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# IT INNOVATIONS AND ENTREPRENEURSHIP IN EMERGING ECONOMIES - IS CLOUD COMPUTING A MAGIC INGREDIENT FOR EGYPTIAN ENTREPRENEURS?

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# IT INNOVATIONS AND ENTREPRENEURSHIP IN EMERGING ECONOMIES - IS CLOUD COMPUTING A MAGIC INGREDIENT FOR EGYPTIAN ENTREPRENEURS?

*Research paper*

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## Abstract

*Using the concept of affordances as an analytical lens, this study aims to understand the use of Cloud Computing (CC) by Egyptian entrepreneurs. The study analyses impact of CC on their businesses and its inhibiting and enabling factors. In general, Egyptian entrepreneurs have positive perceptions of CC and note its various actualized affordances: accessing information technology (IT) resources rapidly, broadening reach and transferring responsibility. The use of CC has yielded diverse effects: shortened time to market, reduced costs, a diversified audience and more useful feedback. We also identify what inhibits the use of CC, including transparency and corruption problems, limited support for online transactions, unsupportive government policies, low appreciation from the domestic market, cumbersome bureaucracy, account hacking and unreliable infrastructure. Finally, we also reveal some enabling factors, including institutional support, overseas market potential and CC uptake (i.e., growing use).*

*Keywords: Entrepreneurship, Egypt, IT innovation, Cloud computing, Emerging economies*

## 1 Introduction

*“Information technology and business are becoming inextricably interwoven. I don't think anybody can talk meaningfully about one without the talking about the other.” (Gates & Hemingway 1999)*

The quote from one of the most outstanding entrepreneurs of the 20th century Bill Gates highlights the challenge for entrepreneurs around the Globe. Information technology (IT) is a fundamental requirement to excel in business. Until recently, entrepreneurs have had to struggle to find, install and maintain business software and IT infrastructure while also focusing on the development of their business ideas. Cloud computing (CC) is a viable alternative to in-house IT, allowing start-ups to access IT resources at an affordable cost (Sultan 2011; Venters & Whitley 2012). Concepts such as software as a service (SaaS), platform as a service (PaaS) and infrastructure as a service (IaaS) (Mell & Grance 2011) have entered the vocabulary and become seen as magic ingredients for businesses (Giudice & Straub 2011). Their magic applies to both established and up-coming businesses and in both advanced and emerging economies (Dutta et al. 2015; Kshetri 2010; Information Economy Report 2013).

The topic of entrepreneurship in emerging economies has received considerable attention from management scholars (Bruton et al. 2008). The management literature has highlighted several

financial and managerial challenges that start-ups face in the institutional environment such as: (1) the lack of resources and incentives (e.g., funding and skills development), and (2) regulative, cognitive, and normative constraints (Guillen 2000; Manolova et al. 2007; George & Prabhu 2000). The contribution of entrepreneurship to driving economic growth, job creation and innovation in emerging economies is widely recognized and reported (Singer et al. 2015; Dutta et al. 2015). However, without good entrepreneurial support, such contributions may diminish (Keilbach et al. 2009; Eckhardt & Shane 2003).

Information systems (IS) research has examined the economic value (i.e., cost savings) and business value (advanced IT security, rapid deployment, enabling strategic focus, and simplicity) of CC services for entrepreneurs (Lacity & Reynolds 2014), as well as the implications for CC adoption decisions by entrepreneurs (Gupta et al. 2013). Regarding the geographical context, IS studies examined entrepreneurship and CC in Eastern countries such as China and India (Luoma & Nyberg 2011; Bhat 2013), South African countries such as Ghana, Nigeria, and Kenya (Kshetri 2010; Greengard 2010), and Western countries such as Germany (Kramer 2014). However, there is still little focus on Egypt in the IS literature, a country that is currently undergoing economic, social and political turbulence. Hence, it is worth exploring the opportunities and potential hazards for start-ups in Egypt to determine how advantageous the implementation of CC might be.

In this paper, we contend that CC is a sort of magic ingredient for entrepreneurship but one for which its magic depends on external influences to a great extent. In this regard, we aim to answer the following research question: *How can CC support entrepreneurs in Egypt?* To answer this research question, we rely on the contributions of academic literature, interviews, and secondary data sources (e.g., official reports). We also use the concept of affordances (Pozzi et al. 2014) to understand the use of CC by goal-oriented actors (i.e., Egyptian entrepreneurs), its effects and its inhibiting and enabling factors.

## 2 Cloud Computing

CC enables convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort (Mell & Grance 2011, p.2). The CC models have changed the way both start-ups and large corporations utilize and manage IT resources (Marston et al. 2011). For start-ups in particular, CC offers strategic capabilities (e.g., scalability, ubiquity and mobility) that would not normally be available in-house (Venters & Whitley 2012), because they require substantial resources to develop and maintain. CC services benefit businesses by reducing costs, increasing innovation by enabling a stronger business focus, increasing efficiency and flexibility with pay-per-use basis and more agility allowing for rapid responses to dynamic market demands (Venters & Whitley 2012; Iyer & Henderson 2012). However, the use of CC services is influenced by several internal, external and technological factors, which can be either positive or negative. Positive factors include cost savings, market maturity (i.e. technological, legal, and Cloud Service Providers' (CSPs) diversity and reputation), CSP's service capability (i.e., trustworthiness and support responsiveness), access to specialized resources (i.e., knowledge skills and latest IT), flexibility, focus on core competencies, service quality, and reduced time to market. Negative factors identified by Schneider and Sunyaev (2014) include strategic vulnerability, cost uncertainty, availability risks, loss of control, security risks, perceived complexity.

