

DUALITY OF SNS AS CHANGE AND STABILITY MECHANISMS: CASE OF TWITTER REVOLUTION IN EGYPT

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Abstract

Twitter revolutions, which are political events characterized with heavy use of social media, showed that information technology might not only bring friends together, but also provoke the dreadful offline events with high-impact outcomes up to major political changes in the region. However, the conclusions and opinions about the role of Social Networking Sites in modern revolutions remained controversial, so we have analysed the case of Egypt Twitter Revolution in order to understand the different opinions on roles of SNS in it. We have adopted Duality-Dualism framework as a theoretical lens and concluded that in mass media coverage, social networking sites are portrayed as having several roles during the revolution period. The application of the framework demonstrated the duality of views on SNS and resulted in 4 identified roles of SNS during the revolution periods.

Keywords: Social Networking Sites, Duality-Dualism, Arab Spring, Case Study.

1 INTRODUCTION

Waves of Twitter Revolutions, which included 2009 Moldova civil unrest, 2009-2010 Iranian election protests, 2010-2011 Tunisian revolution, and 2011 Twitter Revolution in Egypt, brought up equivocal impact of Social Networking Sites on the economy, society and individuals. The Twitter Revolutions, which were characterized by heavy SNS usage, changed the way researchers, platform owners and users think of SNS.

However, despite the wide interest in social media usage during critical situations, it is still not clear whether SNS usage may “guarantee” the outcome of revolution. If we survey the literature, we will see that one group of researchers believes in SNS power, and claims that “*SNS launch revolutions and help them to success*” (Paul 2011; Lysenko 2012). Another part, in contrast, argues, that “*one tweet does not make a revolution*” (Hirst 2012), and the reasons are lying beyond the SNS use. Balancing these polar opinions, the third part of researchers feels that the role and impact could not be clearly identified, e.g. Khiabany (2012), who compared Arab Revolutions and the Iranian Uprising beyond the technology use, and found that the revolts in Iran and Tunisia had totally different outcomes (*Tunisia “could” and Iran “could not”*) even the technologies were incorporated by protesters in both cases.

Having observed the controversial research findings, we assume that SNS can play not one, but many roles in the specific context (e.g. during revolution period), and we want to explore the different roles of SNS during critical period(s) in order to gain some understanding of SNS potential in enhancing or diminishing social movements’ magnitude and outcomes. We believe that this understanding is important from both practical and theoretical points of view. From theoretical perspective, it is interesting whether the information system may have a real-world impact under certain conditions. From practical perspective, it is important to understand and thus acknowledge the new emerging source of power, which might lead to shifts of political regime. Therefore, we aim to provide a framework to understand and interpret the social media use, which would be accessible for both practitioners and researchers.

We start the framework development with interpretation of the SNS roles as stability and change mechanisms. Thus, in alignment with the research direction of “paradoxes of *change and control* as salient IS phenomenon”, proposed by Tilson et al. 2010, we posit our research question as following: “*What is the role of Social Networking Sites: is it a change or stability mechanism?*” We believe that answer is critical due to complex nature of the phenomenon: SNS not only reflect moods, trends and fads of the offline world, but also accumulate, reinforce and supply them through world-wide online interactions, which in turn might lead to offline consequences, devastating like revolutions, or inspiring like success of charity organizations.

To address our research question, we conducted a case-study. Following Dube (2003), who argued that case research is useful when a phenomenon could not be analysed outside the context, we investigate the roles of SNS as change and stability mechanisms during the Egypt Twitter Revolution. Since SNS were more or less used by all types of Revolution participants, social networking sites could not be studied outside the Revolution context. We limit our attention to analysis of mass media and research publications; in particular, we focus on the materials, which were published in English. Despite the obvious limitations, such as lack of views from Arab-speaking communities, or lack of interaction with event participants, we believe that articles are valuable source of rich historical data, which allows us to understand the event and get the preliminary results of the SNS role in it.

We assume that SNS might as *provoke a change*, as *enable stability*, being both change and stability mechanisms. From philosophical perspective, change and stability are usually seen as two opposite states, namely *change* is associated with *continuity, low variance, predictability, regularity, or reliability*, and, on the other hand, *change* is associated with *adaptability, high variance, innovation, and flexibility*.

