

Business Model Design in Location-based Services¹

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Abstract: One of the most critical preconditions for the success of innovative services is to be based on sound business models. Especially today, in the networked economy, the concept of business model is not a theoretical tool but a prerequisite for success. Business model is one of the most common factors encountered for, when Internet firms succeed in business. Furthermore, the rapid introduction of innovative applications necessitates the rational design of their business model. However, despite the extensive use, and sometimes misuse, of the business model concept and design methodology, there exist very limited attempts in design methodology in scientific research. In the present paper, we propose a new framework for 'digital' business model design, by implementing it in a real - life business case, specifically in business models for location-based services.

Keywords: business model, methodology of design business models, location-based services, innovative models.

1. Introduction

It is evident that information and communication technologies have altered enormously the way we work and live. They affected our contemporary life in so many different aspects that today they are actually weaved in the linens of our society.

Indeed the most profound technologies are those that disappear and become an inherent part of everyday life. As a consequence, business development has been fundamentally changed and new business models have been emerged providing a new stream of innovative services.

One of the most critical preconditions for the success of these innovative services is to be based on sound business models. Especially today, in the networked economy, the concept of business model is not a theoretical tool but a prerequisite for success. Business model is one of the most common factors encountered for, when Internet firms succeed in business. A survey-study [1] conducted by the Institute of Strategic Change of Accenture in 2000 concludes that "developing a sound business model matters for making money. Furthermore, the rapid introduction of innovative applications necessitates the rational design of their business model. However, despite the extensive use, and sometimes misuse, of the business model concept and design methodology, there exist very limited attempts in design methodology in scientific research. In the present paper, we propose a new framework for 'digital' business model design, by implementing it in a real - life business case, specifically in business models for location-based services.

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1. Objectives

Taking into account the various approaches concerning the definition and components of business model that exist in the current literature we finally selected to use in this paper and in our relevant research the following basic business model components, as they are generic, include all others and are the most critical factors taken into consideration for the success of the Business Model:

- The value proposition to the customer
- The sources of revenues and the cost structure
- The value production architecture (value chain and actors)

The business model design methodology is a tool to design business models for innovative services and applications, avoiding trial and error methods that result to a huge waste of funds and time. The design methodology will be presented in the next paragraph and a case study in location business services will be presented by implementing the design methodology.

2. Methodology

In order to support innovative design of business models, we have developed a new generic framework for the design of ‘digital’ business models, without having to be based on existing previous ones. Its objective is to design the value proposition, the production architecture (value chain), the actors and the economic model of the business model. Our design framework consists of five stages, as shown in figure 1. Typically, several iterations of these five stages will be required; each iteration provides a better understanding and a more detailed design. Also, the understanding achieved in one stage might necessitate returning and repeating a previous stage(s).

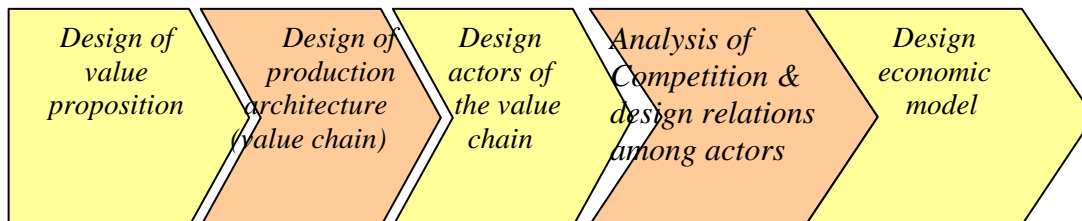


Figure 1: Generic framework for business model design

The five stages of our methodology are described in the following paragraphs:

2.1 Design of the value proposition

In this stage the value proposition is designed; the basic elements of the product/service that will be offered to each customer segment addressed are defined, based on the “Buyer Utility Map” framework (Table 1), [2] and the “Value Chain Model”[3]. The Buyer Utility Map is used as an integral part of the definition of Value proposition, trying to fill in as many cells as possible in order the value proposition to be concrete and complete. For each of these cells, an analysis is conducted to find out if the value proposition is in compliance with the customer value criteria, specifically according to Walters; security, performance, aesthetics, convenience, economy and reputation.

