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The Major Factors That Contribute To E-Commerce Growth In The U.S And China: Analyses And Adoption By Morocco

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THE MAJOR FACTORS THAT CONTRIBUTE TO
E-COMMERCE GROWTH IN THE U.S. AND CHINA:
ANALYSES AND ADOPTION BY MOROCCO

Honors Thesis

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Abstract

The purpose of this study is to research and analyze the growth of electronic commerce (e-commerce) in the United States and China. This thesis will focus on the evolution of mobile commerce (m-commerce) which implies conducting business transactions online through wireless handheld devices such as cellular phones and tablets. Through a review of literature, our first goal is to determine the major factors that contribute to advancements in e-commerce and especially mobile commerce in each of these two countries. The next part is to apply insights gleaned to Morocco, a Northern African country that has significantly developed its Information Technology (IT) infrastructures during the last few years, but has yet to fully embrace electronic commerce. The aim of this project is to establish those success factors for mobile commerce in Morocco.

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Introduction

Each year at least 1 billion global digital consumers purchase goods and services online. The statistics show that in 2021, approximately 2.16 billion people from all over the world are expected to shop on the internet, up from 1.67 billion digital consumers in 2016 (1). Over the past decade, electronic commerce has witnessed a tremendous growth globally due to several factors including the evolution of the internet, the changing socio-economic environment, the changing information technology (IT) landscape, and people's awareness and acceptance of the idea of shopping on the internet. Even though the majority of these digital consumers are familiar with the procedure of shopping from online websites, others lack the knowledge of the functionality of electronic commerce, for instance, how to efficiently search for the products and services (2).

E-commerce refers to any type of business transaction over an electronic network, mostly the internet. It also includes the concept of conducting business electronically through buying and selling goods and services on a website, or simply by transferring funds and data online (2). These online business activities are usually classified as business-to-business (B2B), business-to-consumer (B2C), business-to-government (B2G) or consumer-to-consumer (C2C). In B2B, companies engage in business transactions with their partners, suppliers and distributors using online resources. In B2C, companies offer their products and services for customers to purchase from e-commerce websites. B2G is the procedure of doing business and exchanging information between companies and the government. Another major type of e-commerce is C2C where online transactions are only conducted between consumers (3).

There are various software programs that run the main functions of an electronic commerce website such as displaying products and their features, managing the company's inventory, and

simplifying the process of ordering online to make this experience easier for the customers (3). In order to effectively connect with online buyers and increase the sales volume, companies use several internet-based applications including emails, web services, online advertisements, online catalogs and shopping carts. Prior to the advent of e-commerce, businesses were using a different way called an electronic data interchange (EDI) to communicate and exchange information electronically (3). According to the Information Resources Management Association (IRMA), the EDI procedure also facilitates the e-commerce activities by allowing online retailers to create data links with their customers in order to securely process and track their orders.

There are some major changes that have influenced the e-commerce realm during the last 10 years such as the rise of online marketplaces, the exceptional growth of digital marketing as well as mobile commerce (m-commerce). Nevertheless, there are developing countries such as Morocco that have yet to improve their information technology (IT) infrastructure and fully embrace electronic commerce. According to the International Telecommunications Union (ITU), internet penetration rate in developed countries is about 81%, compared with 42% in developing countries and only 17% in the least developed countries. The extremely high percentage of internet users in some of these countries that have an advanced technological infrastructure such as the U.S and China has led to a significant growth of the e-commerce market in terms of the large number of online businesses, and the recent e-commerce sales volume and revenues (4).

Today, B2C electronic commerce is rapidly shifting to the mobile platform known as mobile commerce. M-commerce is conducted through the use of various mobile devices such as smartphones and tablets to enable online transactions by connecting to cellular or wireless networks (6). Consumers use their portable devices not only to purchase products and services through the internet, but to make bill payments, access online contents in different websites and

use several financial services. Some of the main factors that contribute to the growth of the mobile commerce industry include the increased demand for applications from a mobile consumer base, the well-designed e-commerce sites that facilitate mobile use, and the technological advances that have offered wireless handheld devices more features and advanced capabilities. A study conducted by LexisNexis in 2016 shows how mobile commerce has recently become the go-to habit for online shoppers. The study consisted of over a 1,000 U.S retailers and found that about 26% of them already possess a mobile online shopping channel, and 32% are in the process of creating one. The research also found that about 80% of electronic commerce retailers with at least $50 million in sales annually plan to focus more on m-commerce in the next five years (9). Mobile commerce is being increasingly adopted by e-commerce businesses and online retailers that have already invested in digital, therefore, mobile would be included in their next strategic plan (7).

Electronic commerce has revolutionized the way consumers shop nowadays due to several reasons including the convenience of shopping at any time and from everywhere, the ability to compare and research products and prices available, and the possibility to benefit from shipping services in order to save the consumers' time and transportation costs (11). On the other side, electronic commerce has had a major impact on business costs and productivity, and has led to a significant growth of the economy all over the world. It has a chance to be widely adopted especially in developing countries. This research project will study the factors that contribute to the growth of electronic commerce in the United States and China, and will suggest how to implement those factors to a less developed country in terms of technological advancements and economic development. The focus will be on the evolution of mobile commerce, which is a form of e-commerce used on mobile devices.

History of Electronic Commerce:

Electronic commerce started in the early 1970s, when companies were using Electronic Data Interchange (EDI) to exchange important documents such as order forms and payment receipts with other businesses (8). This method replaced the old fashion of mailing and faxing business documents with a digital transfer from a company's system to another. Even though electronic commerce was initially developed in the late 20th century, it already has a history that can be divided into three major periods of time: 1990-2000, the years of invention and discovery; 2001-2006, the period of consolidation; and 2007-present, the years of reinvention with social media and mobile commerce (6).

