

E-market Analysis through Quantitative Classification of E-business Model with Consideration as a Service Cloud Computing

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Abstract. Cloud computing is one of the important technologies which affected disruptively the economy, business aspects and environment through providing many capabilities and opportunities for the enterprises. These capabilities led many enterprises to adopt and expand their business models to improve their opportunity of profit through providing new products and services, using additional channels for exchanging values as well as involving more parties along the activities of value chain. The variety of chances for expanding the business models based on the variety of capabilities including cloud technology and it's as a service character make the analysing and classification of those business models important for further understanding and taking more advantages from the enterprises to improve their business models more significantly. Therefore, this paper aims to provide multi aspects quantitative classification of the business models and using this classification as base for market analysis through group of leader enterprises in the market. That will help the enterprises to identify their current business character and explore the possibilities and opportunities for improvement and optimizing their offers and business models combination especially, with considering the cloud services.

The result of this paper will be as derived business model characteristics describing the business topology for any business model which can be used as base for a quantitative classification of three considered business models (Google, Amazon and e-Bay) to show the number of possible improvements in the different characters of those business models. That will help all the enterprises working in e-market to optimize their business models and as result their revenue models.

Keywords: E-market analysis, business model, quantitative classification.

1. Introduction

Cloud computing is considered as one of the disruptive technologies which lead to main changes in business and economic aspects through providing new capabilities and possibilities for the digital economy (-Bakhtiar, 2019) that were exploited from the various sectors of industry to reduce costs through the scalability of this computing technology and/or to increase revenue through taking advantages from expanding and innovating their business models (Rachinger et al, 2019, yang, 2013) . many enterprises used this emerging technology to support their business processes along the value chain taking advantage from the use based payment which clearly reduce the cost and increase the flexibility for adding gradually according to the new activities required in case of changing the business processes to meet the business needs (Aalst, 2011). In spite of the effects of cloud computing touch the business models of all industries but the scope of this effect defers according to the type of the core business model and the offered products and services before the integration with cloud technology from from saving and sharing the data and information (Aceto, 2020) to transforming the business models of the software enterprises (Boillar and legner, 2013) establishing innovative business models for providing products as a services. Mo revere, Using cloud computing technology opened the opportunity for variety of enterprises to expand the hybridity of their business model through offering additional products and service, expanding the the value exchanging channels and involving more acted parties.

among this multi-dimensional effects of cloud computing on the enterprises and their business model the consideration of the as a service offers based on the provided capabilities through the technology, there is need to significant classification which spot light on the effect of cloud computing on the different types of business models in the market to increase the likelihood of understanding these effects and to reveal the opportunities of business for another enterprises to plan for expanding their business models to include more products and services taking advantages from cloud computing technology. Therefore this paper will focus on the classification methodology characterize the business models of group of leaders enterprises in the market with focusing on as a service offers along the value chain for supporting the core business models and/or to gene rat additional revenue.

The structure of this work will be continued through the related work in the second section for extracting the classification characteristics as base for the third section which will include the qualitative classification of the chosen enterprises from their business models point of view. The Discussion and evaluation will be presented consequently in the fourth section and the conclusion in the last section.

Most of the articulated works were focusing on different aspects of business model, new online and/or digital economy and the opportunities for improvement without to give clear concepts for comprehensive characterization of business models

which reveal the opportunities for improvement especially with the new digital economy settings provided through cloud computing techniques. Therefore this paper aims to cover this gap through deriving variety of characters which represent widely the business model topology and will be used as base for quantitative classification of business models in direction of identifying the current character of those business models and the possible improvement. For achieving this objective we have selected three well-known online marketplaces (Google, Amazon and e-Bay).

