Economic Research Forum

Determinants of adoption of online commercial activities by Moroccan firms

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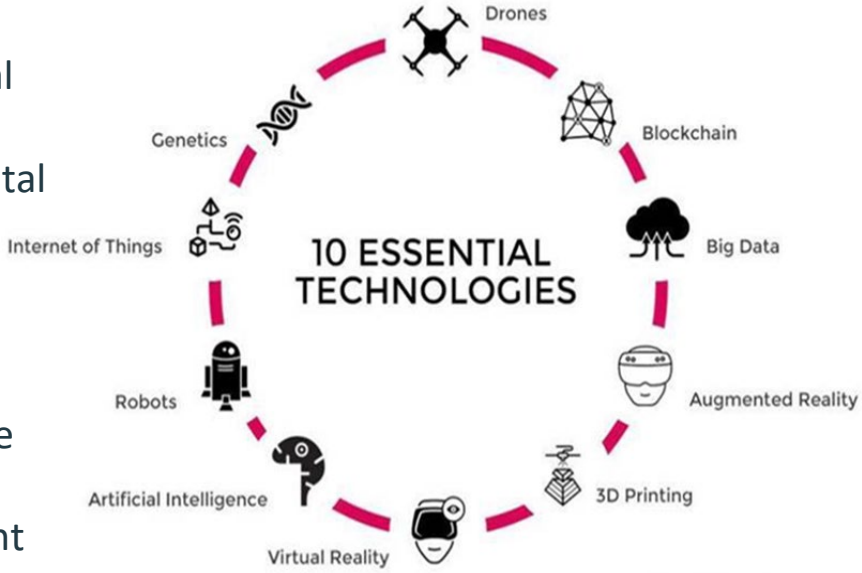
Introduction

- For more than three decades, our societies have been greatly disrupted by the rapid spread of digital technologies.
- It is clear that several waves of complementary digital technologies have followed one another since the 1990s (CEPAL, 2022).
- Each wave of technologies seems to have a higher transformative potential than the previous ones.
- The new wave of technologies are expected to have deep impacts in all the sectors of the economy. Already, the automatisation of many tasks is present and this will reshape the future of the jobs in the service and production sectors.



MENA Region and frontier technologies

- Most of the MENA countries are mobile focused countries
- The number of mobile internet users in MENA exceeded 300 million in 2021, with penetration due to reach 50% of the population by the end of 2022.
- 4G is MENA's leading mobile technology, with almost 270 million connections at the end of 2021.
- 5G remains at a nascent stage. The current adoption rate of just 1% is expected to grow to 17% by 2025.
- The digitalisation of the economy is expected to bring huge benefits to the MENA region, which could increase GDP per capita by at least 46 % over 30 years
- According to the report of the World Bank (2022), the digitalisation can double the female labor participation rate by 20% and employment by manufacturing firms would increase by at least 5% over a 30 year period.
- The estimation shows that universal adoption would reduce frictional unemployment from 10% to 7% of the labor force over a six-year period and to zero frictional unemployment within 16 years.
- The new wave of technologies like Artificial Intelligence, Internet of Things, Robots, 3D printing, virtual and augmented reality, are expected to have deep impacts in all the sectors of the economy in MENA.

What is e-commerce?

- The use of the digital technologies has also resulted in buying and selling online, named e-commerce and opened the door to a new aspect of business practice called "electronic commerce.
- One of the first authors that studied e-commerce Vladimir Zwass (1996) defines it as ***"E-commerce is the sharing of business information, maintaining business relationships, and conducting business transactions by means of telecommunication networks".***
- But this is a broad and an early definition, the most common definition used nowadays is a very simple definition, it refers to ***e-commerce as the utilization of the internet to buy and sell products and services*** (Gibbs &Dedrick, 2003; Grandon & Pearson, 2004).

Literature review

- There is no denying that a lot of research has been done on e-commerce adoption.
- However, most are conducted in developed countries (Kurnia et al. 2015; Williams et al. 2009; Parker and Castleman 2007), with little attention paid to SMEs and developing countries.
- However, there are some doubts about the relevance of e-commerce for developing countries. There is currently a limited number of studies on e-commerce adoption in developing countries.
- Research on the adoption of e-commerce in developing countries is still limited. On the other hand, various authors have recently started to touch on this topic.
- For example, Goyal et al. (2022) show that e-commerce is lagging behind in developing countries due to lack of infrastructure, poor socioeconomic conditions, and lack of national strategies by governments.

Literature review

- In MENA countries, research is scarce. Only a few studies tackle this topic.
- For instance, Smaoui-Hachicha and Chaabouni (2008) proposed a model specifying factors influencing e-commerce development in Tunisian hospitality sector.
- Ziadi and Ben Salah (2019) believed that the spread of use of bank cards and other forms of electronic payments would make citizens used to those forms and would constitute therefore the real takeoff point of the e-commerce activity.
- Specifically in the Moroccan case, research on the adoption of e-commerce remains limited.
- Recently, Bighrissen (2022) examined the main factors hindering the cooperatives to adopt e-commerce solutions in the Agadir region.
- Dahbi and Benmoussa (2019) have conducted an exploratory investigation concerning the Ecommerce adoption among SMEs in Morocco.

Research gap

- This paper aims to analyze the adoption of e-commerce applications by firms in Morocco.
- While the potentiality of e-commerce is very important, it is worth noting that e-commerce in Morocco is still very low.
- There are only few contributions to this field in the literature for the MENA region and especially for Morocco
- This is mainly due to a lack of specific surveys to highlight the determinants of e-commerce activities adoption.
- The recent survey developed by ERF provides a very important source of information to have a better understanding of determinants of adoption of e-commerce by Moroccan firms.