In order to make this “Buyer Utility Map” more appropriate for designing electronic services, we enhanced it by adding to the above ‘buyer experience cycle’ three additional

phases: the phase of ‘search’ (in the beginning of the cycle before the ‘purchase’) taking under consideration the symmetry of information (one of the Internet properties) [4], followed by the phase of trialability and the phase of customization (between the ‘delivery’ and the ‘use’), since according to the relevant literature [5] the most important sources of the value created by electronic channels are the high level of search and customization capabilities they offer. A very significant parameter for the adoption of an innovative service (among others) is the trialability. Trialability is the degree to which an innovation may be experimented with on a limited basis. According to the literature, trialability is a perceived attribute of an innovation and an important factor for its diffusion. [6]. Along this line of thinking, the simplicity versus complexity of the innovative service is an important factor of innovation diffusion. Another addition to the Buyer Utility Map is “Observability”. Observability is the degree to which the results of an innovative service are visible to the others. Some ideas are easily observed and communicated to other people, whereas other innovations are difficult to observe or describe to others.

	<i>Search (symmetric info)</i>	<i>Trialability</i>	<i>Purchase</i>	<i>Delivery</i>	<i>Customization</i>	<i>Use</i>	<i>Supplements</i>	<i>Maintenance</i>	<i>Disposal</i>
<i>Observability</i>									
<i>Customer Productivity</i>									
<i>Simplicity</i>									
<i>Convenience</i>									
<i>Risk</i>									
<i>Fun and image (aesthetics)</i>									
<i>Environmental friendliness</i>									

Table 1: Enhanced Buyer Utility Map

We can use this “Enhanced Buyer Utility Map” for designing the elements/capabilities of the new electronic service and also for analyzing similarly other competitive services (electronic or ‘physical’) and comparing them with the new service; this comparison may give very useful indications for enriching the map of the new service with additional elements/capabilities. In this way an initial list of the elements/capabilities of the new service can be developed.

Concluding with the Enhanced Buyer Utility Map, we screen it by checking the relative advantage of the innovative service and its compatibility. Relative advantage is the degree to which an innovation is perceived as being better than an idea it supersedes. The degree of relative advantage is often expressed as economic profitability, as conveying social prestige, or in other ways, while Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences and needs of potential adopters. [7].

2.2 Design of production architecture

In this stage the production architecture (value chain) is designed, consisting of all the activities that have to be performed in order to deliver the value defined in the first stage. As producing a product or delivering a service requires completing a set of activities, it is at the activity level that much of the competitive advantage can be gained. In this stage, research is in progress concerning the design, of not only value chains but value creating networks as well. For this purpose we use the combination of physical, Porter's "Value Chain Analysis"[8], and virtual value chain [9] (Figure 3). For this purpose we use the the "Value Chain Model" of Walters and Lancaster [10] and the "Strategic Value Creation Networks Framework of Jarillo [11].

In order to be more precise, we can use the two additional 'value creation configurations' that have been proposed by Stabell & Fjeldstad (2001) [12] for analysing complex specialized and mediation services: the 'value shop', which includes five primary activity categories: problem-finding, problem-solving, choice of alternative, execution, control & evaluation, and 'value network', which includes three primary activities categories: network promotion & contract management, service provision and infrastructure operation.

All value creation configurations; chain, shop and network, include the same set of support activities, as described in the classical Porter's model.

The value shop, interrelates the five primary activities, as shown the diagram below.