During the invention period, consumers discovered electronic commerce and started to purchase simple goods/services on the internet from e-commerce retailers. Information technologists and computer scientists consider electronic commerce success nowadays as a fruit of the technological advances back in the late 1990's. Some of these advances include the development of the internet, the invention of various electronics devices, the spread of the wireless connection and the use of large search engines at that time such as Yahoo (6). The vision of electronic commerce was to offer a worldwide communications and computing environment through HTML pages created by individuals, technologists and scientific institutes, that everyone could access with a regular computer from different locations (2).

Beginning in 2000 with the establishment of a stronger presence and acceptance by consumers, e-commerce shifted the way consumers purchase items from the traditional in-store shopping to buying on the internet. Large firms found out about the rapid growth of this industry and started using the internet to build up their market positions and expand their brand by following

the B2C e-commerce model. Therefore, e-commerce retailers offered a broader choice of products and online services such as travel reservations, the ability to use financial services and make online payments (6).

During the reinvention period (2007 - present), electronic commerce has been developed and improved by the growth of online applications, dynamic web pages and social media (online social networks such as Facebook, Instagram and Twitter, photo sharing sites, and blogs). Another factor that mainly contributed to e-commerce growth is the collaborations of large tech companies in e-commerce industry in 2010. For instance, Microsoft and Amazon agreed to share access to their patent portfolios, and VISA purchased credit card payment service CyberSource. In this period, mobile commerce started growing as well, making it a significant portion of the overall electronic commerce market.

Global Revenue of Mobile Commerce:

The following chart represents the global revenue of mobile commerce from 2014 to 2017, with predictions for the next two years. In this research project, we will analyze the factors that mainly contribute to this significant growth in m-commerce revenues in the U.S and China, and the potentiality of growth and adoption in Morocco – a Northern African country.
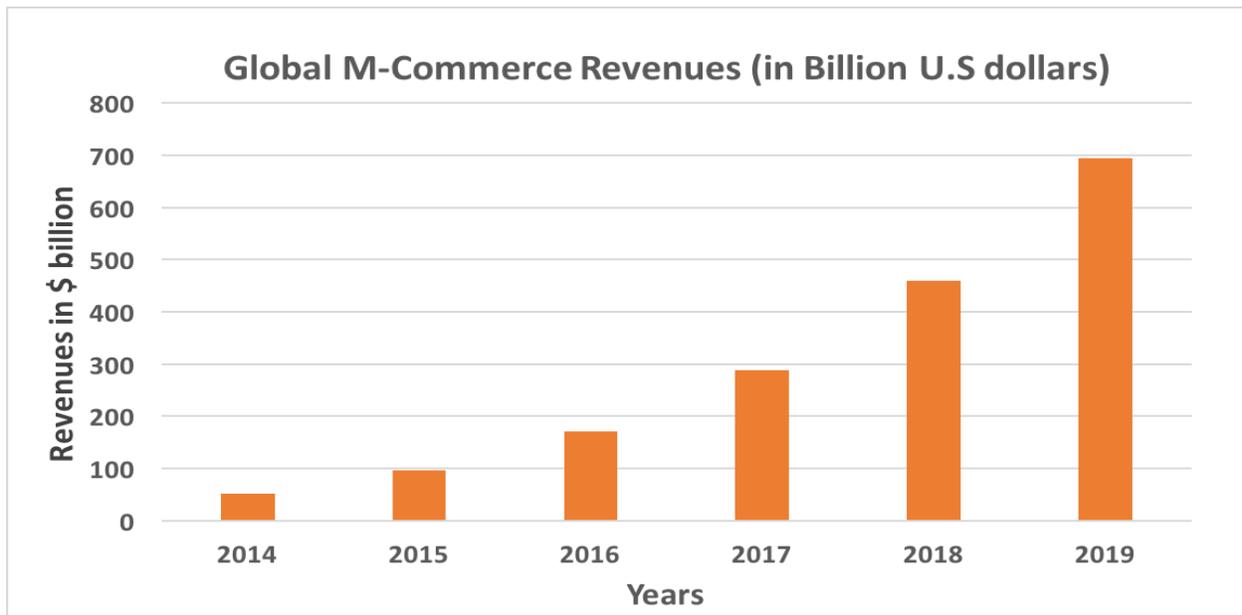
Figure 1: Transaction Value of Global M-commerce sales from 2014 to 2019.

Source: Ovum Report – *Mobile Commerce Value Worldwide 2014-2019* (10).

As this graph illustrates, there has been an exceptional growth in global mobile commerce revenues from 2014 to 2019. According to the annual m-commerce report released in 2018 (10), worldwide m-commerce revenues amounted to 50.92 billion U.S. dollars in 2014 and are projected to reach 693 billion U.S. dollars by the end of 2019. The rise in m-commerce has been due to the developed mobile/cellular infrastructure that makes it more convenient for mobile users to use their smartphones or tablets to purchase goods/services from e-commerce websites.

Electronic Commerce in the United States:

The electronic commerce industry in the U.S has grown rapidly over the past 10 years as consumers are more aware of online sales and are tempted by the convenience of comparing, buying products, and services online (2). The most common form of electronic commerce in the U.S is B2C where online buyers purchase any type of goods from clothing, Christmas gifts, electronics, precooked meals, and home furniture from their computers or mobile devices. B2B is the second fastest growing type of e-commerce in the U.S where manufacturers, wholesalers and e-commerce retailers exchange goods, services or business documents online (3). The percentage of B2B e-commerce sales in the U.S increased from 9.7% in 2016 to 11% by the end of 2017, and this share is projected to attain 14.2% in 2020 (10).