Research suggests that CC helps emerging economies to leapfrog the developed world (Kshetri 2010); as such, it could be a democratizing force for developing countries, because it allows them equal access to IT resources (Sultan 2013). A limited body of literature focuses on using CC services in Egypt. Studies on education (Abou El-Seoud et al. 2013) and e-government (Hana 2013; Nasr & Galal-edein 2012) illustrate that the concept is considered in those specific contexts; however, research that explores the opportunities and challenges for using CC services by Egyptian entrepreneurs still remains unexplored.

### **3 IT Innovations and Entrepreneurship in Emerging Economies**

Utilization of IT in combination with organizational knowledge has been identified as a driver for entrepreneurial endeavours. Shane and Venkataraman (2012) argue that it would not be fair to define entrepreneurship only by who the entrepreneur is and what is his/her entrepreneurial activity. Entrepreneurship is also about opportunities in the external environment, including those stakeholders and factors which influence the opportunities of entrepreneurial behavior (Shane & Venkataraman 2012). Aligned with this view on entrepreneurship, the IS literature emphasizes the role of IT innovations in offering entrepreneurs a great deal of opportunities that do not otherwise exist; these opportunities grow over time as technology advances (Huynh et al. 2003; Giudice & Straub 2011). These technological advancements, together with the institutional environment, define the map for start-ups (Obal 2009; Kor & Abrahams 2007). Hence, every entrepreneurial activity has to be based on a comprehensive understanding of the threats and opportunities that are created by technological and institutional changes along with the business opportunities (Shane & Venkataraman 2012).

#### **3.1 Literature review on entrepreneurship in emerging economies**

To provide a comprehensive overview of the academic contributions on entrepreneurship in emerging economies, we searched three scholarly databases (AISeL, IEEE Xplore, and ScienceDirect). The literature search involved using the keywords “entrepreneur\*” and “emerging economies” in the title; this resulted in 11 articles in total. The articles were screened through reading the abstract and the full text when necessary. The main themes in each article were identified along with the context of the study in each article (i.e., country). The descriptive results of this search are presented in Figure 1.

Figure 1 indicates the scarcity of IS studies on entrepreneurship in emerging economies (i.e., distribution of articles ranges from one to two per year). Furthermore, the majority of the articles focused on specific contexts repeatedly. Those contexts were mainly East Asia, South Africa, and South America. In particular, the most frequently studied contexts are India, China, Brazil, and Indonesia. No studies were found with focus on Middle East and North Africa in general and Egypt in specific. The reviewed articles studied the influence of the institutional environment and technological advancements on entrepreneurship in emerging economies. Two early studies investigated the role of Developmental financial institutions (DFIs) in creating new venture opportunities through governance and technology support programs in India (George & Prabhu 2003; George & Prabhu 2000). In Romania, IT entrepreneurs’ informal social networks and offering customized products and services were found to enable IT entrepreneurs to overcome the institutional, resource and industry constraints and build a successful business (Chircu & Chircu 2008). In Brazil, multinational corporations were found to create micro-entrepreneurship opportunities through direct sales networks in remote areas (Chelekis & Mudambi 2010), and technology investments were positively influencing the performance of high-technology ventures (Siqueira & Bruton 2010).

In South Africa, a study acknowledged that mobile technology is a tool for facilitating entrepreneurship in rural areas (Chelule et al. 2011). In China, a study investigated the institutional influence of government agencies on the performance of IT entrepreneurial start-ups through resources mobilization (Chen & Tan 2011). Only one study investigated the contribution of the institutional influences to the entrepreneurial activity at the cross-national level (i.e., Brazil, China, India, and Korea) (Gupta et al. 2014). In Indonesia, a study provided insights on managing intellectual property as an entrepreneurial research-based university (Payumo et al. 2014), and another study pursued the economic view by estimating the economic welfare as a function of micro-entrepreneurship participation and households’ characteristics (Vial & Hanoteau 2015). Only one article has critically reviewed the extant literature on international entrepreneurship in emerging economies per geographic coverage, and even in the international entrepreneurship, the Egyptian context was studied once (Kiss et al. 2012).