Infrastructure
Human Resource Management
Technology Development
Procurement

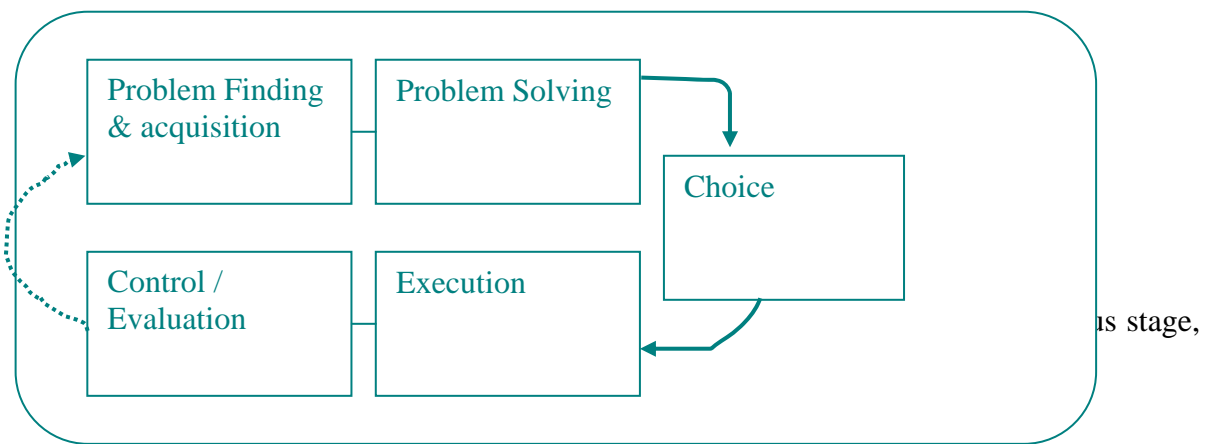


Figure 2: Value shop activities diagram

The value network interrelates the three primary activities, as shown in the diagram below. In the value network, a service/product exhibits network externalities when it becomes more valuable to users as more people take advantage of it.

Infrastructure
Human Resource Management
Technology Development
Procurement

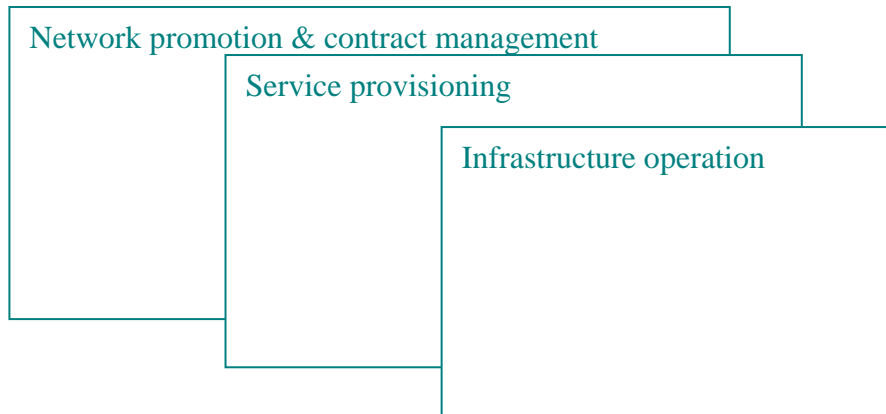


Figure 3: Value network activities diagram

Therefore, the design of the production architecture, reflects two step approach. The first step is the identification of the value creation logic of the innovative service/product, thus value chain, value shop or network, while the second step is the decomposition of the service into strategically important activities and understanding their impact on cost and value.

2.3 Design the actors of the value chain

For each of the value production activities defined in the second stage, the most suitable actors for executing it, are determined, based on the “Resource-Based Theory” [13] and the framework of Talluri (1999). In particular, for each activity are determined the resources and capabilities required for executing it efficiently and effectively, and its critical success factors; based on them initially are identified various alternative classes of actors.

It should be also considered in this stage, that Internet itself form an important actor of the value chain, shop or network. Specifically, Internet acts as a distribution channel for products/services that are largely information bits. There is a replacement effect if the Internet is used to serve the same customers served by the old distribution channel without bringing in new customers. On the other hand, there is an extension effect if new customers are served due to lower transaction costs or the universality of Internet.

2.4 Analysis of competition and design of the relations among actors

In this stage, for each of the layers of the production -architecture designed in the second stage, an analysis of the competitive positioning of the potential players is performed, based on Porter’s “Five Forces Framework” [14]; from this analysis players with extremely high level of power might be identified, which could possibly necessitate the redesign of the value production architecture by returning to stage 2. We remark that in our methodology the widest value proposition is designed in stage 1, based on the capabilities offered by ICT and then the competition is analysed not only for the final value proposition (service/product) but also for all players of the value production activities.

An important aspect that the analysis of competition should consider immensely, is whether the innovative service/product creates new market space by creating a new value curve. The key to discovering a new value curve lies in asking four basic questions [15]:

1. What factors should be reduced well below the industry standard?
2. What factors should be eliminated that the industry has taken for granted?
3. What factors should be created that the industry has never offered?
4. What factors should be raised well beyond the industry standard?