Revenue of the Electronic Commerce Industry in the United States:

Figure 2: The revenues from e-commerce sales in the United States from 2008 to 2017.

Source: IBISWorld Industry Report, *E-Commerce & Online Auctions in the U.S* (10).

According to the IBISWorld Industry Report released in October 2017, revenue for the electronic commerce industry is expected to increase at a rate of approximately 12.4% annually over the five years to 2017, including about 13.2% rise in 2017 to reach 452 U.S. billion dollars (see figure 2). The exceptional growth of the industry is essentially due to the rise in the use of the internet by consumers which has given e-commerce businesses such as Amazon and eBay the opportunity to reach hundreds of millions of U.S consumers (7). As a result, electronic commerce has become an extremely competitive market over the last 10 years. Besides the social, economic and technological factors, designing a user-friendly website (easy website navigation), offering multiple payment options, and flexible shipping options have become significant drivers that affect e-commerce revenues.

By 2022, revenue of the electronic commerce industry is expected to rise at a rate of 9.3% annually to reach about $704 million (10). As e-commerce total revenues grow, the number of companies in the industry is also expected to increase which creates a more competitive market. Over the next five years, the number of industry businesses will rise at a rate of approximately 10.8% annually to an estimated 226,028 companies. Therefore, the number of industry employees is also expected to grow at an annualized rate of 9.8% to about 836,010 employees in 2022 because the need for human capital is required to fulfill fast orders, satisfy the consumers' needs and expectations, and offer them a better customer service (10). During the same time frame, the total revenue from B2C e-commerce websites is expected to continue to increase at a significant rate as general consumer spending rises (8). American consumers have become more aware of the convenience of purchasing products and services online, and their spending habits are changing from the traditional in-store shopping to buying from online e-commerce retailers.
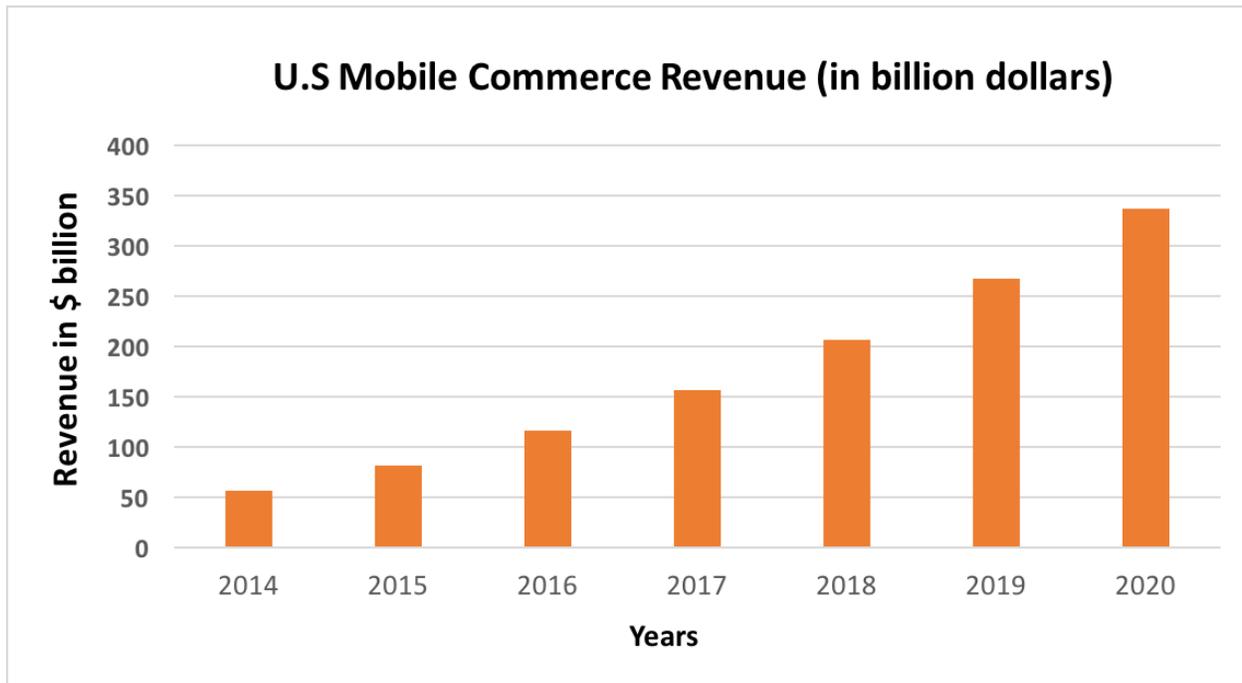
M-Commerce Revenue in the United States:

Figure 3: Mobile Commerce Revenue in the U.S from 2014 to 2020 (in billion U.S dollars).

Source: IBISWorld Industry Report, *E-Commerce & Online Auctions in the U.S* (10).

The mobile population has significantly grown during the last few years due to the increasing usage of smartphones and other portable electronic devices. Several mobile-optimized websites, smartphone applications and digital wallets have been invented in order to support and facilitate mobile commerce activities. Consumers can now easily purchase products/services and make online payments by using their electronic devices. As a result, mobile commerce total revenues in the U.S increased from $80.9 billion in 2015 to approximately $156.2 billion by the end of 2017, and it is expected to attain almost $350 billion in 2020 (see figure 3). Some of the main reasons that have led to this growth include the continued rise of mobile internet access (3G and 4G) and the mobile payment services that tend to be more convenient for the consumers (7).