2. Literature Review

This section will focus on reviewing the works for extracting various characterization of business models and as a service cloud computing based offers. In literature there are many definitions and classification of business model that will be significant source for deriving the main characteristics as shown in table 1:

Characteristics	Digitization Grad (DG)	Acting Field (AF)	Offered products (OP)	Revenue sources
Defined by				
Timmers 1998		y	y	y
Amit and Zott, 2001		y	y	y
Heinrich and Leist, 2000		y		y
MMC 2002		y	y	y
Scheer and Loos 2001	y	y	y	y
Afuah 2003			y	y
Debelak 2006			y	y
Magretta 2020		y	y	y
Slávik 2011			y	y
Boons and Ludeke- Freund 2013		y	y	y
Reim et al 2015	y			y
Wells 2016		y	y	y

From the table above we can extract some of the relevant characteristics that we are looking for in this work to be integrated as basis for the classification. The Digitization Grad (DG)} which answers the question L how far can the transaction phases be completed online? This characteristic distinguishes between Two type of business models the fully and partially digitized according to the accomplishing the transaction phases (information, negotiation and agreement and fulfilment phase) (Zumpe and Madberger, 2007 & Schubert, 1998); Madlberger& Matook, (2017). For all types of offered products through each business model. Acting Field (AF) refers to the categories that the business model belong to according to the personality of

actors like Business to Business,(B2B)}, Business to Consumer(B2C) and Consumer to Consumer (C2C) (Badiei,, 2015); Zhang, N. 2018) as the highly considered in comparison with the another categories like Consumer-to-Business (C2B)., Business-to-Administration

(B2A) and Consumer-to-Administration (C2A) (ivasakthi(2018). The Offered Products (OP) answers the question: which types of goods are offered through the business model. There two main types of goods Tangible and intangible goods in general (Meder, et al, 2018; Haziri,, et al, 2019). Each of the both categories also were classified into subcategories categories as the following (Stelzer, (2000: tangible Goods including physical products and physical services as well as the intangible include Digital products, Digital Services, Information and special goods (which are not belong-to the those three subcategories) . The fourth characteristic which also has been derived from cross the references is the Revenue Model (RM) which consists of revenue sources which includes Product, Contact and Information of and the revenue Forms which represented through Direct and Dependent, Direct and Independent, Indirect and Dependent and Indirect and Independent(Wirtz, 2000, Albers, Clement, 2007)).

In addition to the four previous characteristics is very important characteristic which refers to the basic types of the internet based business models, this characteristic is 4C topology business models including commerce, content, connection and contact) (Wirtz et al, 2010, Golzarjannat et al, (2021, Valtanen et al, 2019, Yrjölä et al, 2018,). The last characteristic that will be added for classification of business models is as a service offers for the consideration of innovative possibilities and opportunities that can be added from this type of product to improve the business model productivity. As a service cloud computing includes various types of services that can be exploited for improving the business models like:

Infrastructure as a Service (IaaS)} for providing the virtual machine infrastructure to the costumer as available service as storage capacities, network connectivity, as well as computing power on demand for different types of application which increase the scalability and flexibility fo the costumer. The costumer will pay just as he use of services from the service provider. Chao, 2014, Ivanchenko et al, (2018, Li, W., Zhou et et al, 2020)

Platform as a Service (PaaS) provides environment for expending the existing solutions or for developing new software completely. The platform offers basic functionalities such as user management, integration and availability which will decrease the complexity of the application development which will be networked between the developers community (Goyal 2013, Beimborn, 2011, Mimidis, 2018,)

Software as a service (SaaS) for providing the subsystems or applications as a service to the individuals and enterprises which increase the scalability for using new needed applications gradually and reduce the costs through applying pay as you use

(or pay as you go) methods for the offered services and without any required installation of soft wares and/or hardware by the users ((Zencke and Eichin, 2008; Bhardwaj et al., 2010, Guo& Ma, 2018 and Yoon and Kim, 2020).

The handled aspects of business models and cloud services in this section will be collected as base for the proposed classification in the next sections.