E-commerce in MENA

- E-commerce and e-trade are felt differently across the MENA region.
- The six GCC countries and Egypt account for 80 percent of e-commerce in the MENA region.
- Within the span of just five years, the share of digital media usage in the region increased from less than ten percent in 2012 to more than 30 percent by 2017.
- This is important as digital social media are increasingly becoming digital marketplaces where people browse, shop, trade, and share information about goods and services.
- The rapid spike in digital adoption in the region was mostly driven by smartphones and underpinned by faster Internet speeds.
- The total revenue of eCommerce in Tunisia stood at $100 million
- E-commerce revenue in Algeria reached an estimated volume of $5 Billion
- The total revenue of eCommerce in Morocco stood at $300 million

Digitalization of Morocco: main trends

- The telecommunication infrastructure of Morocco has been entrusted to the private sector since the early 1990s. The privatization experience in this sector has been very successful, leading to reduction in the cost of access to telecommunications.
- There were 31.59 million internet users in Morocco in January 2022.
- Morocco's internet penetration rate stood at 84.1 percent of the total population at the start of 2022.
- Internet users in Morocco increased by 363 thousand (+1.2 percent) between 2021 and 2022.
- 5.96 million people in Morocco did not use the internet at the start of 2022, meaning that 15.9 percent of the population remained offline at the beginning of the year
- The rate of penetration of smartphone equipment was 137.5 percent at the end of 2020
- The total revenue of eCommerce in Morocco stood at $300 million and growing at a 40% rate by the year 2021.

METHODOLOGY

Database

Survey topics

- Firms' characteristics (firm size, firm age, firm location, total annual sales ...)
- Firms' activities (Agriculture, Industry, IT, Education, Health, ...)
- Participation in digital economy (social media use, digital platform use, having R&D activities, product innovation, ...)

Survey issues

- There were no consistent concerns when the survey questions were developed.
- There are missing responses that make it difficult to exploit the entire sample econometrically.

Model

- We start with the **logistic regression model** (supported by a probit model) as a first step. This choice is justified by the fact that the logit model offers the advantage of several alternative interpretations (including the signs of the coefficients, marginal effects and odds ratios) of the results (Freedman, 2008).
- **Probit model**
- In addition to the logit and probit methods, we use **the conditional mixed process with heteroskedasticity-robust standard errors (CMP)** framework proposed by Roodman (2011). This method is frequently used in existing studies that analyze the determinants of digital technology adoption. By using a Seemingly Unrelated Regression (SUR) technique, the CMP method allows us to simultaneously estimate the determinants of e-commerce adoption and facilitating conditions.