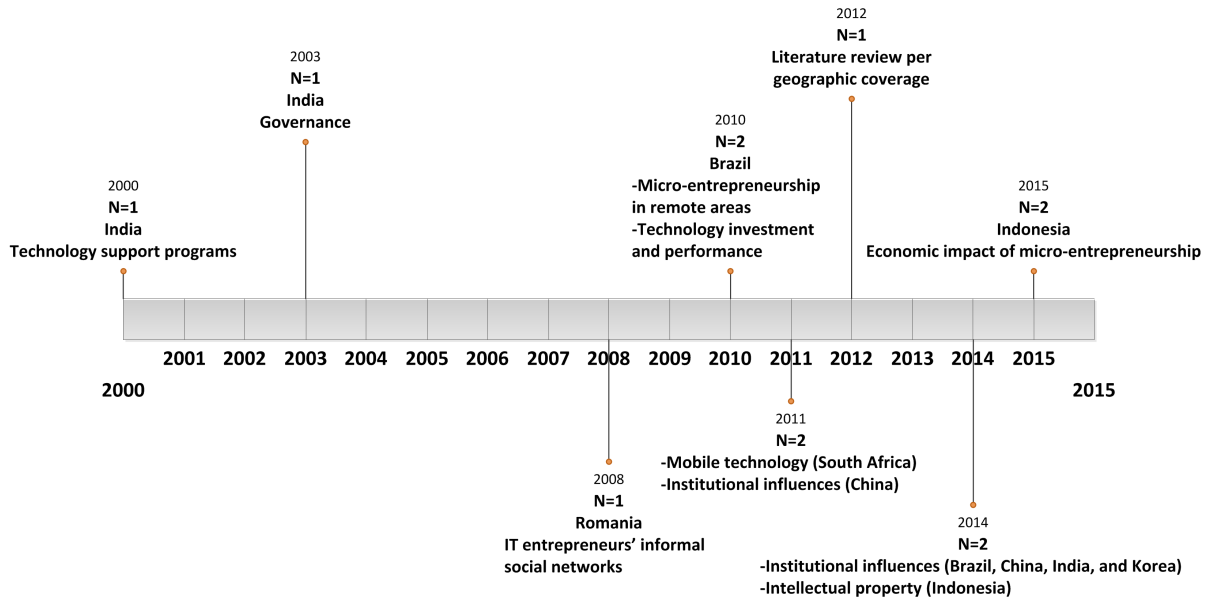


Figure 1. Overview of publications on entrepreneurship in emerging economies.

## 4 Entrepreneurship in Egypt

The number of entrepreneurs in Egypt is growing. Recent estimations suggest that the number of nascent Egyptian entrepreneurs has reached approximately 3,375,000 and baby businesses have reached almost 1,5 million start-ups (Singer et al. 2015). However, this large number of Egyptian entrepreneurs experiences several opportunities and challenges. For example, according to recent figures, Egypt is a country in which it is extremely difficult for entrepreneurs with innovative, but risky, projects to find venture capital (Dutta et al. 2015).

### 4.1 Contributions from literature on entrepreneurship in Egypt

To get an understanding of the phenomenon of entrepreneurship in Egypt based on contributions from academic literature, we searched the three scholarly databases (AISel, IEEE Xplore and ScienceDirect). Contributions where the keywords “entrepreneur\*” and “Egypt” appeared in the title or in the abstract were included. This resulted in three articles (Salama 2010; Marchetta & Ferrand 2012; Hampel-Milagrosa et al. 2015). To broaden the scope, the Google Scholar bibliographic database was searched to identify other publications that did not appear in the three academic databases. Given that Google Scholar has less advanced filtering and search options, we used the following phrases in the search “entrepreneurship in Egypt”, “entrepreneurship Egypt” and “entrepreneurship and Egypt” in the title. After the filtering process (i.e., checking redundancy and completeness), the search resulted in a total of 25 articles. The outcome of the systematic search for scholarly contributions on entrepreneurship in Egypt is presented in Table 1. The reviewed articles focus on the role of social systems in supporting entrepreneurs and capability building. Based on the review, the role of universities in teaching entrepreneurial skills and creating an innovative entrepreneurial culture has received considerable attention (Kirby & Ibrahim 2011; Sheta 2012). The main argument is that the education system in Egypt has, for many years, focused on graduating good employees but not good entrepreneurs (Salama 2010). However, with University-centred entrepreneurship programs, universities have begun to educate students degree and non-degree programs, about entrepreneurship and innovation (Kamel & Ismail 2013); this includes identifying, mentoring, incubating, connecting and supporting talented entrepreneurs in starting their businesses. Entrepreneurship education was investigated solely in the Egyptian context (Sheta 2012) and

compared to that in Finland to understand how students’ understanding of entrepreneurship education varies in two different cultural settings (Kurczewska et al. 2012; Kurczewska et al. 2014).

Context	Reference	Entrepreneurship education	Entrepreneurship obstacles	Success factors	Entrepreneurial support	Self-employment and parallel economy	Egyptian emigrants’ entrepreneurial ventures in Egypt	Entrepreneurial intentions	Empowering women entrepreneurs
Egypt	(Refaat 2008), (Salama 2010), (Kirby & Ibrahim 2011), (Sheta 2012), (El-Gohary et al. 2012), (Kamel & Ismail 2013), (Abou-Warda 2015), (Hattab 2014)	X							
	(Aziz 2008), (Aziz & Mehrez 2013)		X						
	(Farid 2007), (Blackwood 2012), (Dahshan et al. 2012),(Youssef 2012), (Sanders 2014)				X				
	(Dana 2012)					X			
	(Aziz & Mehrez 2013), (Marchetta & Ferrand 2012)						X		
	(Hattab 2014)							X	
	(Assar & Said 2015)								X
Egypt and Finland	(Kurczewska et al. 2012), (Kurczewska et al. 2014)	X							
Egypt and Tunisia	(Adly & Khatib 2014)		X						
Egypt, India, and Philippines	(Hampel-Milagrosa et al. 2015)		X	X					
Egypt and USA	(Ajjan et al. 2013)							X	
Egypt and Spain + men and women	(Fuentes-García et al. 2014)							X	

Table 1. Focus of scholarly contributions on entrepreneurship in Egypt (n=25 articles).

Hattab (2014) examined the impact of entrepreneurship education on the entrepreneurial intentions of university students in Egypt. Ajjan et al. (2013) compared the entrepreneurial intentions of university students in Egypt to their American counterparts based on attributes, such as outcome expectancy, influence of family, friends and peers, entrepreneurial self-efficacy and resource availability. Furthermore, Fuentes-García et al. (2014) compared the entrepreneurial intentions of university students in Egypt to their Spanish counterparts in terms of gender, culture and religion. Common for the articles focusing on the educational perspectives on entrepreneurship is that they focus on building qualifications. IT skills are not mentioned as a specific qualification in any of the reviewed articles. We did examine a few curricula to identify if IT was part of the curricula (Sheta 2012). Farid (2007) argues that Egypt is in a transition process moving towards a free market and this creates a pressure to offer support for entrepreneurial initiatives and institutions. The current political transition of Egypt affects the economy and has resulted in a lack of entrepreneurial opportunities (Blackwood 2012;

Sanders 2014). Thus, incubators and accelerators (i.e., government and non-governmental incubators) are needed, including those that provide funding, training, education, contests and exposure to social entrepreneurship networks. Those entrepreneurial support initiatives and institutions do exist, but suffer from a lack of coordination and duplication of tasks (Dahshan et al. 2012). Furthermore, the non-governmental incubators lack funding and face governmental restrictions (Blackwood 2012). Thus, the role of public policy is important to pave the way for entrepreneurship through influencing institutions that shape the business climate (Youssef 2012).