3. Methodology

This paper will use the table 2 which includes extracted and characteristics through the previous section for quantitative classifications of business models selected as leader group from e-market. This classification aims to numbered characterization of the chosen business models to identify where and how much they are in the business model topology as well as, how they can optimize their business as well revenue models in future to be more feasible.

Table 1: Collected characteristics for business models classification.

Characteristics	Attributes					
Digitization Grad (DG)	Full digitized		Partial digitized			
Acting Field (AF)	B2C		B2B		C2C	
4C business models	Content	context	Commerce		Connection	
Offered products (OP)	Physical Products	Physical Services	Digital Products	Digital Services	Information	Special goods
As a Service offers	IaaS		PaaS		SaaS	
Revenue sources	Product		Contact		Information	
Revenue forms	Direct and transaction dependent	Direct and transaction independent	Indirect and transaction dependent		Indirect and transaction independent	

The proposed classification for analyzing the e-market will use two numbers for representing the current situation of each characteristic attribute as following: 0- means this attribute does not active by the current business model, 1: means this attribute active by the current business model. Through using these numbers, the characteristics of business models will be represented quantitatively which will be helpful for optimizing those characteristics and as result the business model. The optimal business model topology in this perspectives is represented in table 3 which shows that all the attribute of this business model has been activated therefore represented with 1.

Table 3: quantitative classification of the optimal business model.

Characteristic s	Attributes						Number of activated attribute s	Improv e ment opportu nities
Digitization Grad (DG)	Full digitized		Partial digitized				2	0
	1		1					
Acting Field (AF)	B2C	B2B			C2C		3	0
	1	1			1			
4C business models	Content	context	Commerce		Connection		4	0
	1	1	1		1			
Offered products (OP)	Physical Products	Physica l Service s	Digital Products	Digital Services	Informatio n	Specia l goods	6	0
	1	1	1	1	1	1		
As a Service offers	IaaS		PaaS		SaaS		3	0
	1		1		1			
Revenue sources	Product		Contact		Information		3	0
	1		1		1			
Revenue forms	Direct and transactio n dependent	Direct and transaction independent		Indirect and transactio n dependent	Indirect and transaction independent		4	0
	1	1		1	1			
Optimal score							25	0

The previous table shows that the optimal business model should have all the 25 attributes activated and this business model can be represented with 25 as number. That means any business model has less number through this classification should study the feasibility of activating more attributes to improve his topology and revenue.

The next section will present three chosen enterprises as familiar and readers in the market to classify their business models using table 2 and 3 for identifying the current status and discussing the possible improvement.

4. E-market Analysis through Quantitative Classification of E-Business Models

This section will focus on the classification of group of chosen business models through using the method which has been explained in the previous section. These enterprises are (Google, Amazon and eBay) for this study:

4.1. Google

Google is one of the international enterprises provide search services therefore its business model considered mainly as context business model topology. As search engine, Google offer its digital services free of charge to attract huge number of daily visitors which support for generating indirect and transaction independent revenue through the advertising (see table 4). Also provide Google products and services belong to connect and content models such as emails and videos however, it is far from commerce model and does not work clearly yet in this field.

Table 4: quantitate classifying the business model topology of Google.

Characteristics	Attributes						Number of activated attributes	Improve ment opportunities
Digitization Grad (DG)	Full digitized		Partial digitized				1	1
	1		0					
Acting Field (AF)	B2C		B2B		C2C		2	1
	1		1		0			
4C business models	Content	context	Commerce		Connection		3	1
	1	1	0		1			
Offered products (OP)	Physical Products	Physical Services	Digital Products	Digital Services	Information	Special goods	2	4
	0	0	1	1	0	0		
As a Service offers	IaaS		PaaS		SaaS		2	1
	1		0		1			
Revenue sources	Product		Contact		Information		2	1
	1		1		0			
Revenue forms	Direct and transaction dependent	Direct and transaction independent	Indirect and transaction dependent		Indirect and transaction independent		2	2
	1	0	0		1			
Optimal score							14	11

Google provides its search services and google maps for individuals (B-to-C) as well as for the enterprises as(B-to-B) and no intermediation role for (C-to-C) can be experienced through this business model. Google work fully in digital word as click no break because of the digitized form of the offered products which allows the transactions to be completed electronically .

