The function of IT integration in better postal delivery service positioning in the e-commerce market

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Abstract

Growth in e-commerce significantly affects changes in the postal services market. Besides the opportunity for offering various types of electronic postal services, demand for online bought product delivery services is becoming increasingly important. Shopping in the e-commerce market, especially in the B2C segment of this market, necessarily implies the delivery of purchased products. Different user expectations regarding delivery services such as free or lower shipping price, faster delivery, or the possibility to choose a delivery method are gaining importance. It indicates that common inflexible delivery services do not meet customer expectations. Enabling the delivery method to be chosen by the consumer implies various delivery options being offered through the e-commerce „check out“ process which requires an appropriate integration of the IT (Information Technology) system of the postal operator and the e-retailer's web store. This paper examines customer delivery service preferences and API functions as IT tools for offering various delivery options within the e-commerce „check out“ process, allowing customers to choose delivery options that meet their needs with the aim of better positioning of postal delivery service in the e-commerce market.

Keywords: *E-commerce, Delivery options, IT integration, APIs*

1 Introduction

The e-commerce (electronic commerce) market is experiencing significant growth. Since the delivery of purchased products is an indispensable part of e-commerce, especially for the B2C (Business-to-consumer) segment of the e-commerce market, e-commerce market trends create huge opportunities for USPs (Universal service providers), while at the same time, the presence of many delivery service providers makes the e-commerce market very competitive. Moreover, along with the increase in market value and competition, the needs and wants of users are also changing, creating new delivery service-related habits. Customers may prefer various delivery service elements, like delivery speed, service charge, visibility, place and time of delivery, return options, etc. Generally speaking, customer preferences are focused on customizing the delivery process, which implies offering customer selection of various delivery options. Both e-retailers and

USPs may benefit from additional delivery options. By offering additional delivery options enabling customers to customize the delivery process e-retailers and USPs as delivery service providers can differentiate themselves from the competition and thus gain a competitive advantage. However, enabling customers to customize the delivery process and control it at certain phases requires the exchange of data between the e-retaile r, e-platform and delivery service provider. In this paper, we will give a brief overview of customer preferences regarding e-commerce delivery services and USPs' services market position. The main focus of the paper is to describe IT integration functions' role in enabling various e-commerce delivery options that meets e-shopper and e-retailer needs thus improving USPs' market position.

2 E-commerce trends

Digital transformation, an increasing share of individuals using the internet as well as companies trying to reach the consumers in a cheaper and more efficient way have a significant impact on e-commerce growth. E-commerce refers to a business model that allows companies and individuals to buy and sell goods and services over the Internet in a much more cost-effective way than traditional commerce [1]. In 2020, e-commerce sales in Europe grew to

€757 billion euros which is an increase of 10% compared to 2019 and the growth trend is forecasted to continue [2]. Although Eastern Europe has only 6% of total European e-commerce turnover, the impressive growth rate of 36% in 2020 was recorded in this part of Europe [3].

The growth in e-commerce impacts postal operators in different ways. Increasing demand for delivery service offers new possibilities but also requires changes and modification in the traditional postal value chain in a way that meet market trends. The delivery of physical goods is considered one of the key elements of e-commerce. However, the importance of the delivery of products bought online makes the e-commerce market highly competitive in terms of delivery service.

2.1 Customer preferences

Adequate positioning in the e-commerce market requires delivery service providers to offer delivery services that meet customer needs. Consumer expectations and needs are mainly focused on the following service elements: shipping price, delivery speed, visibility, place and time of delivery and return of goods.