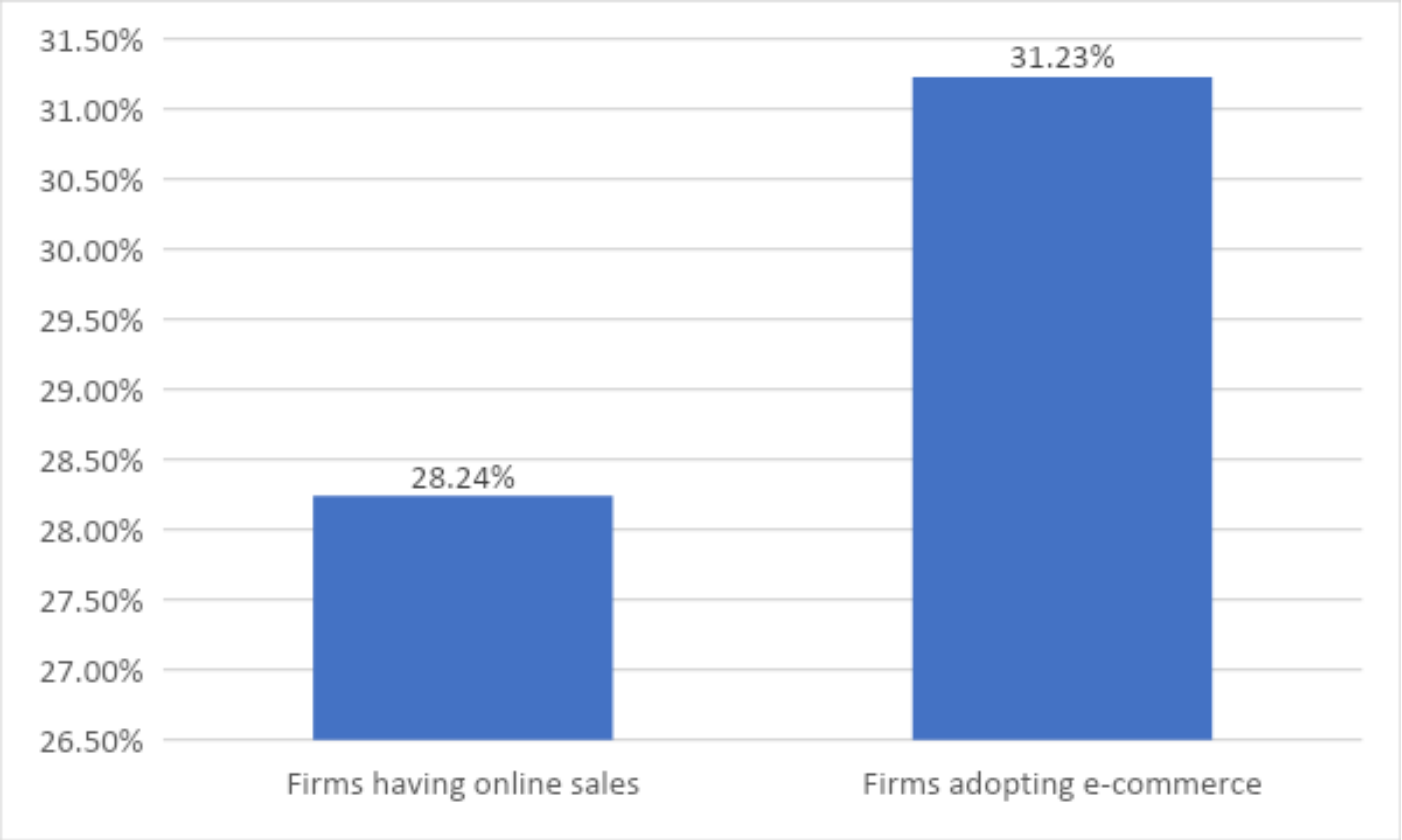
DESCRIPTIVE STATISTICS

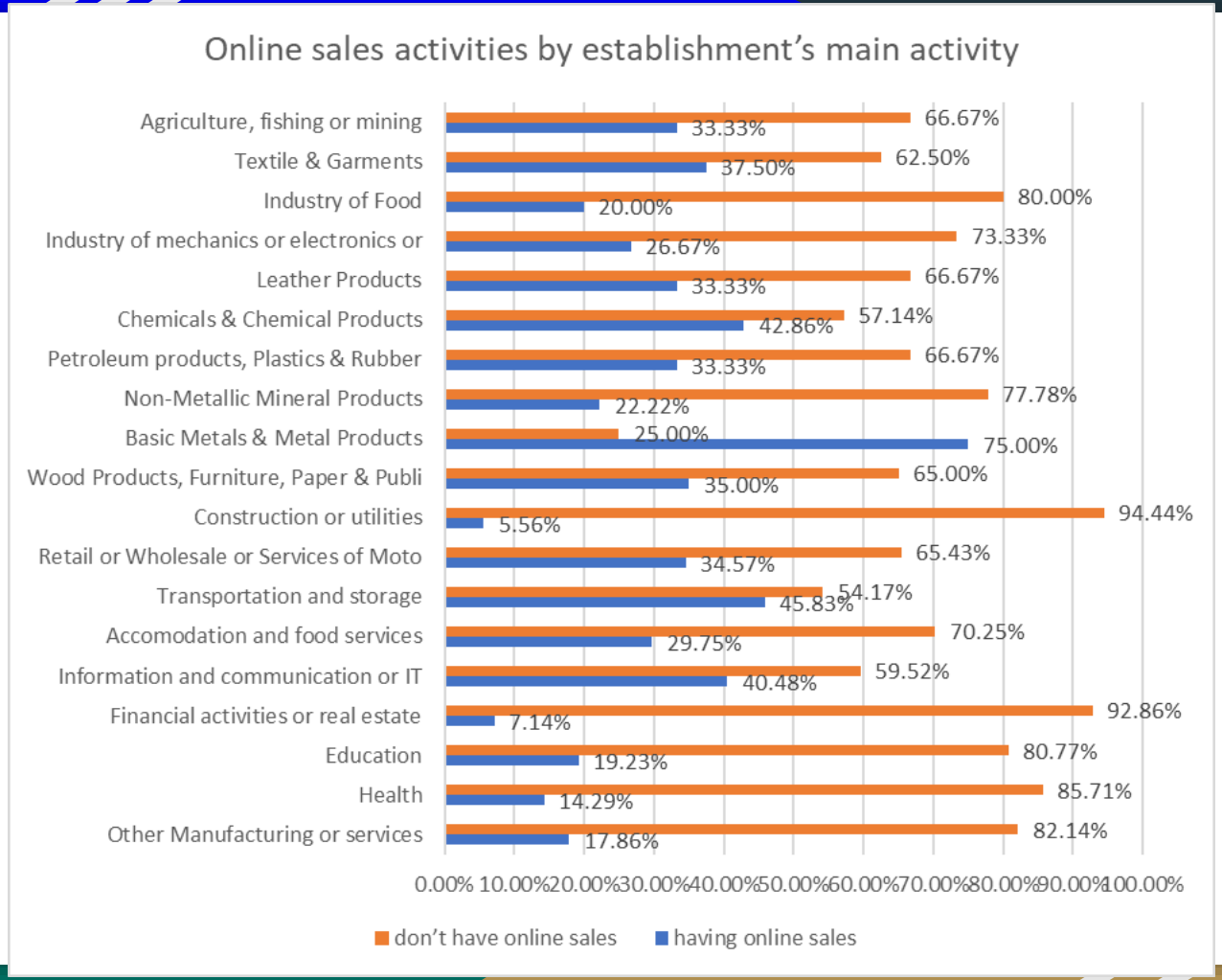
Variable	Frequency	Percentage
E-commerce adoption (N=807)		
Non adopters	551	68.62
Adopters	252	31.38
Firm size (N=807)		
5 employees or less	313	38.79
6 to 10 employees	244	30.24
11 to 15 employees	87	10.78
More than 15 employees	163	20.20
Firm age (N=710)		
5 years or less	184	25.99
6 to 10 years	259	36.58
11 to 15 years	142	20.06
More than 15 years	123	17.37
Firm location (N=807)		
Tanger-Tetouan-Al Hoceima	65	8.05
Oriental	21	2.60
Fès-Meknès	78	9.67
Rabat-Salé-Kénitra	119	14.75
Béni Mellal-Khénifra	15	1.86
Casablanca-Settat	357	44.24
Marrakech-Safi	86	10.66
Drâa-Tafilalet	7	0.87
Souss-Massa	47	5.82
Guelmim-Oued Noun	6	0.74
Laayoune-Sakia El Hamra	4	0.50
Eddakhla-Oued Eddahab	2	0.25