As web services provider, offer number of web services (WSs) like: e "Google SOAP Search API," under <http://code.google.com>. This application allows the user (developer) to use his own application to enter the search result in stead from the browser (as PaaS). Also these applications enable the user to process the returned search results as structured data like in XML format. That allow the users to monitor and search for specific topics automatically for analysis purpose.

Additionally, Google provides free of charge web services in form (PaaS) to support its Google Map application like (API) application programming interface which allow the user to interact with geoinformation related to the city maps. Despite, these two web services are free of charge but Google benefits from offering like this service indirectly through supporting its core business and to increase its share and positioning in the market.

Furtherly, Google provide paid web services to generate direct revenue such as "Google Maps for Enterprise" (as SaaS) which allows the enterprises to integrate the maps with the intranet of the enterprise through special application.

Then there are many opportunities for Google To improve its business model through activating more closed attributes as shown through table 4 and figure 1

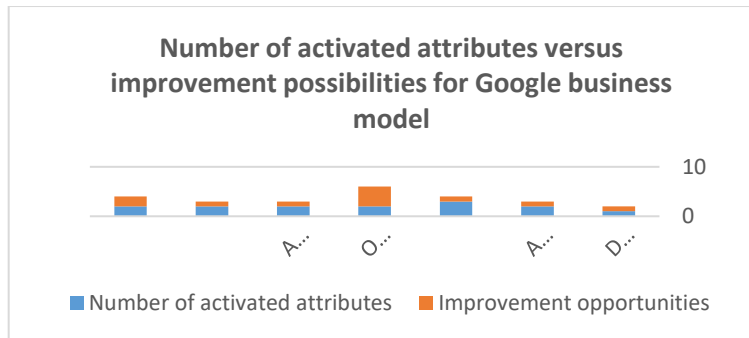


Fig. 1: Number of activated attributes versus improvement possibilities for Google business model.

4.2. Amazon

Similarly, Table 5 shows the classification of Amazon's business model characteristics and their attributes to figure out the possible improvement in the future. Amazon has been established in 1994 and transformed to work online in 1995 as bookseller. Before 1999 Amazon did not have any stock for its products. Besides the books, Amazon was offering in that period music, video games and electronics to the end customer (B2C) as online shop. Additionally, Amazon expanded its business model to act as auction for selling the secondhand products as (C2C). No clear activities provided yet from this enterprise in field (B2B).

Because of the nature of its offered products, it has mixed between partial and fully digital transactions (click and brick) depending on the types of exchanged products if they have digital or physical nature.

Table 5: Quantitate classifying the business model topology of Amazon.

Characteristic s	Attributes						Number of activated attributes	Improve ment opportu nities
Digitization Grad (DG)	Full digitized		Partial digitized				2	0
	1		1					
Acting Field (AF)	B2C	B2B			C2C		2	1
	1	1			0			
4C business models	Content	context	Commerce		Connection		1	3
	0	0	1		0			
Offered products (OP)	Physical Products	Physical Services	Digital Products	Digital Services	Informati on	Special goods	3	3
	1	0	1	1	0	0		
As a Service offers	IaaS		PaaS		SaaS		2	1
	1		1		0			
Revenue sources	Product		Contact		Information		2	1
	1		1		0			
Revenue forms	Direct and transaction dependent	Direct and transaction independent	Indirect and transaction dependent		Indirect and transaction independent		3	1
	1	0	1		1			
Optimal score							15	10

Recently, Amazon improved its business model through providing paid web services to support its core business and to generate direct revenue such as „simple storage access,, as (IaaS). Through this service the developers can store and retrieve data on and from Amazon servers. The charge for this service will be specified depending on the storage capacities used from those developers