However, this relationship is not as simplistic: instead of limiting the attention on mechanisms themselves and thus opposing the states, one can consider outcomes of the mechanisms, and extend the notion with concepts of duality and dualism. *Dualism* sets the clear boundaries between two possible states: (1) stability enables stable outcomes (“exploration”); (2) change mechanisms provoke changes (“exploitation”), while *duality* allows for *continuous innovation*, where change mechanisms might result in a stable outcome and vice versa, stable mechanism (control) might enable change (experimentation). In order to analyse the SNS roles in the views of mass media coverage, a framework, balancing explaining duality and dualism perspectives of change and stability mechanisms (Farjoun 2010), is incorporated.

The application of the analytical framework to the collected data demonstrated that in mass media coverage, there was the duality of views on SNS roles. and we have identified four of them: (1) SNS as an *attendant*, stability mechanism enabling stable output; (2) SNS as a *stabilizer*, change mechanism enabling stability; (3) SNS as a *promoter*, change mechanism, enabling changes; (4) SNS as a *catalyst*, stable mechanism enabling changes. These four high level roles reflect the complex nature of SNS phenomena during Twitter Revolution, and support the idea that ICT can be used to bring the continuous innovation (duality of stability and change) (Corso et al. 2010).

This study makes a contribution to SNS literature by building a partial theory of SNS usage in context of critical situations, and may provide some ideas to organization managers or politic analyst in their ongoing “continuous innovation” battle. Moreover, the study aims to add some value to ongoing exploration-exploitation discussion.

The rest of the paper is organized as following. Section 2 comprises our conceptual development. Section 3 describes the research methodology, including the data collection and analysis. Section 4 introduces the case background and theoretical interpretation of the key events. Section 5 presents the results and their discussion and concludes.

2 CONCEPTUAL DEVELOPMENT

2.1 Use of Social Networking Sites

Social Networking Sites, which enable users to create public profiles and build relationships with other users, are much more than just Web-based software. SNS are social and cultural phenomenon, since SNS functions support social processes. For examples, a typical SNS allows users to make friends, share interests and ideas, and create variety of different types of content. The functions not only support pre-existing connections, but also can bring together users with shared interests or hobbies, thus helping to overcome the physical and geographical borders.

Those two different processes of the online social network formation (supporting offline links and establishing new ones) coexist with the process of triadic closure (Kalish et al. 2006) and SNS recommendations function (e.g. friends suggestions in Facebook) fit well into this process. Moreover, such features as users profile pages grants users with feeling of psychological ownership, and thus help users to satisfy the needs for self-identify, having a place and effectance (Karahanna et al. 2015).

With arrival and development of SNS, the information spread has changed dramatically in terms of speed and efficiency: with SNS, the new forms of word-of-mouth, such as ratings, reviews and hashtags appeared. Indeed the electronic WOM has received the attentions and was proven to be a useful source of information in different settings: predicting movie revenue box (Rui et al. 2011), affecting the online book sales (Chevalier 2003; Zhang 2012), being cost-effective marketing instrument in hospitality and tourism (Leivadiotou et al. 2010), and even outperforming the traditional marketing in the long-run perspective (Trusov et al. 2009).

But social interactions and marketing are part of peaceful life, and until the series of so-called Twitter Revolutions, which included 2009 Moldova civil unrest, 2009-2010 Iranian election protests, 2010-2011 Tunisian revolution, and Egyptian Revolution of 2011 occurred, we would probably never think

of strong social media impact on political movements. The revolutions and protests, which were driven by SNS, changed not only the way researchers, platform owners and users think of social networking sites, but also led to many difficult questions, such as similarities and differences across the cases of revolutions or revolts, impact and role of SNS, evolution of ICT use before, during and after revolution, etc.