Aziz (2008) identified six significant obstacles that prevent Egyptian entrepreneurs from starting their own businesses: administrative corruption, government bureaucracy, lack of transparency, lack of financing sources, regulatory requirements and lack of market data. Along the lines of obstacles, a study reported that Egypt is undergoing similar socio-economic and political changes as in Tunisia, where obstacles to entry and growth for entrepreneurs have increased (Adly & Khatib 2014). Another study identified five key challenges that micro and small entrepreneurs face when growing their businesses in Egypt, India, and Philippines; these challenges are finance, labour, market, technology, and social security (Hampel-Milagrosa et al. 2015). The same study has also identified five success factors related to the entrepreneur's characteristics, enterprise characteristics, personal network, professional network, and the business environment (Hampel-Milagrosa et al. 2015). Aziz and Mehrez (2013) have identified bureaucracy, lack of transparency and market conditions as obstacles for Egyptian emigrants to start their entrepreneurial ventures in Egypt, while market potential, availability of cheap manpower and lifestyle incentivize them to do so. However, unlike the stayers in Egypt, the past international migration experience of the returning entrepreneurs is found to be key to the survival of their entrepreneurial activities in Egypt (Marchetta & Ferrand 2012). Only one recent study investigated the effect of entrepreneurship education on female students in Egypt (Assar & Said 2015).

The literature review of entrepreneurship in Egypt illustrates major challenges when starting a business. However, the review suggests that none of the identified studies focus on the role of IS/IT. To get a closer understanding of the role of IS/IT, in particular, in relation to CC, the lens of affordances was chosen to interpret our data. The next section provides a brief introduction to the concept of affordances.

## **5 Affordances**

The concept of affordances allows for the examination of how goal-oriented individuals interpret and actualize material properties within IS to create changes in organizational practices (Markus & Silver 2008; Seidel et al. 2013). In the context of affordances, actors are organisms perceiving and behaving in the environment (Pozzi et al. 2014). The conditions that enable this interaction include the properties of both the actor and the environment (Gibson 1986). An affordance is an action possibility available in the environment to an actor (Gibson 1986). In their literature review of affordances, Pozzi et al. (2014) identify four important aspects of affordances: their existence, perception, actualization and effects. In this study, we integrate the last three aspects into our analytical lens to better understand how affordances are actualized by CC services and their impacts on start-up businesses.

Affordances are conceptually relational, i.e., they require a relationship between an actor (in this case, an entrepreneur) and an artefact (in this case, CC services) (Pozzi et al. 2014). First, an affordance needs to be perceived by an actor to exploit its potential. Properties of an artefact may or may not be perceived (McGrenere & Ho 2000). This is a process, which is influenced by several factors, such as the artefact's characteristics, actor capabilities and external information (Pozzi et al. 2014). Affordances are conceptually relative, as the action possibilities are relative to the interactions between the actor and the artefact (Chemero 2003). An affordance may be useful for an actor who perceives and actualizes it, but it may not be useful for another (Markus & Silver 2008). Furthermore, because an actor may actualize an affordance in concordance with her/his goals, its actualization can be goal-oriented (Leonardi 2013) and in turn produce affordance effects or empirical results (Pozzi et al. 2014). Other factors affect the actualization of an affordance provided by an artefact are the actor's

experience, knowledge or culture (Norman 1988) – cited in (McGrenere & Ho 2000). These factors may inhibit or enable affordance actualization (Wahid & Sæbø 2015). Hence, we add inhibiting and enabling factors into our analytical lens (see Figure 2). We focus on affordance perception to some extent, but our focus is mainly on its actualization and effect in the context of CC use in supporting business entrepreneurs in Egypt.

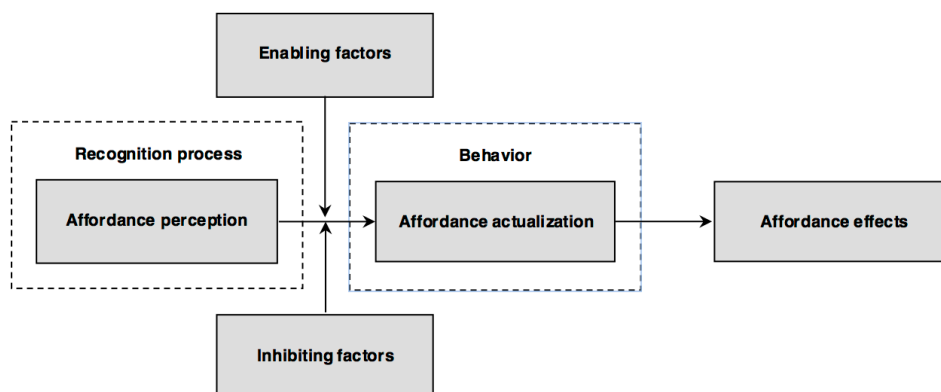


Figure 2. Our analytical lens (Note: inspired by (Pozzi et al. 2014; Wahid & Sæbø 2015)).