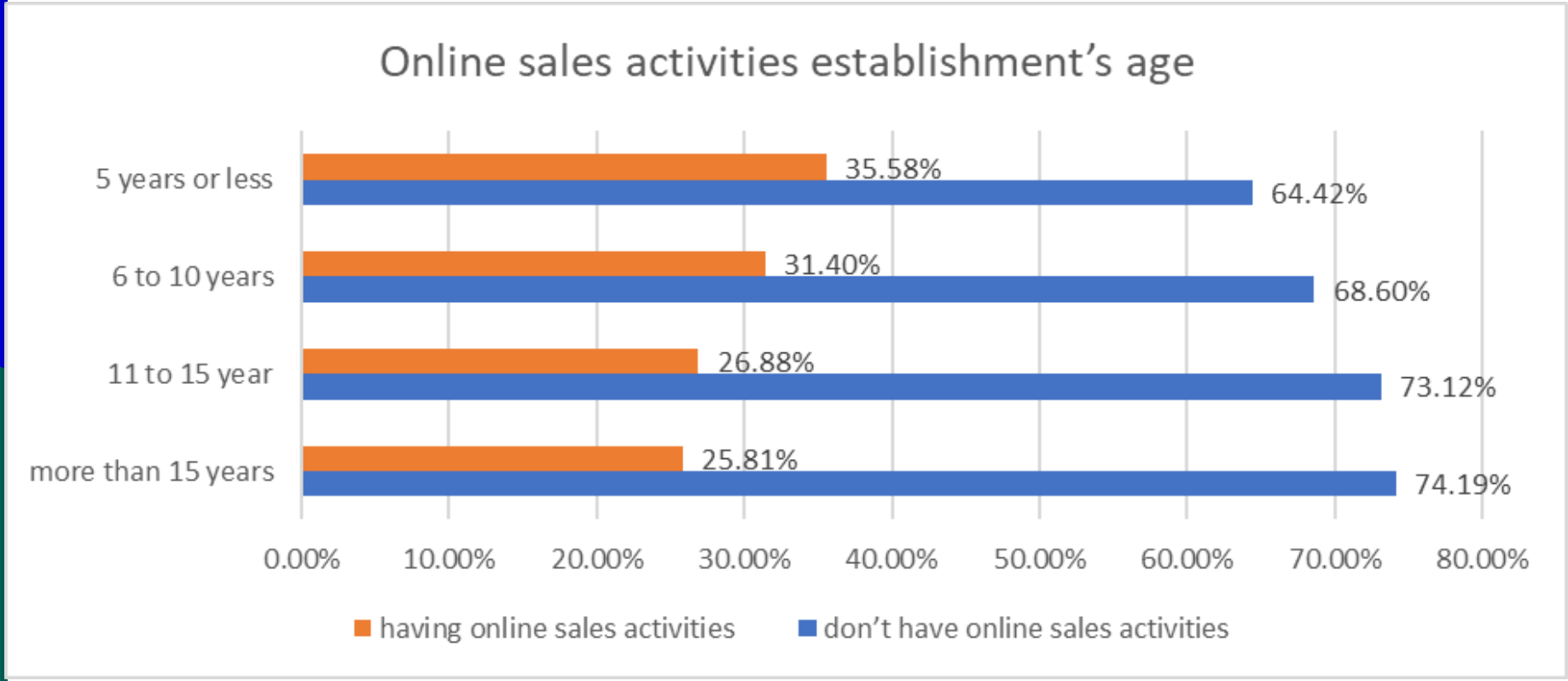
Variable	Frequency	Percentage
Economic sector (N=807)		
Primary	12	1.49
Secondary	258	31.97
Tertiary	537	66.54
Highly educated workers (N=807)		
25% or less	264	32.71
26% to 50%	261	32.34
51% to 75%	142	17.60
More than 75%	140	17.35
Women in the workforce (N=807)		
25% or less	281	34.82
26% to 50%	328	40.64
51% to 75%	159	19.70
More than 75%	39	4.83
Gender of the firm's owner (N=807)		
Female	155	19.21
Male	652	80.79
Managerial staff digital skills (N=517)		
Digital skills not important	144	27.85
Digital skills important	373	72.15
Workers digital skills (N=517)		
Digital skills not important	311	60.15
Digital skills important	206	39.85
Facilitating conditions (N=517)		
Not having IT support	264	51.06
Having IT support	253	48.94