Shipping price – Delivery charge is one of the biggest considerations for customers shopping online given the fact low prices are one of the main reasons for purchasing online. Customers are very satisfied with the free delivery charge. The most important reason for European e-shoppers to purchase from one online store over another is free shipping. About 68% of European customers abandon their checkout if they consider shipping costs too high, while 40% are not willing to pay for shipping at all when the order value exceeds €150 [4]. E-retailers, who are the ones who bear the costs of delivery, are not always able to offer free shipping since their capability to bear the costs depends on the order value on the one hand and the cost to deliver that order on the other. Only 23% of e-commerce stores in Europe generally offer free shipping while 46% only above certain order value [4]. About 69% of European online shoppers are likely to add another product to their shopping basket to reach a free shipping threshold. The fact that e-retailer ability to offer free shipping depends not only on order value but on the delivery costs as well, has to be considered by USPs in their effort to offer competitive delivery service. Furthermore, bearing in mind e-shoppers' readiness to buy more products to reach the free shipping threshold, postal operators should be able to offer more price different delivery services instead of only one. This would enable e-retailer to lower a free shipping threshold, i.e. to offer free shipping for lower-value orders.

Delivery speed is another delivery service element very appreciated by e-shoppers. Fast delivery service generally costs more than ordinary service so e-retailers cannot be expected to offer delivery service that satisfied customer preferences for both free and fast delivery service. Given the fact that some customers prefer delivery speed over free shipping, introducing various services in terms of speed (i.e. express and non-express) or one service with more options in terms of delivery speed, USPs may offer a long-term solution for both e-retailers and e-shoppers.

Visibility – Visibility of the delivery process is an important part of the customer experience. Customers expect to be updated about the delivery status of their orders. A bad experience with the delivery company is one of the main reasons for European consumers to choose one online store over another and the ability to track shipment plays a major role. One-fifth of European consumers would not re-order at an online store at all if the possibility to track the shipment is not available or limited. As tracking updates are often very standard and impersonal, there is much space for USPs to improve the visibility of delivery service by enabling proactive communication all the time during the delivery process [4].

Besides fast, charge-free, and visible delivery services, customers show preferences for flexible delivery options. What customers want is actually the ability to choose between more delivery options and thus personalize the delivery process in accordance with their preferences. One of the main reasons European consumers choose one online store over another is flexible delivery options (71%) while (18%) abandon their shopping cart during the checkout process when the preferred delivery method is unavailable [4].

Service point/Parcel locker delivery - Although the Home delivery is still the most preferred e-shopper's method of delivery of e-commerce bought products (57%), providing alternative delivery options gains importance. The parcel locker delivery method is preferred by 15% while service point delivery by 16% of European consumers [4]. Due to Universal Service obligation USPs have a wide post office network cowering whole national territory thus ensuring high territorial service accessibility. However, post offices have limited working hours. By launching parcel lockers systems that can be used 24/7 placed at convenient locations, postal operators provide convenient delivery enabling customers to pick up parcels at a preferred time and place thus improving accessibility of the service point delivery network.

Delivery day and time - Time of delivery or day of delivery are two delivery service elements that customers consider important and want to be able to choose. More than 70% of European consumers want to be able to select a time frame for their delivery or to choose the exact day of delivery during check out implying these delivery options are available for selection on e-platforms [4]. Furthermore, around 50% of consumers consider the ability to change the delivery time slot when the parcel is on the way to delivery as important [4]. Postal operators enable this option by sending notifications via e-mail, SMS or similar e-message to customers informing them about expected delivery, thereby allowing customers to change delivery time by selecting a preferred delivery time slot.

By offering various delivery options, delivery service providers are able to reduce the first delivery attempt failure rate. Delivery at Parcel lockers or at the post office reduces the number of items that have to be delivered to the home address, thus reducing the number of items that the first delivery attempt can potentially be unsuccessful. Furthermore, by enabling customers to communicate to delivery service providers their preferred delivery time, USPs will carry out delivery on the day and at the time when the recipient is available at his/hers home address. Therefore, besides improvement of customer experience, introducing above mentioned delivery options will result in USP's "last mile" process optimization and cost reductions.