By creating new market space, potential new actors could perform the activities of the value production architecture.

In addition to the above, the relations among the value chain actors are designed by using the e^3 - value methodology and its extensions [16]. This model provides a more detailed approach for the contractual obligations, the value objects exchanged among actors, the control mechanisms and the possible violations.

The basic version of this methodology allows the formal representation of value creation through cooperation of several actors who exchange objects of economic value (e.g. products, services, money, etc.), based on a number of basic concepts, such as: actor, value object, value exchange, value interface, dependency path, etc. (see also Figure 4); in this way it supports the design and communication of the rights and obligations of each involved party. Its extension (e^3 - value+) allows also the formal representation of ‘sub-ideal situations’, in which one of the involved parties violates its obligations (i.e. does not deliver one or more of the value objects it was contractually obliged to deliver to another party), in this way supporting the design of clauses for possible violations of obligations.

2.5 Design economic model

In this stage, the economic model is designed, taking into account the “Price Corridor Model” [17] and the different pricing models. In order to find the right price for the new product/service /application, it is necessary to identify the price corridor of the mass; the price bandwidth that captures the largest groups of customers. Additionally, the definition of the pricing model(s) for the specific service is of great importance; e.g Flat-rate, commission-based, advertising-based, mark-up based, production-based, subscription-based, fee-for-service based models [18] or direct selling, leasing, time-share, equity payment (Kim, 2000) etc.

3 MOBILE-IN project (Case study)

The general description of the MOBILE-IN project service is the following: A mobile user is visiting a high-populated town. After finishing her shopping she wants to go back to the hotel but unfortunately she can't find a free taxi on the road and additionally she doesn't know any telephone numbers for calling a local taxi. However, her mobile operator has provided her with an always on-line application called “Taxi Finder”. She locates the *Mobile IN application* in her mobile terminal by scrolling down her menu and executes it. Once executed, the *Global MobileIN Service Creation and Execution Framework* is activated, and searches for the correct and at the same time available application server responsible for this service and depending on user's number (i.e. his operator). The application server is notified of the user's request, and automatically retrieves the user's location from the mobile network GMLC (using any LBS technology available) and by utilizing the *MobileIN PLMN Open Access Gateway*. The application server processes this information and after querying the application database locates the nearest taxi company. The server then using the *MobileIN IN/OSA Gateway* triggers the necessary IN components and (again automatically) executes a call from the user's terminal to the taxi company. The next thing that the user hears is the beeping tone on her phone.

The second similar service based on location identification is the pizza service, which is described as following: A user wants to order a Pizza in his area. Instead of going through the telephone directory and by searching for all the local Pizza delivery houses in the area he decides to use his new mobile phone application called “My favorite Pizza”. Once executed, the *Global MobileIN Service Creation and Execution Framework* is activated, which searches for the correct and at the same time available application server depending

on user's number (i.e. his operator). The application server is notified of the user's request, and as in the previous scenario it automatically retrieves the user's location from the mobile network using the *MobileIN OSA Gateway*. Next, it locates from its database all the available and open at that time Pizza delivery houses in the area. The list is sent to the user mobile application using WAP or HTTP/IP technology. The user receives the list on his mobile phone application screen and is asked to enter a number according to his preferred pizza delivery choice. The user enters his preference. His response is sent back to the application server, which triggers the correct IN nodes in order to initiate a call to the selected delivery restaurant, using the *MobileIN IN/OSA Gateway*.