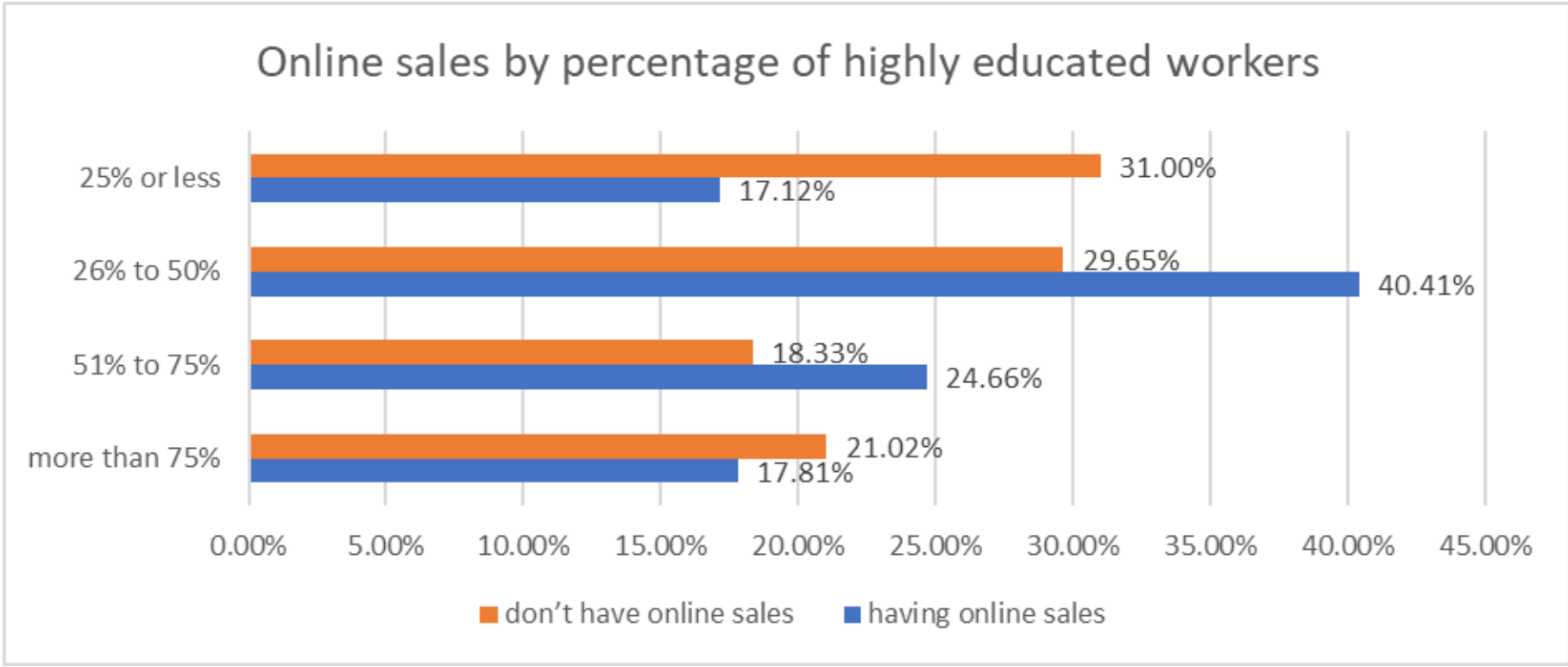
Variable	Frequency	Percentage
Social media use (N=517)		
Don't use social media for business purposes	228	44.10
Use social media for business purposes	289	55.90
Digital platform use (N=807)		
Firm not listed on app or website	744	92.19
Firm listed on app or website	63	7.81
Product innovation (N=807)		
Don't have product innovation activities	480	59.48
Having product innovation activities	327	40.52
Smartphone use (N=807)		
Not using smartphones for business	265	51.26
Using smartphones for business	252	48.74