Returns - Along with the increase in purchases, the share of returns is also growing. Returns have become increasingly important for customers. In Europe, online consumers have the right to return goods purchased online within 14 days. Goods can be returned for any reason, without the obligation to inform the retailer about the reason for returning the item [5]. From the customer's standpoint, having the right to return an online bought product is one of the great advantages of shopping online. There are many reasons why a customer may need to return a purchase they made online, like damaged in transport, the product doesn't match the description, it is of poor quality, etc. The current state of returns shows that more than half of European e-shoppers always check the return policy before they decide to buy a product and typically return a product if they are not satisfied. About 45% of consumers prefer to take a parcel to the drop-off point (post office or parcel locker) while 36% want their return parcel to be picked up at home [4]. Given the importance of return for customers and their preferences to take return shipments to drop-off points, USPs can gain a competitive advantage by offering low-cost return service by using post offices as return service points. In order to improve the online customer buying experience, USPs can provide e-retailers with solutions that enable smooth and efficient returns services, like easy creation and print of return labels, picking up parcels at home upon customer's request or the possibility to use a wide range of post office network for return parcel drop off service.

2.2 USP e-commerce market position

In light of significant growth potential in e-commerce deliveries, many USPs have been expanding their business to B2C e-commerce deliveries. In most EU (European Union) member states, in terms of volume, USPs have estimated market shares above 20 percent in their domestic market [6]. While in the Western and Northern EU member states USPs deliver more than half of B2C parcels, in the Southern and many Eastern EU countries USPs often do not meet the service requirements of e-retailers and online shoppers and thus have not yet managed to reach significant market shares in the delivery of B2C parcels [5]. The adaption of delivery services in a way that meets customer requirements is the only way USPs can seek a better competitive position and market share.

This necessarily includes improving the availability of delivery services and offering various delivery options that meet customer needs. Like all other products in the e-commerce market, postal delivery services should be available for customers in the e-commerce market in order to be sold, whereby e-platforms serve as distribution channels also for postal services. Concerning the availability of USP's delivery service in the e-commerce market, competitor analysis of shipping service providers shows a significant difference in USP's delivery service offered on best-ranked e-platforms in European countries. While USPs in Sweden, Switzerland and Denmark are the most offered delivery service providers on best-ranked e-portals in those countries (in 81%, 75%, and 75% of cases, respectively) the most of USPs in Europe are offered on less than 50% e-platforms [7]. According to indicators [6] and [7], it can be noticed that USPs e-commerce market share corresponds to the availability of their services on e-portals. In order to improve the availability of their services for customers, USPs have to improve the integration of their IT systems with e-platforms. The more e-portals integrate with postal delivery-related services, the better USPs delivery service availability will be [8].

3 USPs e-commerce delivery service integration

3.1 E-commerce market players

E-commerce IT systems need to communicate with each other using defined standards and protocols for data exchange. The technological integration should cover all the processes involving the Post [9] and the parties involved in e-commerce data exchange related to delivery service. From a delivery service value chain perspective, the parties involved in the e-commerce delivery value chain are e-shoppers, e-retailers and e-commerce platforms whereby IT systems of e-retailers and e-platforms should be integrated with the USPs IT system.

E-shoppers - The e-shopper initiates the purchase, makes a payment, chooses the delivery service, and, in most cases, receives the goods. Unlike the conventional postal market where the sender of a postal item chooses the delivery service, in the e-commerce market the recipient, who is the buyer of goods, is the one who chooses the delivery service. Given the fact that buyers of goods are recipients of postal items, it is quite expected they are mainly focused on the "last mile" i.e. on the possibility to choose between various "last mile" delivery-related options that best suit their preferences and requirements.

E-commerce platforms – E-commerce platforms are virtual marketplaces where retailers and consumers can sell/buy goods. Today's e-commerce platforms are comprehensive IT solutions that operate a web store with features like search, cart, payment, etc. The most important functions in terms of delivery service are those used for the collection of shipping information and choosing shipping methods. These functions are integrated into one single process called "check out" which finalizes the shopping process. The typical checkout process has the following steps: shopping cart, billing information, shipping information, shipping method, order preview, payment and order confirmation [10]. Delivery services aimed for the delivery of online bought products should be offered on online platforms and chosen within the e-commerce check-out process. In the e-commerce market, online platforms replace post offices and serve as distribution channels being the place where customers chose delivery services. Unlike at the counter, at the online store, the customer does not have the possibility to ask a post office counter clerk for more information or for a delivery service recommendation. Therefore, the online platform must be able to provide all relevant delivery service information which can be decisive for customers to choose the appropriate delivery service.