	<i>Search (symmetric info)</i>	<i>Trial ability</i>	<i>Purchase</i>	<i>Delivery</i>	<i>Customization</i>	<i>Use</i>	<i>Supplements</i>	<i>Maintenance</i>	<i>Disposal</i>
<i>Observability</i>							n.a.		
<i>Customer Productivity</i>			Easy, through a request from user's terminal	At customer's place and specific time		No training is needed	n.a.	External maintenance, provided by the service supplier	The service does not create waste items
<i>Simplicity</i>			A request through the user's terminal			The end-user is already educated by mobile phone functions			
<i>Convenience</i>			As requesting a service by mobile phone			Time and place			
<i>Risk</i>	No risk	No risk	No risk	No risk	No risk	No risk the service is paid after usage			
<i>Fun and image (aesthetics)</i>						Creates status and security feelings (taxi-finder) It is fun and can be used by all family members (my-pizza service)			
<i>Environmental friendliness</i>	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Table 2: Buyer Utility Map for taxi-finder and pizza service

Both, above described services, are developed by a common concept in location based services. The first step to understand the framework of the new services is to deploy the user utility map, trying to revealing the buyer (end-user) experience deriving from the potential usage of the service

The production architecture (value chain) of the taxi finder and the pizza scenario, is actually consisted by the Global MobileIN Service Creation and Execution Framework and the MobileIN IN/OA Gateway, an application server depending on user's number (i.e. his operator), any mobile network using the MobileIN OSA Gateway, a user mobile application using WAP or HTTP/IP technology and the user mobile phone. The production architecture is described in Figure 4.