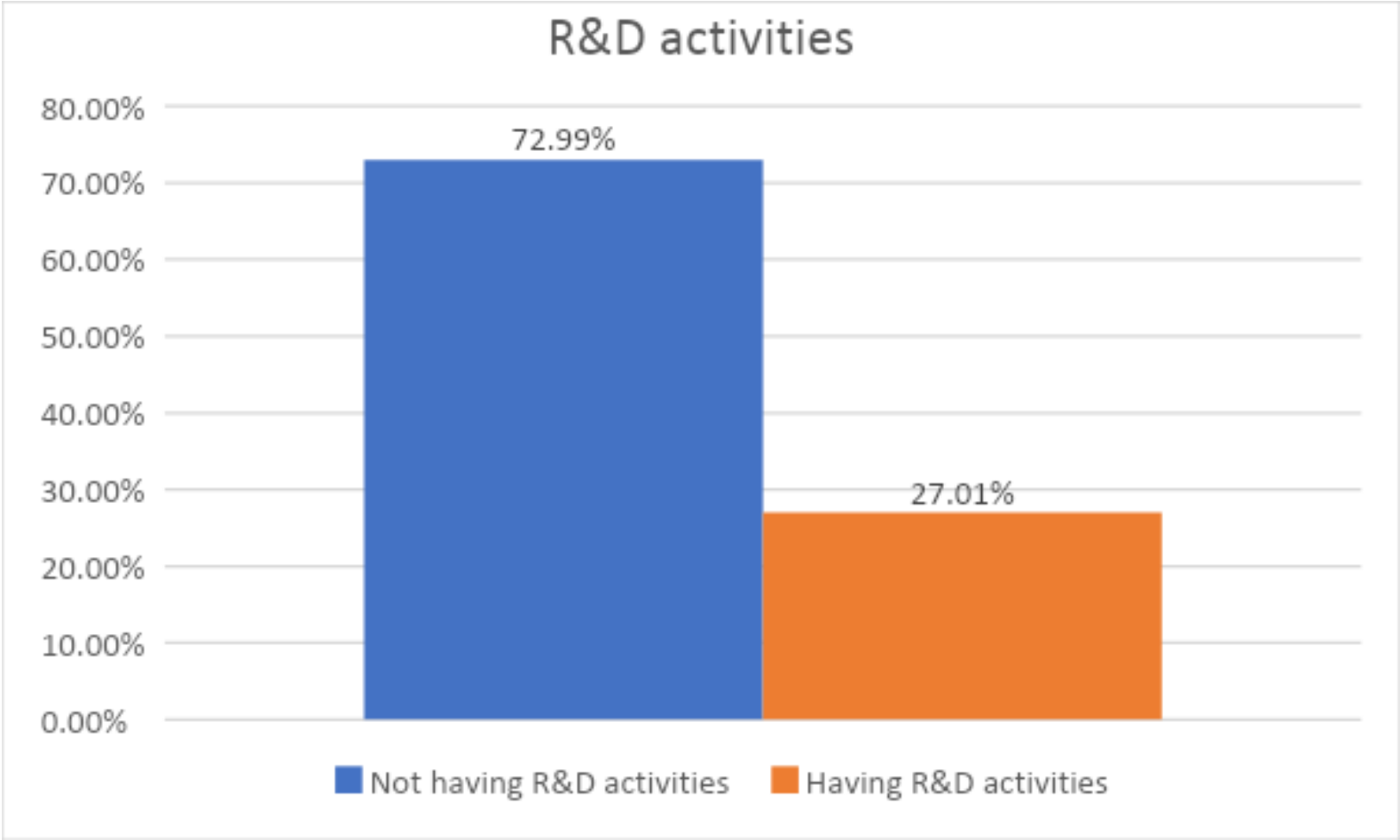
Adoption of e-commerce

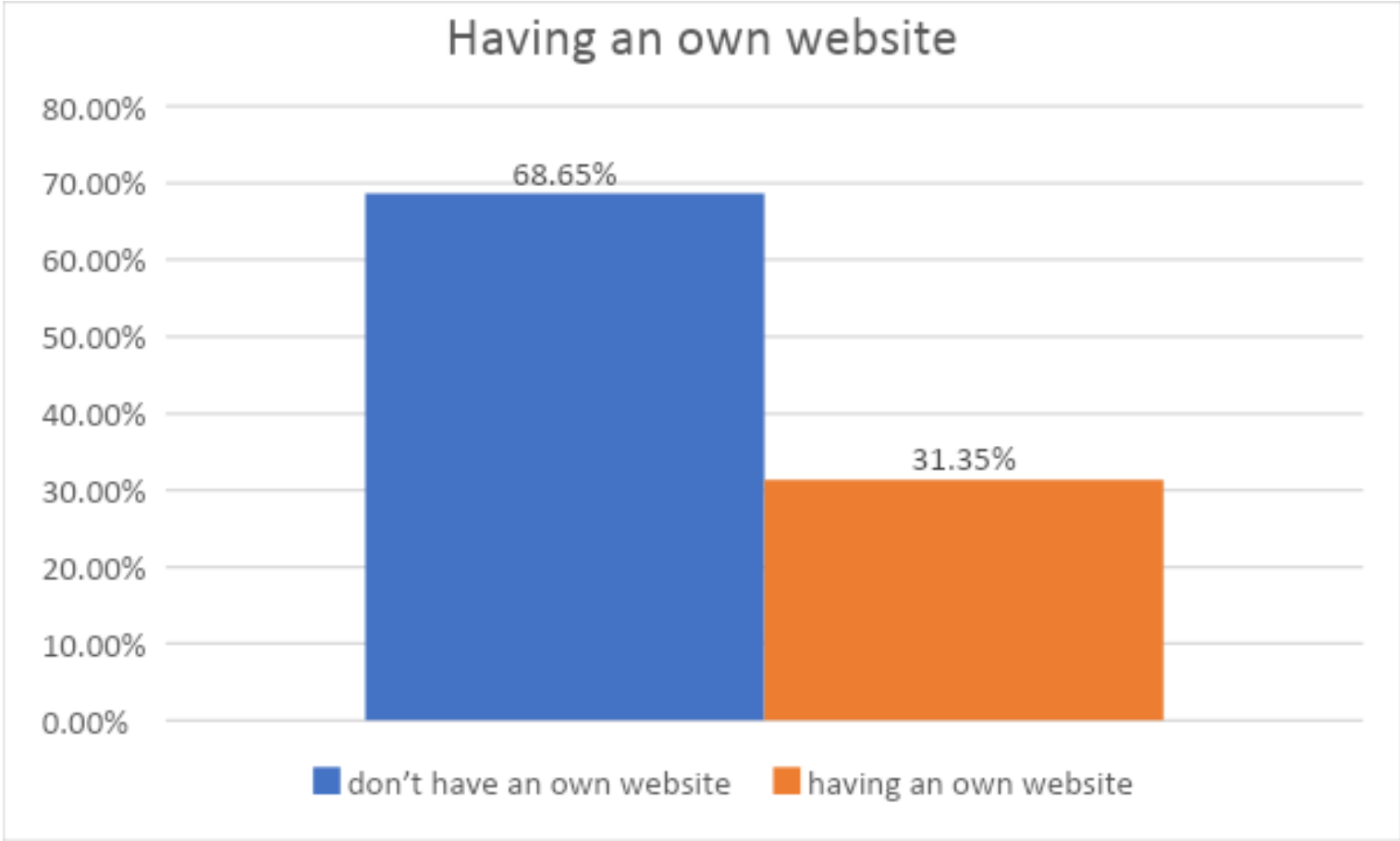



Online sales activities by establishment’s main activity
Agriculture, fishing or mining
66.67%
33.33%
Textile & Garments
62.50%
37.50%
Industry of Food
80.00%
20.00%
Industry of mechanics or electronics or
73.33%
26.67%
Leather Products
66.67%
33.33%
Chemicals & Chemical Products
57.14%
42.86%
Petroleum products, Plastics & Rubber
66.67%
33.33%
Non-Metallic Mineral Products
77.78%
22.22%
Basic Metals & Metal Products
25.00%
75.00%
Wood Products, Furniture, Paper & Publi
65.00%
35.00%
Construction or utilities
94.44%
5.56%
Retail or Wholesale or Services of Moto
65.43%
34.57%
Transportation and storage
54.17%
45.83%
Accomodation and food services
70.25%
29.75%
Information and communication or IT
59.52%
40.48%
Financial activities or real estate
92.86%
7.14%
Education
80.77%
19.23%
Health
85.71%
14.29%
Other Manufacturing or services
82.14%
17.86%
0.00% 10.00% 20.00% 30.00% 40.00% 50.00% 60.00% 70.00% 80.00% 90.00% 100.00%
don’t have online sales
having online sales


Online sales activities establishment’s age
5 years or less
6 to 10 years
11 to 15 year
more than 15 years
35.58%
64.42%
31.40%
68.60%
26.88%
73.12%
25.81%
74.19%
0.00%
10.00%
20.00%
30.00%
40.00%
50.00%
60.00%
70.00%
80.00%
having online sales activities
don’t have online sales activities


Online sales by percentage of highly educated workers
25% or less
26% to 50%
51% to 75%
more than 75%
31.00%
17.12%
29.65%
40.41%
18.33%
24.66%
21.02%
17.81%
0.00%
5.00%
10.00%
15.00%
20.00%
25.00%
30.00%
35.00%
40.00%
45.00%
don’t have online sales
having online sales