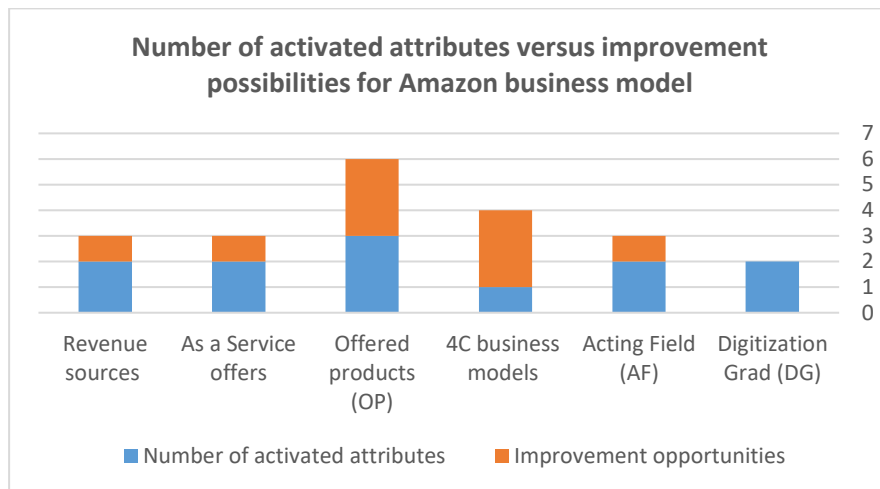


Fig 2: Number of activated attributes versus improvement possibilities for Amazon business model

As in table 5 and figure 2 shown, there are many opportunities for Amazon to optimize and extend its business model through activating more characteristics and aspects. That will help it to generate more revenue and to increase its market share.

4.3. eBay

eBay is American multinational mediator marketplace funded in 1995 to work as broker between sellers (individuals and business) and buyers as C2C and B2C categories through auctions and fixed prices transactions. Because of the physical and intangible nature of the products and services sold through this marketplace, its transaction partially and fully digitized.

Table 5: Quantitate classifying the business model topology of eBay.

Characteristics	Attributes						Number of activated attributes	Improve ment opportunities
Digitization Grad (DG)	Full digitized		Partial digitized				2	0
	1		1					
Acting Field (AF)	B2C		B2B		C2C		2	1
	1		0		1			
4C business models	Content	context	Commerce		Connection		1	3
	0	0	1		0			
Offered products (OP)	Physical Products	Physical Services	Digital Products	Digital Services	Information	Special goods	4	2
	1	1	0	1	1	0		
As a Service offers	IaaS		PaaS		SaaS		1	2
	0		1		0			
Revenue sources	Product		Contact		Information		2	1
	1		0		1			
Revenue forms	Direct and transaction dependent	Direct and transaction independent	Indirect and transaction dependent		Indirect and transaction independent		2	2
	0	0	1		1			
Optimal score							14	11

As web services provider, eBay free of charge Application Programming Interface (API) (as platform as a service (PaaS)) for developers to create web-based applications for accessing data by ebay .com to perform some effective functions like item search, sales management and user account management. That will support indirectly the core business model of eBay (Choudhuri & Mohapatra, 2015).

eBay generates revenue through receiving commissions from the sellers for each transaction as indirect and transaction dependents form, as well as through advertising and listing fees from the sellers for every product listed over the first 200 (free of charge) products as indirect and transaction independent form.

For understanding the business model of eBay see classification through table 6 and figure 3 below which presents the current business model characters and the opportunities for improvement.

