves are considering selectively moving into logistics to offer improved delivery and return experiences. The current challenge is same-day delivery, with direct consequences on the transport market. One example is Amazon, the company is no longer satisfied with merely offering later outbound cut-off times than other e-commerce players (Lierow et al., 2013). It may consider moving into same-day logistics (in Germany) if no logistics partner steps up to offer the service. Recently, DHL is experimenting with same-day deliveries in the Cologne area in cooperation with an online food retailer.

In addition, e-retailers are developing sophisticated transport purchasing systems and aggregating increasing volumes of parcels through third-party fulfilment businesses, thus increasing their bargaining power with delivery logistics providers.

Some new intermediaries could also emerge: Shutl and Tiramizoo provide back-end services matching an e-commerce order with a courier service for delivery within 90 minutes. This service is currently available in the UK and Germany.

Delivery services such as next-day home delivery are becoming increasingly common. Including the cost of delivery in the cost of the product (rather than having it as a separate line item) and the increasing use of flat-rate subscription models (such as Amazon Prime) are augmenting the need to lower delivery costs. As a result, third-party delivery logistics providers are seeing greater fluctuation in volumes when e-commerce players shift volumes between 3PL providers. Prices for next-day delivery in Germany are hovering around two Euros per parcel, and are only slightly higher in the UK and France (Lierow et al., 2013).
References