In the context of entrepreneurship, the lens of affordances has been utilized to examine if the Swedish Information and Communications Technology (ICT) entrepreneurs perceive the technology affordances brought by the Internet-based crowdfunding platforms the same way as their counterparts around the world (Ingram et al. 2014). According to the study, the ICT entrepreneurs perceive crowdfunding platform investors to be unable to provide the money and soft skills that would be provided by traditional investors (Ingram et al. 2014). In the context of CC, it has been argued that technology affordances cannot be perceived unless there is an active and informed engagement (Bianco 2009). Another study examined the intended, perceived, unintended, and false affordances from using CC tools by Nigerian teacher educators (Ofemile 2015). Another study identified the 21st century learners' skills and the affordances brought by CC to enhance those skills (Mahalingam & Rajan 2013).

The topic of entrepreneurship and affordances of CC in developing countries has not, yet, received attention from the research community. We try to address this gap in the previous research by exploring the affordances that CC brings to entrepreneurs in the context of Egypt.

## 6 Research Method

Our study is motivated by recognizing the sparse research on entrepreneurship in Egypt, particularly with regards to the use of CC. We conducted six interviews with six Egyptian entrepreneurs about their experiences with and views of CC; the interviewees include both the supplier side (cloud providers) and entrepreneurs who are users of cloud services (See Table 2). The interviews took place in Cairo and Alexandria from January 2014 to November 2015. Each interview lasted between 30–60 minutes and was recorded and later transcribed. The interviews were conducted in Egyptian and followed a semi-structured format.

Two interviews were e-mail based for the interviewees' convenience. The entrepreneurs were asked about the challenges they face and the opportunities they perceive in using CC services. The cloud providers were asked about the benefits in CC for businesses and their uptake for CC services. Due to the a-theoretical nature of CC, we consciously avoided basing our data collection and analysis on theoretical assumptions. Instead, we mapped our interviewees' views on CC into coded themes during the process of data collection and analysis. This method of a dynamic and a-theoretical interpretation of data is best described as grounded theory (Glaser & Strauss 1967) or a process which summarizes the common-sense of fieldwork (Czarniawska-Joerges 2007, p.26).



Interviewee type	Code	Business activity/role
Entrepreneur	E1	Software outsourcing/ custom SaaS
	E2	Development of desktop and mobile applications
	E3	Music/band
	E4	Graphic and web design
CC provider	CP1	Former cloud consultant at a cloud provider and currently freelance IT consultant
	CP2	Technology service professional at a cloud provider

Table 2. Overview of the interviewees and their business activities/roles.

## 7 Findings

We present the findings in five parts: (1) affordance perception, (2) affordance actualization, (3) affordance effects, (4) inhibiting factors and (5) enabling factors.

### 7.1 Affordance perception

We find that the interviewees have positive perceptions about the emergence of CC services. In general, they perceive CC to be helpful in starting and running their businesses; CP2 asserts that small businesses perceive CC services as helpful in “*maximizing the utilization of resources, reducing operating costs [i.e., administration headaches], and avoiding [upfront] IT investment [i.e., employees, hardware and software].*”

### 7.2 Affordance actualization

The entrepreneurs reported that they enjoy various actualized affordances from using CC services. These relate to accessing IT resources (such as IT infrastructure and applications), reaching a broader customer base and transferring responsibilities to CC providers for IT maintenance, backup and security. Table 3 summarizes the actualized affordances.

Actualized affordances	Excerpts
Accessing IT resources rapidly	“ <i>Instead of building the IT infrastructure from scratch, which I don’t have the capabilities, resources or time to do so, I use tools and resources that are already available and I build my applications on them.</i> ” (E1)
Broadening reach	“ <i>Of course the website I built to showcase my own designs helped me to get my work recognized and often, customers who navigate the website request designs from me based on their review of my work by saying ‘we saw your good designs and we would like to request a logo [for instance]’, and there you go!</i> ” (E4)
Transferring responsibilities	“ <i>Furthermore, it saves effort on resources maintenance, backup recovery and security, as these are already the cloud provider’s job.</i> ” (E1)

Table 3. Actualized affordances.

### 7.3 Affordance effects

The empirical results show four effects of actualized affordances: shortened time to market, diversified audience, more useful feedback and reduced costs (Table 4).

Affordance effects	Excerpts
Shortened time to market	<i>"[It] quickens the time to market; plus, if I need to validate an idea for an application and track its feasibility [proof of concept], CC services speed it up. It would be problematic for me if there were no cloud-based tools available to build certain functionality!" (E1)</i>
Diversified audience	<i>"I was following top musicians overseas who have massive numbers of fans on their YouTube pages. I asked some of them about how to reach a broad audience, and they advised me to create a YouTube channel. I and become a pioneer in what I do because they heard my music and liked it." (E3)</i>
More useful feedback	<i>"We depend on social networks like Facebook to reach users [...] We made an App [that] was an official client for SoundCloud on a Windows phone, and it was very popular—it has +300K downloads, and it was ranked 13th in the U.S. market." (E2)</i>
Reduced costs	<i>"For me, any CC service reduces time and [resource running] costs tremendously." (E1)</i>

Table 4. Affordance effects.

## 7.4 Inhibiting factors

We identify several factors that hinder affordance actualization (see Table 5). These factors are diverse but generally relate to: (a) government transparency and corruption problems, unsupportive government policies and cumbersome bureaucracy), (b) societal context (such as low appreciation from the domestic market and account hacking) and (c) infrastructure.