R&D activities
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
72.99%
27.01%
Not having R&D activities
Having R&D activities


Having an own website
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
68.65%
31.35%
don’t have an own website
having an own website

MAIN RESULTS

Variable	Logit		Probit	CMP
	Coefficient	Odds ratio		
Firm size				
5 employees or less	(Ref.)	(Ref.)	(Ref.)	(Ref.)
6 to 10 employees	-0.3131 (0.2763)	0.7311 (0.2020)	-0.1758 (0.1592)	-0.2244 (0.1369)
11 to 15 employees	-0.2639 (0.6131)	0.7681 (0.4709)	-0.1368 (0.3448)	-0.3601 (0.3212)
More than 15 employees	0.6493 (1.3377)	1.9143 (2.5608)	0.4434 (0.7478)	0.3265 (0.5790)
Firm age				
5 years or less	**(Ref.)**	**(Ref.)**	**(Ref.)**	**(Ref.)**
6 to 10 years	**-0.5392*** **(0.3193)**	**0.583*** **(0.186)**	**-0.310*** **(0.185)**	**-0.3046*** **(0.1648)**
11 to 15 years	**-0.7578**** **(0.3923)**	**0.469**** **(0.184)**	**-0.465**** **(0.223)**	**-0.4077**** **(0.1927)**
More than 15 years	**-1.3204***** **(0.3712)**	**0.267***** **(0.099)**	**-0.792***** **(0.217)**	**-0.6907***** **(0.1991)**
Firm location				
Tanger-Tetouan-Al Hoceima	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Oriental	-1.0947 (0.7236)	0.3347 (0.2422)	-0.6588 (0.4253)	-0.5909 (0.4015)
Fès-Meknès	-0.7791 (0.5697)	0.4588 (0.2614)	-0.4230 (0.3149)	-0.4135 (0.2617)
Rabat-Salé-Kénitra	-0.3110 (0.5284)	0.7327 (0.3872)	-0.1709 (0.2993)	-0.1571 (0.2549)
Béni Mellal-Khénifra	-0.0025 (0.7424)	0.9975 (0.7406)	0.0480 (0.4569)	0.0628 (0.4352)
Casablanca-Settat	-0.8414* (0.4591)	0.4311* (0.1979)	-0.4874* (0.2574)	-0.4126* (0.2176)
Marrakech-Safi	-0.7576 (0.6104)	0.4688 (0.2862)	-0.4221 (0.3341)	-0.3677 (0.2683)
Drâa-Tafilalet	-1.0348 (0.9261)	0.3553 (0.3291)	-0.5903 (0.5866)	-0.4661 (0.6078)
Souss-Massa	-2.0786*** (0.6422)	0.1251*** (0.0803)	-1.2346*** (0.3707)	-1.1137*** (0.3763)
Guelmim-Oued Noun & Laayoune-Sakia El Hamra & Eddakhla-	-0.9960	0.3694	-0.5661	-0.6899

Economic sector				
Agriculture, fishing or mining	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Textile & Garments	1.9003 (1.3454)	6.6877 (8.9976)	1.1098 (0.7593)	0.5424 (0.6288)
Industry of Food	0.2435 (1.3505)	1.2757 (1.7228)	0.0962 (0.7612)	-0.2422 (0.6273)
Industry of mechanics or electronics or Vehicles	1.4374 (1.3278)	4.2095 (5.5894)	0.8003 (0.7563)	0.3184 (0.5801)
Leather Products	3.2087** (1.4139)	24.7472** (34.9893)	1.8567** (0.7945)	1.3308 (0.6417)
Chemicals & Chemical Products	3.8332** (1.7081)	46.2104** (78.9341)	2.2360** (0.9540)	1.2595 (0.8013)
Petroleum products, Plastics & Rubber	0.9891 (1.7900)	2.6887 (4.8130)	0.5428 (1.0922)	0.2460 (0.9960)
Non-Metallic Mineral Products	2.7625* (1.5892)	15.8398* (25.1726)	1.6075* (0.8782)	0.8570 (0.7077)
Basic Metals, Metal Products, Wood Products, Furniture, Paper & Publishing	**3.0818***** **(1.3048)**	**21.7982***** **(28.4412)**	**1.8289***** **(0.7342)**	**1.2329**** **(0.5878)**
Construction or utilities	1.3719 (1.4061)	3.9427 (5.5438)	0.8036 (0.7831)	0.3898 (0.5943)
Retail or Wholesale or Services of Motor Vehicles	2.2189* (1.2376)	9.1975* (11.3828)	1.2901* (0.6918)	0.7551 (0.5235)
Transportation and storage	2.3003* (1.2926)	9.9774* (12.8963)	1.3604* (0.7288)	0.7261 (0.5891)
Accommodation and food services	2.0337* (1.2305)	7.6421* (9.4036)	1.1398* (0.6877)	0.6838 (0.5149)
Information and communication or IT	2.1938* (1.2643)	8.9693* (11.3396)	1.3033* (0.7082)	0.7159 (0.5532)
Financial activities or real estate	1.0778 (1.3484)	2.9383 (3.9619)	0.6448 (0.7510)	0.1513 (0.5564)
Education	**3.5088***** **(1.3918)**	**33.4069***** **(46.4970)**	**2.0336***** **(0.7679)**	**1.4422***** **(0.5998)**
Health	**2.7243**** **(1.3218)**	**15.2450**** **(20.1501)**	**1.5953**** **(0.7341)**	**0.9677*** **(0.5736)**
Other Manufacturing or services	2.3431* (1.2736)	10.4133* (13.2623)	1.3519* (0.7154)	0.8359 (0.5611)