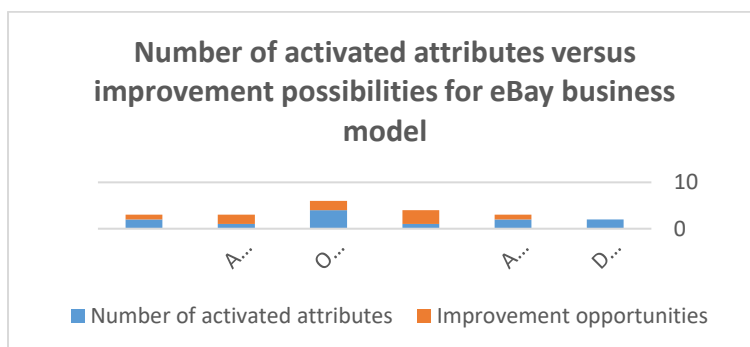


Fig. 3: Number of activated attributes versus improvement possibilities for eBay business model.

Similarly to the previous examples, eBay has developed its business model characters to expand its opportunities but still there are inactivated fields which could be exploited to increase the direct and indirect revenue.

5. Results and Discussion

There are many research articles handled business models aspects from different points of view therefore, this paper provides characteristics and their attributes extracted through crossing huge number of references handled business model aspects. These characteristics has been summarized in one table (table 2) and used as logical base for classifying and analyzing the business models of group of selected marketplaces as market leaders in the e-market for understanding the current active characteristics of every business model as well as the possible opportunities for improvement in future . additionally, the quantitative classification which has been presented in this work reveals new idea about how we can represent every business model as number out of 25 as optimal situation to know the improvement possibilities for optimizing the revenue moreover, the presented business models can be used as learned lessons for the startups and newly deployed marketplaces to improve their business models as optimal as possible in earlier stages during their business carrier through comparing the business model with the others like in table 6. The comparison matrix in table 6 has been formulated based on tables 3, 4, 5 to shows improvement question for each business model, competing with each other. For example:

- Why Google does not extend its business model provide tangible goods like Amazon and/or eBay?
- Why Google and Amazon do not expand their business field to intermediate between the individual as C2C relationship.

Similarly there are many questions based on the comparison as shown in table 6 cab be answered with taking into account the feasibility issues and success factors for activating the none activated attributes of the classified business models for improvement.

Table 6: Comparison matrix for improvement opportunities.

Online marketplaces		Google	Amazon	EeBay
BM characteristics and their attribute				
Digitization Grad (DG)	Full digitized			
	Partial digitized	?		
Acting Field (AF)	B2C			
	B2B			?
	C2C	?	?	
4C business models	Content		?	?
	context		?	?
	Commerce	?		
	Connection		?	?
Offers Offered products (OP)	Physical Products	?		
	Physical Services	?	?	
	Digital Products			?
	Digital Services			
	Information	?	?	
	Special goods	?	?	?
As a Service offers	IaaS			?
	PaaS	?		
	SaaS		?	?
Revenue sources	Product			
	Contact			?
	Information	?	?	
Revenue forms	Direct and transaction dependent			?
	Direct and transaction independent	?	?	?
	Indirect and transaction dependent	?		
	Indirect and transaction independent			

6. Research Limitation

This work focused on extracting some interesting and useful characteristics and their attributes from literature which handled the different aspects of a business model as base for classification and analyzing the business models in practice for highlighting the possible opportunities for improvement but there are another aspects can be derived also and added to the characteristics that are proceeded in this work.

Also this work does not provide consideration of the feasibility and success factors that should be taken into account from the marketplaces to decide the usefulness of activation non-activated to be real opportunity for those business models.

7. Conclusion

This paper provides and quantitative classification of group of business models for some leader marketplaces. This classification has been achieved through derived characteristics and their attributes which can give comprehensive overview about the business models including the different aspects related to Digitization Grad (DG), Acting Field (AF), and 4C business models, Offered products (OP), As a Service offers, Revenue sources and Revenue forms. the result of the classification was various business model topologies that can draw attention about the possible opportunities for improvement related to those characteristics which can be considered in future for increasing the market share and revenue. Additionally the considered characters in this work will help the online marketplaces startups as guidelines for developing and deploying optimized business models.

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