E-retailer/seller - E-retailer sells products on the e-commerce marketplace and is responsible to arrange the delivery of products to the e-shopper. The online sale can be concluded through the e-retailer's own website or through a third-party e-commerce platform. The e-retailer concludes the contract with the delivery service provider on the provision of delivery service. Whether the e-retailers prepares good for shipment or hires a third party to do so, in addition to customer needs, e-retailers expect USP's services to meet their own needs in terms of postage calculation, facilitating shipment preparation, accounting process, and return policy.

There are many ways to exchange data between IT systems of involved parties, from file sharing to web services. The best way would be to build interfaces that enable data exchange, such as an API (Application Programming Interface). An API allows one web-based application to interact with another. It is now common for Posts to develop APIs to enable external users such as e-platforms to integrate postal service-related data into their platforms and to provide e-shoppers access to postal services.

3.2 API integration of postal delivery services into the e-commerce value chain

Generally speaking, an API (Application Programing Interface) exposes a set of data and functions to facilitate interactions between computer programs and allow them to exchange information [11]. The most commonly used type of APIs are the Web APIs, which enable the exchange of data and functionality sharing between web-based systems. The API consists of two components:

- A technical specification defining the functions of the API, how they are used altogether with the specification of parameters and feedback and all other instructions necessary for the implementation of the API and
- Software interface implemented in accordance with the defined specification [14]

The REST architectural style is commonly applied to the design of APIs for modern web services. REST stays for Representational State Transfer which is an architectural style for designing distributed applications [12]. It is an architecture style for the building of modern web software that in recent years has strength popularity and is used as a way to build distributed services recognized as REST or RESTful services. Web APIs that comply with REST architectural constraints are called RESTful APIs. Most used RESTful API functions (methods) to work with resources are: GET - Obtain information, POST - Add information, PUT - Replace information, PATCH - Update certain information and DELETE - Delete information [13].

API provides an interface used for the integration of e-platforms and the application system of the postal operator. This interface includes methods enabling the e-platforms to obtain delivery service-related information before, during, and after purchasing process, like type of service, delivery service request, track and trace, return service and label print, etc. The following is an overview of the key phases along the postal delivery value chain that should be covered by IT integration and where API methods could be used thus enabling USPs to meet the needs of all parties involved in the e-commerce delivery process.

Addressing Postal codes - Postal value chain in e-commerce begins within the process of e-commerce “check out”. The first important delivery-related step in check out process is collecting address data, so-called “shipping information”. The aim of API in this phase of the postal value chain would be to ensure that customers through e-platforms are able to enter only the correct addressing postal code. This API provides the access to USP’s IT system retrieving a list of addressing postal codes customers can select from. In addition to the postal code list, using API service the USPs can provide an operational list of street names, thus providing a fully valid entry of the recipient's address on the e-platform.

The next important delivery-related step within the e-commerce check-out process is the “shipping method”. Within this step, the e-shopper should be able to choose a delivery service.

Service type - After providing address information e-shopper selects the type of service. Typically services offered to customers are standard (basic) end express (premium) services. Since the type of services is a small data set which do not change often, this list is typically not retrieved through an API method but specified in the API documentation, which means that the e-platform offers a delivery services list without calling the API method. However, a lot of other parameters like weight and dimension limits, delivery speed, delivery deadline choice as well as additional delivery options are determined by service type. This implies the service type is passed to other API methods like Service Generation Request and Postage price calculation. Therefore, it is crucial for service types to be described in API technical documentation [14].

Delivery options – The aim of API within this step of "check out" would be to provide e-shopper with information about available delivery options and ensure that customers through the e-platform are able to select only those delivery options postal operator offering for previously selected service type. This API should return a list of delivery options e-shopper can select from like: Home delivery, delivery at the post office, delivery in a Parcel locker, etc. [14].