Inhibiting factors	Excerpts
Government transparency and corruption problems	Transparency problem: <i>"Say I wanted to do a market research to offer [a product or a service] to the Egyptian consumer; to get some data on the current state of the market or market segments etc. it is almost impossible! And sometimes it is considered to be a secret data if it exists in the first place, or sometimes I have to contact a particular person to get only some specific data [not any data to get]. At the same time, if I need data on a targeted market in another country, I could simply find all the data I need online. Then, I could formulate a business model and work on it!" (E1)</i> Corruption problem: <i>"The second obstacle I faced is the notion of intermediaries [having good connections or relatives to attract sponsors], even without listening to whether my work is good or bad! So I didn't accept this; I prefer to build myself [my business] by myself." (E3)</i>
Limited support for online transactions	<i>"According to the law, for any selling outside the home land, there are no taxes on this profit or restrictions to prohibit such selling. So I started selling the songs of my album on [an online music store]. So, to get the money transferred to my PayPal Egypt account, nothing could be done and the account remained zero! It couldn't receive the money I earned from selling the album, it only sends money!" (E3)</i>
Post-revolution effect	<i>"late in 2013, some projects have been canceled for us [by clients] as they were afraid to give [E1 a project] that might take longer time because the situation is not stable in terms of political changes, or Internet problems, or electricity problems which we are still suffering from severely." (E1)</i>
Unsupportive government policies	<i>"We didn't get support from [the] government, they [are] just talking and talking...taxes and blurry laws prevents us from registering [our start-up] as an Egyptian company." (E2)</i>
Low appreciation from the domestic market	<i>"Basically, we have only two Egyptian clients, who are actually our friends, and the rest of the clients are overseas [particularly from the U.S.]. We try to avoid dealing with more Egyptian clients, as this is always problematic regarding commitments of time and money, even in terms of appreciating the work we do for them." (E1)</i>
Banning decisions	<i>"Nowadays, telecommunications companies are banning VoIP calls [one of those companies has already banned Skype], and other companies will follow. So when VoIP is banned, what should I do?! I talk to the majority of my clients [who are from outside Egypt] via Skype! I don't know what to do!" (E1)</i>

Inhibiting factors	Excerpts
Cumbersome bureaucracy	<i>“Of course, the first obstacle I faced in my life was that there is nothing called ‘the right to register intellectual property’, particularly in Alexandria. Often times, the registration procedures of the intellectual property are difficult ... to do so, I have to file a note and travel from Alexandria to Cairo and pay the registration fees to officially register my intellectual property rights. This was the most difficult and irritating thing!” (E3)</i>
Intellectual property issues	<i>“Plagiarism—it is a risk to upload my work online without putting some restrictions. The worst case is that somebody would take my work and put their name on it and claim that it is their own work; this often happens. Then, after some time, when clients go online and see my design published by me and by the plagiarist at the same time, then they would say there is no proof that this design is originally made by me. Hence, I would need to put some kind of restrictions; I mean to disable saving my designs on the computers of my Website’s visitors or put a Watermark sign on the designs.” (E4)</i>
Account hacking	<i>“I had my e-mail account stolen; hence, my Facebook account was stolen as well. This was problematic for me as I couldn’t access either accounts, and I was worried because I had important stuff on my e-mail! I had assistance from a friend to get them back.” (E4)</i>
Suspicious users	<i>“I promoted my website on Facebook; I gained 6,500 fans, but most of them had fake names such as ‘cute girl’, and they were inactive. So I tend to remove these strange and suspicious users, who are useless [they don’t give feedback], and I just keep the fans who frequently interact with me.” (E3)</i>
Unreliable infrastructure	<i>“Often times we had the electricity cut for almost five hours and at different times each day. This caused us to change the times of our work shifts. Additionally, when no electricity, Internet is gone of course and if we are working with laptops we would keep working until the battery is empty after two hours, then we would have to go home anyway! So that was problematic and it is still happening but relatively less than before.” (E1)</i>

Table 5. Inhibiting factors.

## 7.5 Enabling factors

We also identify some enabling factors that may foster CC adoption by Egyptian entrepreneurs (See Table 6). These include institutional support, overseas market potential (that may compensate for low appreciation from the domestic market (see Table 3)) and the rapid growth of CC uptake.

Enabling factors	Excerpts
Institutional support	<i>“In Egypt, there are [many] organizations (global or local) that support entrepreneurs, like [the] USAID, the Kauffman Foundation, the Technology Innovation and Entrepreneurship Center [TIEC] and the American University in Cairo [AUC] Venture Lab [called Flat6Labs and is a start-up accelerator based in Cairo, launched by Sawari Ventures in conjunction with the AUC].” (E2)</i>
Overseas market potential	<i>“Basically, we have only two Egyptian clients who are actually our friends, and the rest of the clients are overseas [particularly from the U.S.] And we try to avoid dealing with more Egyptian clients, as this is always problematic regarding commitment with time and money, and even appreciating the work we do for them. In contrast, business deals with clients overseas are done in a professional manner, plus they appreciate our work!” (E1)</i>
Growth of uptake	<i>“They [businesses] have been using cloud computing for a few years, so they are not new to this technology.” (CP1)</i>

Table 6. Enabling factors.

The connections between affordance perception, affordance actualisation and affordance effects, along with the associated enabling/inhibiting factors, are depicted in Figure 3.