Electronic Commerce Industry Growth in China:

China's entry to the World Trade Organization (WTO) and its commitments to liberalization in the financial services and telecommunication industries had a massive impact in the growth of Chinese electronic commerce (5). In 2012, China was the second biggest Internet market in the world and became the largest mobile phone market. Its entry into the WTO provided multinational companies with opportunities to invest in China and grow their businesses, which opened a more competitive market for foreign investments. Some of the major factors that contributed to the growth of e-commerce in China include the extensive use of the telephone and other portable devices, the large popularity of internet users, and the development of information Technology (IT) and telecommunication infrastructures during the early 2000's (5).
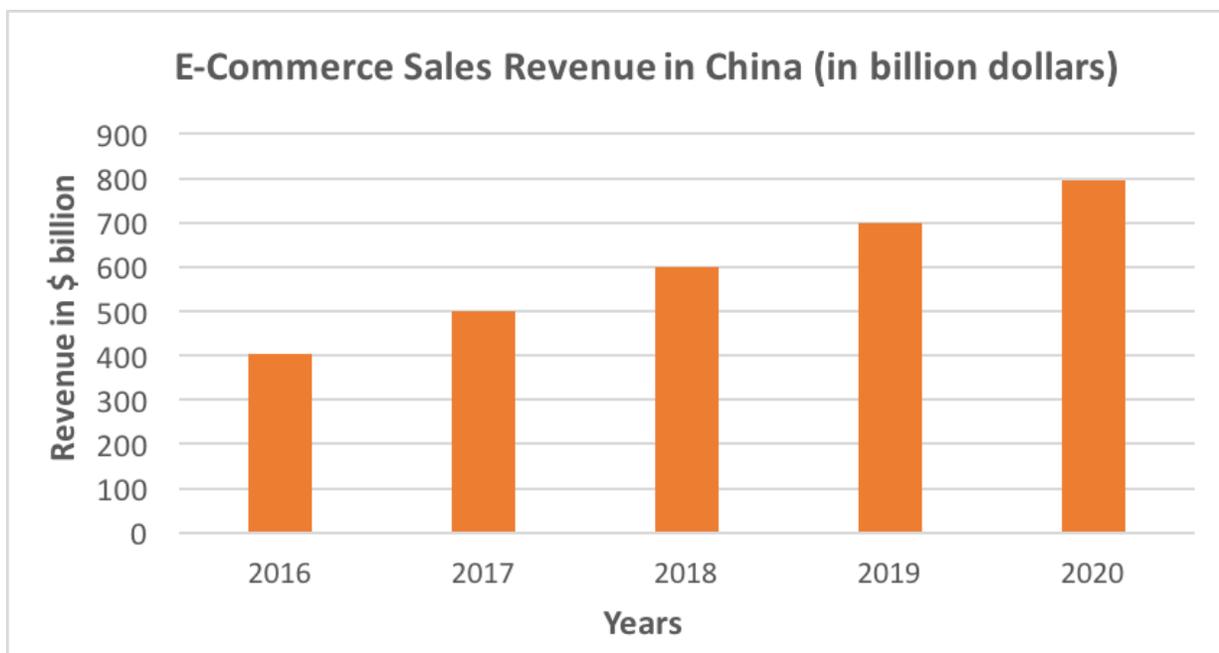
E-Commerce Revenue in China:

Figure 4: The annual e-commerce sales revenue in China from 2016 to 2022.

Source: Statista - The Statistics Portal, *E-Commerce Sales in China Report* (12).

The statistics show the growth of the Chinese online retail market from 2016 to 2017, with predictions that electronic commerce sales will exceed $950 million by 2022 (see figure 4). Based on the graph, we noticed a significant rise in e-commerce sales revenue in China over the last two years. Today, the largest e-commerce retailer and operator of payment platforms in China is Alibaba Group. Alibaba's annual total revenue highly increased from about 3.7 million yuan ($581,139) in 2010 to 119.788 million yuan ($18.7 million) in 2017, while the number of online orders generated only on electronic commerce properties on a daily basis increased from 254 million orders in 2013 to approximately 812 million orders by the end of 2017 (15).

Mobile Commerce Revenue in China:

The following chart illustrates the significant growth in total revenue of mobile commerce in China from 2014 to 2017, with projections for the next two years.
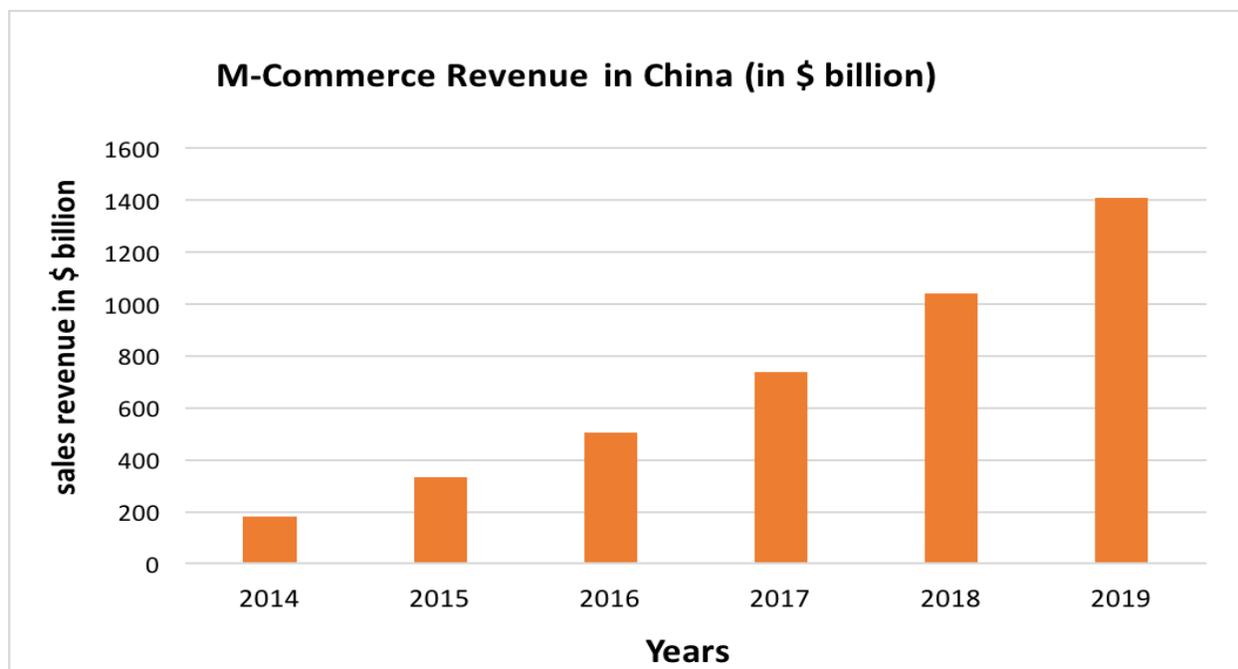