Post office locations - In case a parcel has to be delivered at the post office e-shopper have to select the post office for delivery. The aim of API would be to provide e-shopper with information about available post offices serving as collection points and ensure e-shopper chooses the correct and most suitable post office for parcel collection point. This API should provide the access to USPs IT system and retrieve the list of postal offices serving as collection points customers can select from, containing information about post office postal code and name, street name, working days, work hours and location coordinates [14].

Parcel lockers - The same as in the case of post offices, the aim of API in case of delivery in parcel locker would be to provide the customer with information about available parcel lockers serving as collection points and ensure the customer chooses a parcel locker which suits him best. This API method should retrieve the list of parcel lockers from the USPs database e-shopper can select from, containing information about parcel locker name or ID, street and location coordinates [14].

Postage price calculation – After completion of address data and selecting delivery service type and options e-platform calculates postage price. Postage price depends on many previously selected parameters like service type, delivery option, and order value as well as on item weight and dimensions. Furthermore, in this phase of the e-commerce checkout process API method should enable the calculation of the postage price. Postage price or model of its calculation can be specific for every e-seller. Different pricing models between e-retailers and postal operators are possible. The price for the e-shopper that will be displayed on the e-portal depends on this pricing model. The simplest pricing model from USPs is the model where e-retailer or e-shoppers bears all costs of delivery service. Unlike this model, the e-retailer can opt to bear the full amount of postage price, regardless of the value of the order or only in case the order value reaches a certain threshold, offering the e-shoppers "free shipping". Also, e-retailer can offer e-shoppers a "flat rate" bearing the cost difference between postage price and flat rate. This API sends all parameters required for postal price calculation including e-retailer ID as the reference to a specific pricing model which should be applied and returns price information to e-buyer and e-seller. Depending on e-commerce check-out design and customer preferences to base their service selection on price and speed, postage price can be calculated prior to service type selection. In this case API method sends order-related parameters (value, weight and dimensions) and as a result, provides the customer with a list of eligible service types with prices and expected delivery times so the customer can select the preferred shipping method based on cost and speed [14].

Generating service requests – Delivery service request is the most important phase in the e-commerce delivery value chain. The function of the APIs so far has been to control data entry on the e-platform side, without causing any data change in the UPS's IT system. Generating service requests is usually related to the final step of the e-commerce checkout process, namely order confirmation. The API method in this step should have two main functions. The first would be to send all postal-related data, collected during check out process to USP's IT system for validation. The minimum set of input parameters that should be sent by e-platform through API method to USP should in order to create delivery service request include:

- Information on the sender of the shipment (Name and surname / Name, Address, Contact information)
- Information on the addressee (Name and surname / Name, Address, Contact information)
- Order Data (Weight, Insured Value, COD amount,)
- Information on delivery options

After USP's IT system has performed the data validation process the result the API should return is either a validation error description or a unique service request identifier. In addition to a

unique service request identifier API method returns a unique postal item identifier (according to UPU (Universal Postal Union) S10 standard - the specification for 13-character item identifiers for universal use [15]) which is also generated within the process of generating a service request. The purpose of both identifiers returned by the API method is to enable further data exchange between IT systems of e-retailer, e-platform and delivery service provider, generated along delivery process like parcel status, COD payment status, etc. It is important to emphasize that this API method is typically not limited to a single service request but rather allows sending more delivery service requests within a single call, forwarding the list of requests. In this case, in addition to postal-related data order ID must be sent within the API method to make the e-retailer able to link the order with the service and postal item identifier.

It is crucial that the type and range of values are precisely defined in technical documentation for all parameters passed to this API method including data for which entry control has previously been imposed on the e-platform, using described API methods. These identifiers, returned as a result of the API method, are basically the key to the integration of three IT systems: the information system of the postal operator the e-retailer, and the e-platform. These key identifiers serve as parameters for all further API functions which can be used along the delivery process like tracking shipment status, summary manifests generating and printing, address label generating requests, generating shipment return requests, etc. [14].