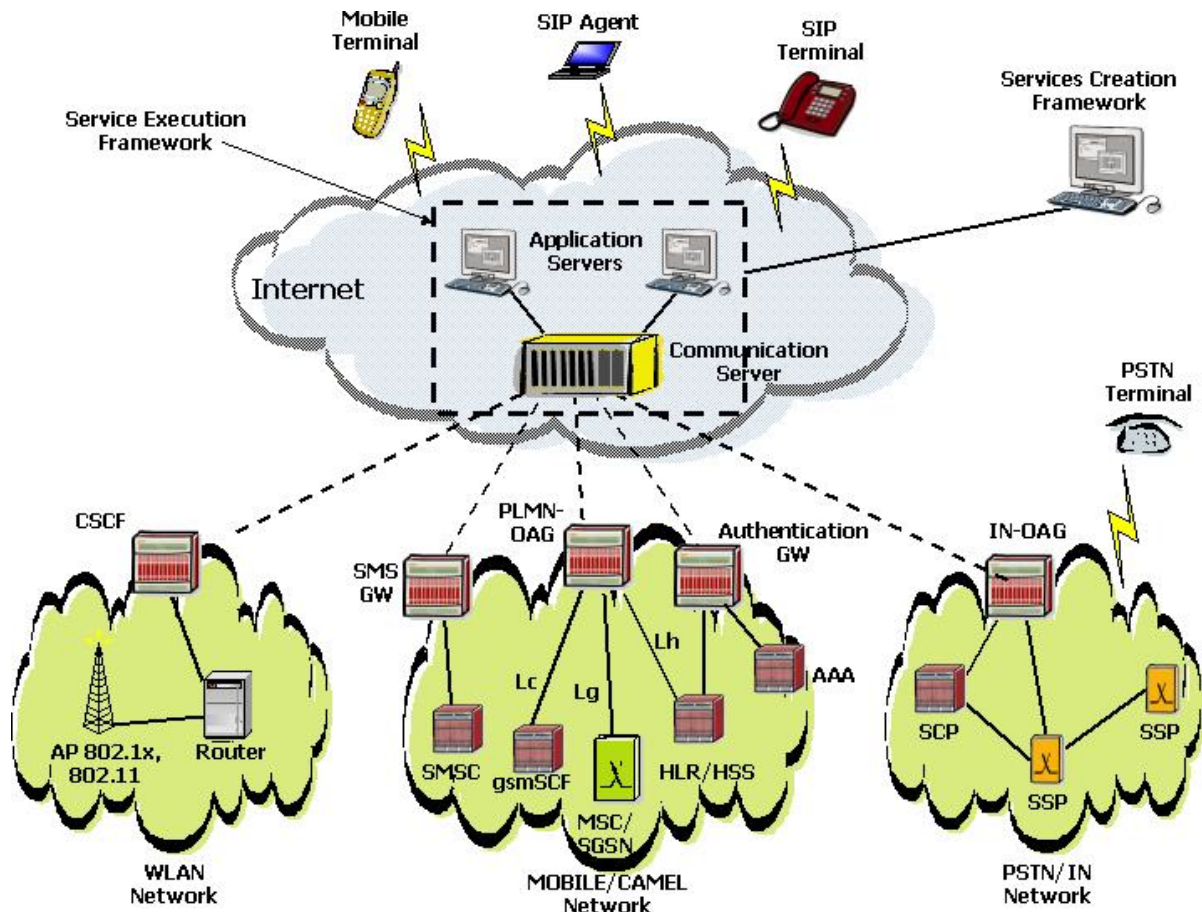


Figure 4: Overview of the MobileIN network architecture

Of course, the value chain of the service architecture is virtual and it is supported by a clearance mechanism, which is dividing costs and profits among actors of the value chain. Accordingly, in location based services and the scenarios described already, the services can be delivered to the end-user by a number of entities that form the industry value chain and their roles are complementary and competitive as well. The underlying business model should reveal a potential for all involved stakeholders.

End - user

This role is assumed by entities that use the services provided by other stakeholders. This is typically the end-user. The consumer's business role is introduced through economic literature as the entity that consumes services without trying to make money from them. All other types of business roles are characterized as producers or resellers. The end user is the final input side of the value chain. The end-customer can be a person, a group of people (business customer).

Retailer

The retailer sells services to consumers that are developed and supported by a Service Provider. The retailer business role is oriented towards subscription management and adding value, while the service provider is oriented towards production and maintenance of

the service. In location-based services the retailer can be either the pizza restaurant or the taxi syndicate (consortium) that offers a value-added service to their customers.

Service provider

The aim of a service provider is to support retailers or other service providers with services. Note that both a service provider and a retailer special cases of a service provider but, in contrast with a retailer, a service provider does not have a contractual relation with stakeholders in the consumer domain. The role of the service provider could be “played” by a mobile operator, a fixed-network provider or a new entrant (third party provider).

Network provider

A stakeholder in the role of network provider owns and/or manages a network comprising switches, cross-connects, routes, and trunks. This network can constitute a transport network to support streamed media connections or can constitute the transport network to support connectivity for basic signaling. The network provider participates in a user/provider relation with the stakeholders that terminate a connection (i.e. consumer, retailer, and service provider). Furthermore, a network provider engages in a peer-to-peer relation with other stakeholders in the network provider role in the case that an end-point of a connection is situated in the network domain of another network provider.

It is evident that the mobile telecom operator has a competitive advantage, as its relation with the end-user is very stable. This dominant position can be a problem in the faster development of the services, if the dominant mobile operator does not allow any other entities to be involved. The stakeholders of the potential service need specific business contracts, while for the end-user is just a minor part of the general contractual obligations.

The retail business model for the taxi finder service is considered to be an extensive business success, as the consumption of the service is considered to be extremely vast. For the financial considerations deploy the basic assumption is that we only calculate the revenues from a European country and not from all countries that the service could be launched. The population of taxi drivers penetrated each year is assumed to almost the same after the second year.

1st year: 30.000 taxi drivers, 2nd year 40.000 and then becomes steady, as the hypothesis is that the public means of transport will offer better services to work competitively. The taxi driver is paying a flat fee per year:

1st year	2nd year	3rd year	4th year	5th year
200 €	250 €	300 €	350 €	400 €

While the user is paying per call. Our assumption is that an average user is making a least two calls the first year for a taxi finder service, while the total number of users is assumed to be at least 75.000 persons. These estimations are extremely conservative.

1st year	2nd year	3rd year	4th year	5th year
0,50 €	0,60 €	0,70 €	0,80 €	0,90 €

4. Conclusions

Business model is a concept fundamental to business performance, particularly for the numerous telecommunication and business application services of the new digital economy. For this reason, the concept of ‘business model’ has become quite popular, especially today, in the dawn of the new networked economy. However, despite the extensive use of the business model concept, only limited scientific research has been conducted in this area. In this paper we present a new framework for ‘digital’ business model design. We present a business case where the new framework has been used. The important outcome of the validation of the proposed framework methodology in a real-life scenario, is that all aspects of this innovative business idea have been taken into

consideration under a unified and methodological way. Several shortcomings were identified in the evaluation of the industry stakeholders, in the definition of the capabilities needed to achieve the value proposition. So far, the business model of MOBILE-IN services has been presented to stakeholders and EC with success, although has not been commercialized yet.

Further research is in progress towards elaborating the above framework into a detailed methodology.

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