Figure 5: The annual sales revenue of retail m-commerce in China from 2014 to 2019.

Source: Statista, *China: Retail m-commerce sales report* (12).

Mobile commerce is considered as the fastest growing sector of China's digital economy nowadays due to the increased number of consumers using mobile devices to purchase goods and benefit from various services (14). According to the annual m-commerce revenue report published by Statista in October 2017, the total sales revenue of retail mobile commerce increased from $333.9 billion in 2015 to approximately $737.07 in 2017 (see figure 5). Some of the major drivers behind the rapid growth of the Chinese m-commerce industry include the highly developed mobile payment ecosystem such as Ali Pay and WeChat Pay, the large number of mobile internet users in the country (751 million users in 2017), and the continuously growing economy (12).

Market Conditions: The U.S and China

According to the International Monetary Fund (IMF), China is the world's largest economy by purchasing power parity (PPP) and is the second largest economy in the world based on nominal GDP. On the other hand, the U.S is the largest economy by nominal GDP and is extremely advanced in terms of information technology infrastructure. Both countries mainly invest in technology industries that contribute to economic growth. Their intense competition to become a world leader has created the high-tech realm during the last few years. The difference comes in the main industries that contribute to economic development in each country. China is considered as a world leader in gross value of industrial output, machine building and technological equipment (including electronics, telecommunications and robotics), while the U.S is the second largest industrial output in the world. The industrial sector in the U.S is highly diversified between electronics, telecommunications, car manufacturing, aerospace and consumer goods. However, the industrial production growth rate in the U.S was limited to 1.8% in 2017, while it was much higher in China at approximately 6.2% (23).

Table 1: Statistics about Internet Usage in the U.S and China.

	USA	**China**
Number of internet users (in millions)	286.94	771.98
Number of mobile internet users (in millions)	227.2	732.65
Licensed Internet Service Providers (ISP) per 100,000 population (Yr. 2012)	7,000	5
Percentage of population using the internet	72.8	55.8
Number of fixed broadband subscriptions in 2016 (in millions)	106.07	297
Largest mobile phone network operator & number of subscriptions (in millions)	- Verizon Wireless - 148.9	- China Mobile - 887.2
Sources: *ITU (International Telecommunications Union: www.itu.int/ITU-D/ict/statistics/); Statista: The statistics Portal − internet usage in the U.S and China; FierceWireless − Verizon Report (2017): Statista: Fixed Broadband subscriptions in 2016.*		

In this part, we look at the key drivers for electronic commerce growth in general. These drivers are very relevant for the U.S and China due to their developed or large economies and advanced technological infrastructures. Overall, the growth of internet users in both countries has been significantly high from 2012 to 2017. While the percentage of population using the internet in the U.S was about 72.8% in 2017, it was limited to 55.8% in China for the same period due to its high population density and the fact that the country is mainly agro-based economy that is still transforming to become a world leader in technology industry. In terms of the depth of reach of

the Internet, China seems to have a march over the U.S. The number of Internet users in the U.S by the end of 2017 was close to 287 million, while it was much more in China at over 771 million, which accounted over 20 percent of the 3.5 billion Internet users worldwide. However, the percentage of smartphone penetration in the U.S was greater than China due the increased demand for mobile devices in the U.S. as well as its highly developed mobile phone infrastructure.

Internet Technological and Infrastructure Conditions: 2012 – 2017

Connectivity is vital to electronic commerce development. The U.S leads China in almost all aspects of technological infrastructure including the total number of internet hosts, the percentage of fiber broadband coverage in the country and the installed telecommunication bandwidth. As a result of the superior tech infrastructure, the average internet speed in the U.S has been significantly higher than China over the years. In 2017, the total number of internet hosts in the U.S were almost 505 million and the number of internet domains were 80.8 million compared with China's 20.6 million internet hosts and about 7.1 million internet domains.

The difference comes in the nature of the interaction of the government and the internet. The internet is mostly state controlled in China which explains the limited transparency of the internet by government agencies. On the other hand, the U.S government aims to continuously improve the internet market conditions and privatize this sector by attracting multinational companies to invest in various fields of the IT industry such as cloud computing, big data, networking and telecommunications. However, both countries are taking the initiative of improving their international bandwidth connectivity which would facilitate conducting trade with other countries, and therefore, achieve more e-commerce sales.

Table 2: Internet Infrastructure.

The following table lists the key indicators of the internet infrastructure in the U.S and China.

	USA	China
Number of Internet hosts (in millions) in 2012	504.9	20.6
Total number of domains (Yr. 2017)	80,818,367	7,139,690
Average Internet Speed (Mbps) in 2017	18.2	7.6
Percentage of Fiber Broadband Coverage (Yr. 2017)	28	60
Percentage of installed telecommunication bandwidth of the global total (Yr. 2014)	13.2	29
Average fixed broadband download speed (in Mbps) in 2017	64.17	16.4
Average fixed broadband upload speed (in Mbps) in 2017	22.79	9.46
Sources: FCC (Federal Communications Commission – Internet Access Services 2016); Statista – 2017 United States Internet Report; ITU (International Telecommunications Union: Fixed and Mobile Internet Connections Report).		