Highly educated workers				
25% or less	(Ref.)	(Ref.)	(Ref.)	(Ref.)
26% to 50%	0.2957 (0.3172)	1.3441 (0.4264)	0.1568 (0.1831)	0.0640 (0.1591)
51% to 75%	**1.0877*** **(0.4083)**	**2.9675*** **(1.2116)**	**0.6039*** **(0.2310)**	**0.3972**** **(0.1946)**
more than 75%	0.1100 (0.4089)	1.1163 (0.4565)	0.0481 (0.2302)	-0.1042 (0.1908)
Women in the workforce				
25% or less	(Ref.)	(Ref.)	(Ref.)	(Ref.)
26% to 50%	-0.0872 (0.2972)	0.9165 (0.2724)	-0.0563 (0.1684)	-0.0419 (0.1394)
51% to 75%	-0.3690 (0.3712)	0.6914 (0.2566)	-0.1951 (0.2123)	-0.1647 (0.1777)
more than 75%	0.0265 (0.6374)	1.0269 (0.6545)	-0.0477 (0.3834)	-0.0385 (0.3227)
Gender of the firm's owner				
Female	(Ref.)		(Ref.)	(Ref.)
Male	0.4595 (0.3180)	1.583 (0.504)	0.2596 (0.1851)	0.2650 (0.1731)
Managerial staff digital skills				
Digital skills not important	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Digital skills important	**0.4967*** **(0.3082)**	**0.6085*** **(0.1875)**	**0.2897*** **(0.1755)**	**-0.3373**** **(0.1473)**
Workers digital skills				
Digital skills not important	(Ref.)		(Ref.)	(Ref.)
Digital skills important	0.2131 (0.2762)	1.2375 (0.3418)	0.1358 (0.1573)	0.0904 (0.1338)
Facilitating conditions				
Not having IT support	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Having IT support	0.5235* (0.2975)	1.6879* (0.5022)	0.3017* (0.1673)	1.3709*** (0.2340)
Social media use				
Don't use social media for business purposes	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Use social media for business purposes	**1.1709*** **(0.2600)**	**3.2248*** **(0.8383)**	**0.6928*** **(0.1500)**	**0.5234*** **(0.1438)**

Digital platform use				
Firm not listed on app or website	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Firm listed on app or website	**0.9447** **(0.4161)**	**2.5720** **(1.0702)**	**0.5804** **(0.2298)**	**0.4421** **(0.2048)**
Product innovation				
Don't have product innovation activities	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Having product innovation activities	**0.6055** **(0.2418)**	**1.8321** **(0.4429)**	**0.3539** **(0.1392)**	**0.3272** **(0.1219)**
Smartphone use				
Not using smartphones for business	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Using smartphones for business	**1.2270** **(0.2742)**	**3.4111** **(0.9351)**	**0.7283** **(0.1561)**	**0.5700** **(0.1441)**
Constant	-2.8391 (1.3026)	0.0585 (0.0762)	-1.6544 (0.7326)	-1.3615 (0.5716)
Facilitating conditions				
Computers use				
Not using computers for business				(Ref.)
Using computers for business				0.1610 (0.0492)
Firm's website				
Don't have own website				(Ref.)
Having own website				0.6731 (0.1082)
Internet access				
Firm don't have access to the Internet				(Ref.)
Firm have access to the Internet				0.0816 (0.1200)
Constant				-1.2083 (0.1897)
Observations	462	462	462	512
Log pseudolikelihood	-234.7048	-234.7048	-234.4637	-539.3411
Prob > chi2	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.2661	0.2661	0.2668	
atanhrho_12				-0.9456 (0.2995)
rho_12				-0.7378 (0.1365)

Main results

- Firm age is an important indicator of the adoption of e-commerce. The newer firms are more likely to adopt e-commerce since they are more open to innovations and the changes.
- In relation to the sectors of activity of the firms in the study sample, the results show that firms operating in the “Basic Metals, Metal Products, Wood Products, Furniture, Paper & Publishing”, “Education” and “Health” are more likely to adopt e-commerce respectively.
- The adoption of e-commerce depends on the level of education, where firms with higher education workers are more likely to adopt e-commerce.
- The level of digital skills required to recruit new employees have no effect on the probability of adopting e-commerce. This indicates that Moroccan firms give a low importance to e-commerce adoption, and they do not require that digital literacy to be a prerequisite for the recruitment.
- The listing in digital platforms is an important factor which increases the probability for the adoption of e-commerce.
- The innovation activities and introducing new products and services can influence the adoption of e-commerce in Moroccan firms.

CONCLUSIONS

Conclusions

- Firm activity and age are important indicators of the adoption of e-commerce.
- The adoption of e-commerce depends on the level of education,
- Low importance to e-commerce adoption
- Low level of digital skills
- The lack of e-commerce websites
- Low level of R&D activities

Recommendations

1. The Moroccan firms should change business operation strategies by leveraging the potential of the new technologies and shifting online. The e-commerce requires that the firms have a degree of digitization, therefore the internet and digital technologies are key for an effective e-commerce adoption.

2. The firms should have a strategy for the consumer retention online. As e-commerce saves time and has several benefits, there are many consumers that prefer to buy online in order to save time to visit the shops physically. The adoption of e-commerce can increase the number of the consumers and consequently the sales.

3. There is a need to train the employees and to provide them with the necessary skills for the adoption of e-commerce. Firms should offer different programs to help workers achieve the needed level of the digital skills. Equipping the employees with digital skills is key for the improvement of e-commerce and its effective function.

4. The firms should be listed in the digital platforms and explore new ways to leverage the market online. The digital platforms are having a great impact in our daily lives, therefore being part of an e-commerce platform can offer many benefits, reach more consumers and increase the visibility.

5. There is a need to introduce more innovative products and services online. This may increase the market and improve e-commerce.