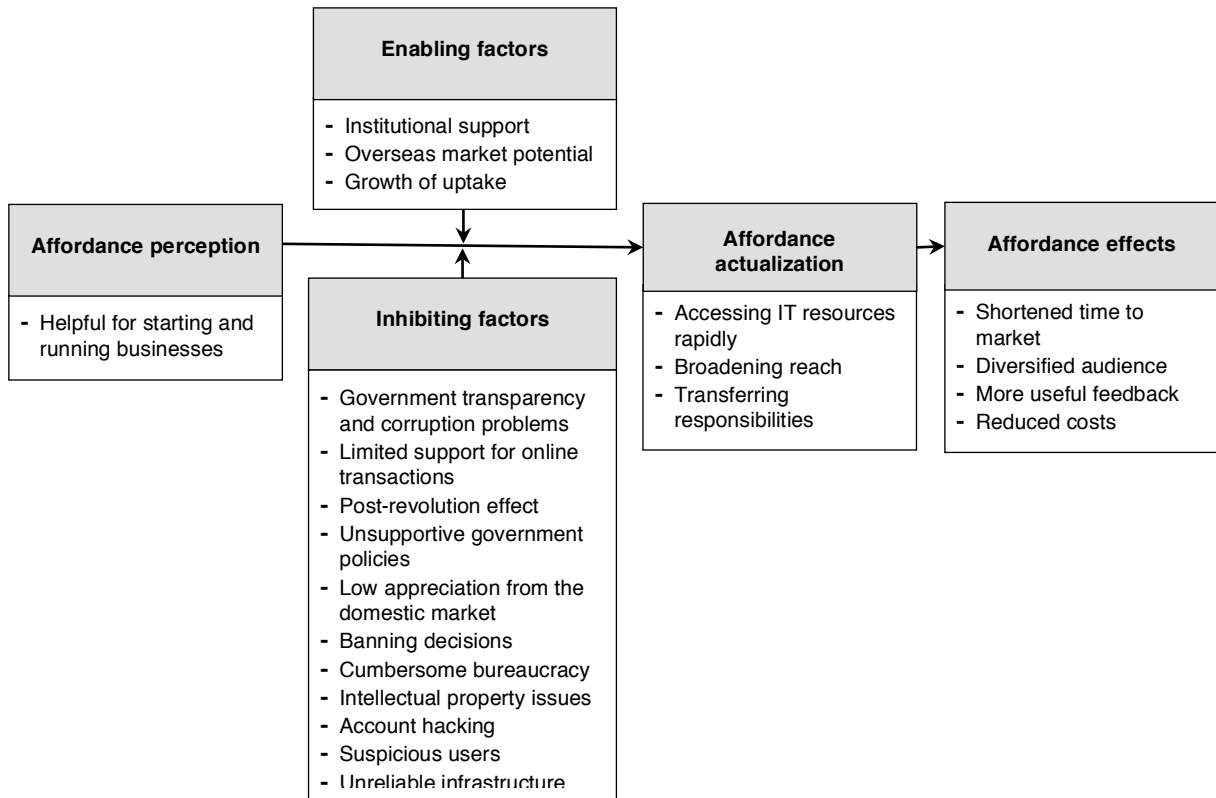


Figure 3. Summary of the findings.

## 8 Discussion

This study focused on how CC can support entrepreneurs in Egypt; although it confirms many of those trends found in the literature on IT start-ups in developing countries, it offers insights that are specific to the Egyptian context. Figures show that there are millions of nascent Egyptian entrepreneurs (Singer et al. 2015), and they are more technology-driven and innovation-driven by choice and in accordance with the global market trends (Nazmy 2016). However, Egyptian entrepreneurs are still facing major challenges hindering them from harnessing the benefits from using CC services to support their entrepreneurial activities. The Egyptian entrepreneurs find that CC offers them low barriers to enter the market this is supported by scholarly research (El-Gazzar 2014). The insights from the study suggest that CC provides various affordance actualizations for Egyptian entrepreneurs by enabling them to access IT resources efficiently, such as IT infrastructure and applications (such as Google App Engine, Microsoft Azure, and content management systems) to develop and host applications for their customers. It helps broaden entrepreneurs' customer base to get their work recognized and give them an opportunity to transfer responsibility for IT management, including maintenance, backup and security. Egyptian entrepreneurs enjoy various affordance effects from using CC services. These include shortened time to market being able to develop their products quickly and get them to the market without waiting longer to purchase the needed software, reduced costs, diversified audiences and more useful feedback on their work (i.e., ratings or downloads).

To the best of our knowledge, the extant literature does not highlight the benefits of reaching diversified audiences as potential users or supporters to give advice and encouragement. This finding supports the crowdsourcing concept, in which the crowd, made up of people from various backgrounds and located in different places, collaboratively create content and solve problems (Zhao & Zhu 2014). We find many factors that may hinder the further exploitation of CC services by

entrepreneurs in Egypt. Some of them resonate with findings from previous studies, such as unsupportive government policies, bureaucracy, lack of transparency (Aziz 2008), and unreliable infrastructure (Greengard 2010).

Furthermore, several inhibiting factors are very context-specific, including corruption problems, limited support for online transactions, low appreciation from the domestic market, post-revolution effect, banning decisions, intellectual property breaches, account hacking, and suspicious users. It is a cumbersome to go through regulatory procedures to start a business due to corruption (i.e., bribery and having good connections) and the lack of transparency and online availability of the regulatory information related to starting a business in many cities (The World Bank 2014). In cities such as Alexandria, Cairo, and Giza it is easy to start a business; however, the needed information for entrepreneurs are not publicly available in Alexandria (The World Bank 2014). Hence, we would argue that there is a chance for CC services to fill in this void and support entrepreneurs by saving their time and effort in getting the information they need to start their business and eliminating corruption (Wahid 2013).