Internet has had a tremendous impact on economic growth and development in the U.S as well as China in the last 10 years. Government, policy makers, and businesses are aware of the several opportunities the internet can create due to the highly increased demand for e-commerce services such as B2C e-commerce sales and online payment options. As of 2016, the total fixed and mobile internet connections in the U.S counted about 240 million, whereas it was over 730 million in China. In 2017, the percentage of fiber broadband coverage in the U.S was about 28%, while China had 60%. The main reason of this major difference in terms of the number of connections and installed telecommunication bandwidth is China's extremely large population.

However, the average internet speed is higher in the U.S because of its advanced networking and telecommunication infrastructure. As of June 2017, China had an average internet speed of only 7.6 Mbps compared to 18.2 Mbps in the U.S. Both countries are trying to improve their internet infrastructure and increase the number of internet service providers (ISP).

Mobile Phone: Market Conditions

In this section, we compare the U.S to China in terms of mobile phone infrastructure. While the U.S had about 226.2 million smartphone users in 2017, China accounted 717.3 million. However, the percentage of smartphone penetration in the U.S was greater than China. During the same period, the total mobile cellular subscriptions per 100 inhabitants was 123 in the U.S and 97 in China. These numbers are still rising due to the growth and development of mobile commerce.

Table 3: Statistics about mobile use.

	USA	China
Smartphone users (in millions)	226.2	717.3
Percentage of smartphone penetration (Yr. 2016)	69.3	51.7
Number of mobile phones in the country in millions (Yr. 2014)	327,5	1,321
Mobile phone connections per 100 citizens (Yr. 2014)	103.1	92.4
Mobile cellular subscriptions per 100 inhabitants (Yr. 2016)	123	97
Sources: International Telecommunication Union (ITU) Annual Report (2016); Central Intelligence Agency (CIA) – The World Fact Book;		

Information Technology (IT) in Morocco:

Prior to 2006, IT in Morocco was relatively underdeveloped particularly the internet infrastructure: low number of internet hosts and network service providers, only one large mobile operator, slow fixed-line service, and limited revenue of the industry (29). After 2006, the Moroccan government launched several programs, for instance, "Numeric Morocco 2013" and "Morocco Digital Development". The intention was to implement strategies that promote the country as a destination for outsourcing services and an active participant in the global digital development (19). Morocco continues its efforts in attracting a large number of global technology companies to invest in different IT sectors including communications, mobile telephony, software services and big data.

While the telecommunications sector is the main focus of the government, the percentage of the population using the internet (internet penetration rate) has significantly increased over the past 10 years. For instance, the percentage of internet penetration in Morocco increased from about 19.8% in 2016 to reach approximately 57.6% by the end of 2016 (20). A year later, in 2017, the percentage of internet usage in Morocco increased by 3.3% to reach 60.9%. The internet penetration rate also reflexed an annual growth of 4.7%. This growth has been partially affected by the adoption of the 3G and 4G spectrum technologies (17). The three major mobile operators that share the Moroccan telecom market are: Maroc Telecom (42.4%), Orange (29.9%) and Inwi (27.7%). Morocco is witnessing a telecom revolution; the total revenue of the mobile telecom market represents about 73% of the total IT industry revenue (17). According to the National Agency for the Legalization of Communications (ANRT), the mobile phone network registered an annual growth of 2.68%. The number of phone subscribers reached about 38 million subscribers in 2017 up from 16 million in 2006, a growth of over a hundred percent in a decade (20). Despite

this significant progress in the technology market, Morocco's network readiness is relatively low. Network readiness measures a country capability to exploit the opportunities offered by the IT sector. World Economic Forum's (WEF) network readiness index ranked Morocco at 78th out of a total of 139 countries in 2016 (25).

Changes in Information Technology in Morocco after 2006:

The following table highlights the development of information technology (IT) services in Morocco before and after 2006.

Table 4: IT development in Morocco.

	Before 2006	**After 2006**
Telecommunication industry	Mostly owned by the government	Privatized
Telecommunication services	Fixed-line / mobile phone services Internet (expensive to access) Wi-Fi (only in a few cities)	Faster cell phone networks Affordable cell phone services Wi-Fi (available in every city)
Main activities in the IT sector	Telecommunications (home telephone system, mobile telephony and the internet)	Mobile networks (3G, 4G, LTE) Software services Cloud services Big data
Sources: Country Profile – *Morocco Report* (29); Infomineo – *The Development of IT in Morocco* (25).		

This table illustrates the significant change in information technology (IT) infrastructure in Morocco. Before 2006, large telecom companies were mostly owned by the government and the telecommunications services offered were limited to fixed-line, internet and mobile phone services. After 2006, the Moroccan government launched a strategy that has attracted large global telecom operators such as *Orange Telecom* to invest in Morocco and offer a variety of services including mobile networks (3G, 4G and LTE), software services, and clouding services.

Government Interests in the Technology Development in Morocco:

Today, the Moroccan government is aware of the importance of investing in technology development since its main goal is to position Morocco among dynamic developing countries in the Middle East and North Africa (MENA) in terms of IT infrastructures (25). This initiative started by the end of 2009, when a national strategy called "Numeric Morocco 2013" was launched in order to develop the Information and Communications Technology (ICT) sector and increase the computerization of society. This efficient strategy offered jobs for over 50,000 employees, and the total income of the ICT industry exceeded 6 U.S. billion dollars by the end of 2016 (21). During the same period, Morocco focused on promoting investment and trade in order to attract international companies to invest in data center services, host services, virtualization, communication technologies and big data. The government signed 60 agreements for the promotion and protection of foreign investment, and 50 agreements to eliminate the double taxation of income. According to the International Data Corporation (IDC), the IT services market in Morocco is expected to reach about $550 million by the end of 2018, while developing a wide range of IT areas including telecommunications infrastructures, software development, and information security (25).