Service request revoke (DELETE request) - Every service request should have the possibility to be revoked. Revocation is possible until the shipment is picked up from the retailer, or until the delivery service request changed its status to "Parcel picked up from the sender". This API method should enable e-platform or e-retailer to send a service delete request to USP, check the service request status, and return the final request status.

Shipment and order status - Status requirements differ for buyers and retailers. While the customer requires full visibility of the parcel along the delivery process, the e-retailer prefers to have only those statuses that are relevant to the order like delivered, returned to sender and COD paid. This method should return the status of a parcel or order using any of the two identifiers as parameters: service request ID or postal item ID. Furthermore, the API method used for shipment status, initiated by the e-shopper, contains typically parameter for a single item, namely a unique postal item identifier, while the method for order tracking, initiated by the e-retailer, should enable obtaining the list of service requests statuses using, in addition to service request ID, date period and specific status of the order as parameters [14].

Address label print – In the shipment preparing phase address labeling could be supported by using API methods. Using a unique service request identifier as a parameter, this API method should return a set of data in a print format like PDF or data interchange format like XML, JSON, etc. The structure and format of the data should be defined in detail in the technical specification of the API. PDF format is commonly used by e-retailers who don't change USP's predefined label pattern while XML and similar address label formats are aimed for e-retailers who do not provide complete address data within the requesting delivery service process and/or want to integrate address data in their own application system [14].

Deliver choice - The aim of this API method is to call the service which is used to send a notification to the addressee about the planned delivery day and/or time and to collect information about the day, place and/or time of delivery selected by the addressee. In this case, the USP uses the API method of the SMS service provider. SMS is a common way of sending delivery-related notifications, although other communication channels such as e-mail, Viber, etc. can be used as well. Within this API method, the USP sends to the addressee information about the planned day and time of delivery of the parcel, in case it should be delivered to the customer's home address, or information about the arrival of the parcel at the delivery service point, in case the parcel is addressed to service point location like the post office, parcel locker, etc. Within the same message, the customer is offered an alternative day and/or time slot of delivery and/or the option to redirect the parcel to an alternative location for delivery like the post office. As a result, this API method returns the delivery method (day, time, and place) chosen by the addressee.

Generating return service requests – The process of returning the package, especially generating return requests as its key part, must be as simple as possible for the customer. Offering API method within the process of returning goods USPs should enable e-shopper to request a return by simply selecting the order on the e-platform he wants to return. Based on the existing delivery service ID selected by the customer and data available, new service requests and return labels are created. Within the request for return service API method should send the original service request identifier and as a result return a unique return service request identifier and unique postal item identifier (according to UPU S10 standard) which are linked to unique order identifier thus enabling further data exchange between IT systems of e-retailer, e-portal, and delivery service provider, generated along the return process.

Error handling - An important functionality that has to be implemented within the APIs is the processing of errors. The simplest way to handle errors is to provide customers with response messages related to the processing of certain methods containing appropriate status code. In addition to basic response codes, USP should, within the API technical documentation, precisely define the list of response codes related to every method i.e. every phase within the e-commerce delivery value chain, making all parties involved better understand errors.

4 Conclusion

E-shoppers have different preferences and expectations regarding e-commerce delivery services while e-retailers expect to have technical support in the process of converting an order to a postal parcel, postage price calculation and return process. No matter if e-shoppers' preferences are related to postage price, visibility, place or time of delivery, easy return, or another delivery service element, they all have ultimately the same goal: customizing the delivery process. Also, retailers' preferences are focused on custom-tailored support for their processes. Enabling customization of the delivery process necessarily implies offering customers the possibility to choose between various delivery service options, which is an interactive process that requires the exchange of data between parties involved in the postal value chain. Developing and offering web APIs within the e-commerce postal delivery value chain is a simple and effective way for USPs to enable the exchange of data between parties involved in e-commerce thus enabling e-shoppers to customize the delivery process and provide expected support for e-retailer and all to improve the availability of USP's delivery service on the e-commerce market.

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