CC is one of the megatrends that will shape the digital future of entrepreneurship; this manifested itself in the growing tendency of entrepreneurs to deliver their products and services via the cloud (EY 2015). However, the support for such e-commerce activities is limited in Egypt (e.g., PayPal Egypt account) and represents an obstacle standing against entrepreneurs in Egypt. More specifically, this study reveals that although CC has seen rapid growth in the Egyptian market, the capacity of domestic CC providers is limited. Hence, *“companies mostly will buy cloud services from providers outside Egypt ... [companies] in Egypt have no deep knowledge about [CC risks] that are, mainly, security and data location” (CPI)*. This situation is worsened by low appreciation from the domestic market for businesses that use CC services. Hence, Egyptian entrepreneurs often focus on exploiting overseas markets.

Some entrepreneurs suffer from the lack of commitment and appreciation from the Egyptian customers compared to the overseas customers when it comes to business deals. Thus, entrepreneurs tend to deal with customers overseas, as they are perceived to be more professional and appreciating when it comes to business. The appreciation problem with the Egyptian market is attributed to their attitude towards cost than quality. Another reason for why Egyptian clients show less appreciation to the entrepreneur's work is the resistance to new ideas and innovations unlike clients overseas who embrace them. This situation has happened to E3; the Egyptian audience did not appreciate the new style of E3's music, while the audience overseas liked it and appreciated its quality, E3 asserted this: *“One of the top international musicians heard my music that I recorded at my home and found it as same quality as the Western music recorded in specialized studios [...] I shared my songs on SoundCloud platform, which recorded 22000 listeners in a month! The problem here in Egypt is that people don't appreciate new ideas given that I sing in Arabic on a Western-like music. They don't appreciate this new combination. [...] However, I am keeping on!”*

After the revolution in 2011, instability in socio-economic and political life as well as IT and utility infrastructures affected the entrepreneurs' business in terms of losing customers, Internet instability, and electricity instability. There was a recently spreading, but shocking, news about banning Voice over Internet Protocol (VoIP) applications (e.g., Skype, WhatsApp and Viber). At first, the decision was publicly recognized as being issued by the government; however, this was a rumour and the main reason behind it was that Telecommunications companies wanted to repair their financial loss caused by the less use of regular calls and text messages (Aggour 2015). Such banning decision is deemed to make the entrepreneurs' life even harder, especially, those entrepreneurs who use VoIP applications to collaborate with their clients or partners from outside Egypt. In the cyber space, it is challenging for entrepreneurs to safely preserve the copyright of their work that they showcase online. Thus, plagiarism becomes unavoidable. Registering the intellectual property is a cumbersome in terms of procedures and proofing the uploading/publishing date is not acknowledged to be an official way: *“I am done with it eventually [registering the intellectual property], but after a hardship. [This was*

*important because] some people here don't respect one's rights. For instance, they could play my music themselves live, which I didn't play live yet! And without my permission!"* (E3)

Despite social media help entrepreneurs to gain massive audience who support them and follow their work in an interactive manner, some of these audiences may not be active users with unreal names and pictures. These suspicious users represent a threat to entrepreneurs rather than a support. With the current socio-economic and political transition happening in Egypt, the situation dictates giving attention to technology innovation and entrepreneurship. The support efforts from government or nongovernment incubators and accelerators are dispersed and not all of them are remained active all the way. There are local incubators that have been mentioned by the interviewed entrepreneurs, such as the Technology Innovation and Entrepreneurship Center (TIEC) that is a government-established incubator under the auspices of the Ministry of Communications and Information Technology (MCIT).

TIEC is dedicated to drive innovation and entrepreneurship in ICT for the benefit of national economy. TIEC achieves its objectives through training, competitions, and initiatives with multinational corporations. Furthermore, the Social Fund for Development (SFD) also offers financial support to entrepreneurs. These local incubators are not as effective as global ones, especially since the revolution. E1 explained what happened with them: *"In late 2010, the first introduced incubator called 'Plug and Play', and people started talking about entrepreneurship and life was bright. After 2011, the focus on entrepreneurship has increased to spread awareness of its importance among investors and entrepreneurs. This was honestly credited to the USAID and events like 'start-up weekends' and 'start-up camp'. Since 2013 until now everything has stopped! Of course there exist some events and support activities nowadays, but not as active as they used to be earlier. This resulted in having many start-ups closed after a while because there is no enough investment to further build the business on. The most famous incubator in Egypt is 'Flat6Labs'; it is the most committed incubator [and] 'Angel Investors' community where entrepreneurs can apply for venture capital support. There is TIEC and SFD, [but] these local incubators might offer an entrepreneurial support, but they are not as effective as the global ones, especially since the revolution."*

## 9 Conclusion

This study concludes that, in general, the interviewees have positive perceptions of CC services. They report several important actualized affordances, along with their effects. However, we identify many more inhibiting factors than enabling ones. Those who are interested in promoting the use of CC services among Egyptian entrepreneurs, such as policy makers and CC providers, may want to focus on formulating strategies for how to cope with these inhibiting factors. For example, the Egyptian government should make serious efforts to eradicate corruption and increase transparency, which would reduce red tape and create a more supportive climate for entrepreneurs who would like to adopt CC services to support their businesses. Improving the domestic market would also create a more secure business environment.

The main contributions of this study are threefold. First, practically, it demystifies the actualized affordances made possible by the emergence of CC services and their empirical effects, especially in Egypt, which are largely underreported in the extant literature. Second, it identifies a list of inhibiting factors that hinder the uptake of CC services in Egypt, in addition to identifying some enabling factors. Some of the factors are very context-specific. Third, theoretically using inhibiting and enabling factors; it validates the concept of affordances for understanding the new phenomenon of CC uptake by entrepreneurs.

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