IT Infrastructure in Morocco in the Current Decade:

In this part, we look at the drivers for information technology (IT) development in Morocco. These drivers are very relevant for Morocco – a developing country, seeking to become more advanced economically, socially and technologically. Overall, the country has positioned itself among the top most developed Northern African countries in technological and innovative capabilities (24).

Table 5: IT infrastructure in Morocco.

	Morocco
Colocation data centers (Yr. 2016)	4
Cloud service providers (Yr. 2016)	4
Major network media services	Wi-Fi; fiber-optic
International Internet bandwidth per user (in kb/s)	10.77
Secure Internet Servers	252
Government investment into Morocco's telecom infrastructure in 2017 (in U.S billion dollars)	1.3
Source: ANRT (National Agency of Telecommunication Regulations); Cloudscene – Colocation Morocco: Data Centers (27); International Telecommunication Union (ITU).	

In 2016, the total number of colocation data centers and cloud service providers in Morocco was extremely low compared to other developed countries such as the U.S and China (table 2). In 2017, the Moroccan government invested about $1.3 billion to improve the telecommunications infrastructure.

Internet Infrastructure & Market Conditions in Morocco:

A large part of electronic commerce success depends on internet connectivity. As of 2016, the number of internet users in Morocco was 20.6 million users, representing about 58.3% of the population (15). Even though Morocco has mainly invested on the telecom sector during the last 5 years, it has yet to develop a better connectivity, and therefore, fully embrace electronic

commerce. The following table points out indicators of the current internet infrastructure in Morocco.

Table 6: Internet infrastructure in Morocco.

	Morocco
Number of internet users (in millions) in 2016	20.6
Percentage of the population using the internet in Morocco (Yr. 2016)	58.3
Share of World Internet Users (Yr. 2016)	0.7
National Internet service providers (ISP)	8
Number of internet hosts (Yr. 2012)	277,338
Major internet services	- 3G/4G - ADSL - Fiber internet - Public Wifi
Source: World Bank Development Indicators: Internet Users; ITU (International Telecommunication Union – Morocco Report; Ministry of Communications (Morocco); CIA World Factbook (2015); ITU (International Telecommunication Union.	

Moroccan government has heavily invested on the internet infrastructure. However, it is still considerably weak compared to other developed countries such as the U.S and China. Percentage of population using the internet was 58.3% in 2016, it accounted about 72.8% in the U.S and 55.8% in China during the same period. The U.S had the largest number of internet service providers (ISP's) as compared to China and Morocco. The growth of the internet infrastructure in the U.S is due to the government investments in various IT sectors including telecommunications and fiber broadband coverage.

Mobile phone infrastructure:

Today, the mobile phone industry in Morocco has become a large industry that provides several communication services. The table below illustrates some relevant indicators of mobile phone infrastructure in Morocco.

Table 7: Statistics about mobile phone use.

	Morocco
Number of mobile phones in use in 2016 (in millions)	44.4
Mobile cellular subscriptions per 100 inhabitants (Yr. 2016)	117.68
Percentage of the Moroccan population using mobile devices to access the internet	82.1
Mobile internet services	3G, 4G and LTE
Average mobile Internet speed (Mbps)	7.36
4G mobile internet use (in millions)	6.7
Mobile network operators	3
Sources: International Telecommunication Union (ITU) − ICT Development Report; Federal Research Division. Country Profile: Morocco; Word Bank − Mobile Cellular Subscriptions.	

Based on the statistics above, mobile phones are considered as a necessity in Morocco. In 2016, Morocco had 117.68 mobile cellular subscriptions per 100 inhabitants, similar to that as U.S, whereas China was limited to 92.4. Morocco is able to offer the most advanced mobile internet services including 4G and LTE. This translates into increased the number of mobile internet users at a significant rate. Interestingly, in 2016, Morocco had 44.4 million mobile phones for a population of 37.7 million. This means that the actual number of handset subscriptions in the country was greater than its population.

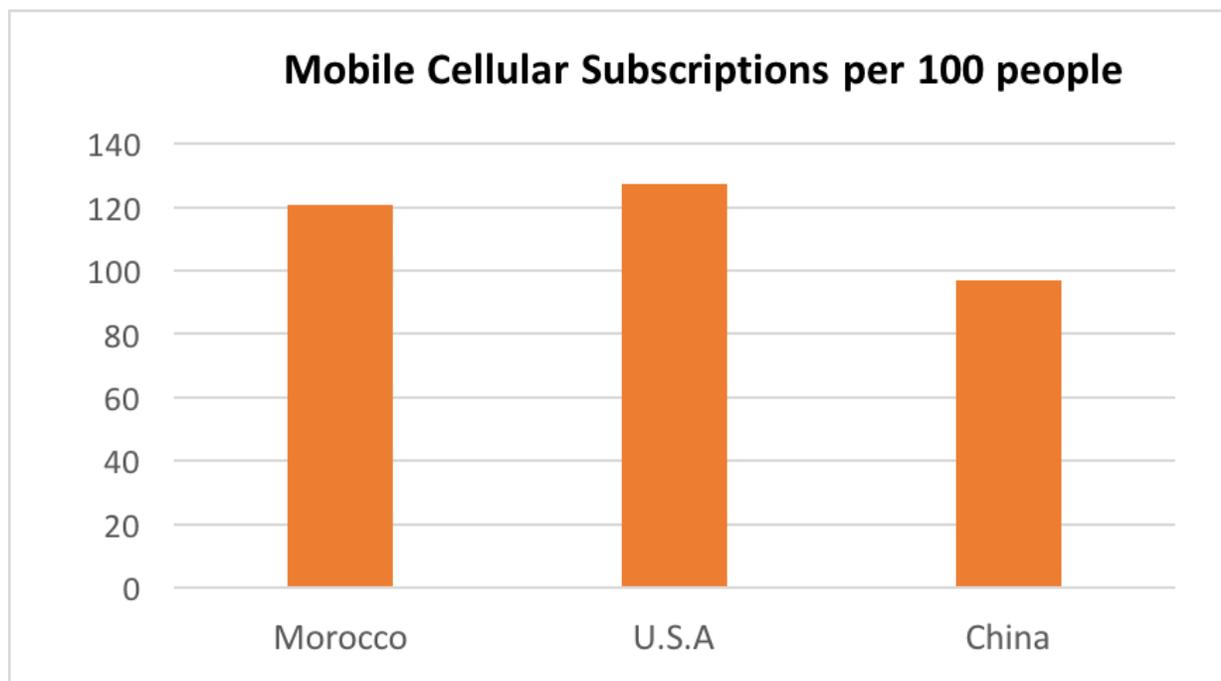**Mobile Cellular Subscriptions in the U.S, Morocco and China:**

Mobile Cellular Subscriptions per 100 people

Figure 6: Mobile cellular subscriptions in the U.S, Morocco and China in 2016.

Source: International Telecommunication Union (ITU) – *ICT Development Report (37).*

As this graph illustrates, in 2016, there were about 117.68 mobile cellular subscriptions per 100 people in Morocco, as compared to only 97.25 subscriptions in China and 122.8 subscriptions in the U.S during the same period. Even though Morocco has only three GSM mobile-phone networks, mobile service coverage is generally excellent and 4G is available in every large city. As of 2016, the percentage of population using mobile devices to access the internet in Morocco was 82.1%. The rise of cellphone use in Morocco has resulted to the adoption of mobile lifestyle and technology. This indicates that there is great potential to embrace mobile commerce within the next few years.

Future Growth of M-Commerce in Morocco:

Is Mobile Commerce Overtaking E-Commerce?

Mobiles devices such as smartphones and tablets have transformed our daily activities and the way businesses communicate with consumers. Electronic commerce and mobile commerce have become widespread, especially during the last 10 years. Consumers find it more convenient to purchase products and services using the mobile platform. In fact, the global m-commerce revenue is growing at a fast pace and is taking over e-commerce because of mobility, security and fully developed software such as mobile apps (36). As of the year 2015, worldwide m-commerce revenues amounted to 96.34 billion U.S. dollars and are projected to attain 459.38 billion U.S. dollars by the end of 2018 (10). Some of the main factors that contribute to m-commerce growth include the increased demand for mobile applications from a consumer base, the well-designed e-commerce websites that facilitate mobile use, and the technological advances that have offered mobile devices more features and advanced capabilities.

The Rise in Usage of Mobile Phones in Morocco:

The mobile telecom industry in Morocco has changed into a large industry that provides various communication services such as unlimited phone calls, mobile internet (3G, 4G and LTE), and mobile applications (see table 7). According to World Bank indicators, mobile cellular subscriptions per 100 people in Morocco was estimated to 117.7 subscriptions by the end of 2016, as compared to 122.9 in the U.S and 97 in china. Similarly, as per ITU, mobile cellular subscriptions per 100 inhabitants in Morocco was estimated to 120.7 subscriptions by the end of 2016, as compared to 123 subscriptions in the U.S and only 94 subscriptions in China during the same period. Therefore, Morocco almost parallels the U.S in mobile penetration rate per 100

people ahead of China. In addition, the percentage of Moroccan population using mobile devices to access the internet was 82.1% as of 2017 (31). This large percentage of mobile users in Morocco makes mobile commerce grow

Morocco's Economic Growth:

The government made large investments in the agricultural sector and therefore, real GDP growth rate in Morocco reached 4 percent in 2017 from 1.2 percent in 2016 (37). The economy in Morocco is overly dependent on agriculture. However, non-agricultural GPD remained steady at 2.8 percent. In fact, the fiscal deficit declined in 2017 while exports increased by 9.4 percent, and imports also rose by approximately 6.4 percent (29).

The Moroccan government is trying to position Morocco among dynamic developing countries in the Middle East and North Africa (MENA). For that, the government has already invested $1.3 billion in information technology development, especially telecom. The government also continues its efforts in attracting multinational IT companies to invest in different sectors such as telecommunications, software services and big data. As a result, the total revenue of the mobile telecom market represents 73% of the total revenue of the IT industry (25).

Conclusions and Take-away:

M-commerce is the fastest growing segment of electronic commerce. Today, m-commerce defines the e-commerce market globally. M-commerce is ripe in Morocco because of widespread adoption of mobile telecom and commerce. Moreover, unlike developed economies such as China and especially the U.S, Morocco is not constrained by high legacy cost of traditional telecom. The

government has also invested heavily on the telecom infrastructure in Morocco. Given all these factors, Morocco could easily adopt mobile commerce.

However, despite all the indicators for a viable and vibrant m-commerce market, Morocco is rated low as per the network readiness index. This means that in parallel to fully exploiting the advantages of m-commerce, investments in network infrastructure need to improve in parallel. For instance, more investments in fiber optic would improve the network infrastructure, reducing the cellular data costs for individuals for improved access to the internet, and finally, improving the technology education offered through private and government organizations.

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