We may notice that even if there is much interest in social media-driven revolts all over the world, there is no consensus on question whether SNS usage may guarantee, or predict the outcome of revolution. One part of the researchers believes in SNS power, and claims that SNS can launch revolutions and bring them to success (Paul 2011, Lysenko 2012). Another part, in contrast, argues, that “one tweet does not make a revolution” (Hirst 2012), and the reasons are lying beyond the SNS use. Balancing between these polar opinions, the third part of researchers feels that the role and impact could not be clearly identified, e.g. Khiabany (2012), who compared Arab Revolutions and the Iranian Uprising beyond the technology use, and found that the revolts in Iran and Tunisia had totally different outcomes (Tunisia “could” and Iran “could not”) even the technologies were incorporated by protesters in both cases.

Therefore, we see the phenomenon of SNS driven revolution is quite complex and that there is a need for a high-level understanding of it. The high-level understanding, such as framework, would allow one to classify and assess the polarized opinions and, hopefully, explore more detailed questions, while having the bigger picture in mind.

2.2 Duality and Dualism of Change and Stability

In order to understand the role of SNS in revolutions and develop the framework, we interpret SNS-based information systems as the working mechanisms, which lead to socially important outcomes. Basically, there are two types of mechanisms (stability and change) and two types of outcomes (stability and change).

If we consider the following working mechanisms and corresponding outcomes: stability -> stability and change -> change, we employ a philosophical perspective of *dualism*, which opposes stability and change. Specifically, stable mechanisms, such as habits, routines, discipline, tight coupling, limits, commitments, control, and low variance always result in stable output. This consistent state is called “exploitation”. The opposite state, where change mechanisms, such as search, mindfulness, redundancy, openness, preoccupation with failure, imagination, and variety, provoke changes and this state on ongoing change is called “exploration”. Thus wise, dualism sets exploration in opposition to exploitation, and brings up the paradox of seeking the balance between the opposite states.

This paradox might be observed in different levels. On individual level, a person might choose between obtaining and keeping deep knowledge in one domain, and between broad knowledge from the different domains, which allows him to solve complex problems, adapt to changing circumstances and create (Dane 2010). On organizational level, managers have to balance between theory and practice (Feldman et al. 2011), look for an appropriate organizational form (Schreyögg et al., 2010), or harmonize consistency and ongoing change (Turner et al., 2012).

Balance between “effective exploitation” and “flexible exploration” might take a form of a “continuous innovation”, which is allowed in the philosophical view of *duality*. Duality allows for the states, where change mechanisms (search, mindfulness, redundancy, and openness, preoccupation with failure, imagination, and variety) result in a stable outcome (continuity, low variance, predictability, regularity, and reliability). For example, development of SOPs for new technology adoption might be an example of change mechanism (new technology) enables stability (SOP helps to routinize the new technology). On the other hand, a controlled experimentation, incorporated for a choice of a new technology or method, is an example, when stable mechanism (control) enables change (experimentation).

Thus, we address our research question with interpreting SNS as working mechanisms, which either provoke changes or support stability, and the mechanisms result in changes or stable outcome. Philosophical perspective of dualism allows for all four possible cases, and thus we adopt this view for the further analysis.

3 METHODOLOGY

To get the insight into SNS use in Egyptian Twitter Revolution, we adopted case-study approach, since case-studies are most appropriate for a research addressing *what* question if the purpose of the study is to explore a new phenomenon (Yin 1994). SNS, which penetration was comparatively low (Facebook penetration was just 5%), and which were used by all participants of the Revolution, were not only new, but also a complex phenomenon, which could not be investigated “outside the context in which it occurs”. For such type of phenomenon, in-depth investigation is needed, and thus case research is appropriate (Dube 2003).

Using the case selection criteria for single-case design, obtained from Dube (2003), we evaluate the selected case of Twitter Revolution in Egypt as the following. First, the case was critical (“a case which has the conditions that allow the test of a theory”), because all Revolution parties (protesters, government and outside observers) used SNS to different extent during the different phases of revolution. Second, the case was extreme – users of the single Facebook page met offline, started the Revolution and tried to overthrow the governing regime of Hosni Mubarak. Third, the case was unique – the Revolution emerged in the middle of the economic boom. Therefore, the Egypt Twitter Revolution is the appropriate case for in-depth analysis.

In to collect data in the appropriate way, perform analysis and assess the outcome of research, we used theory, following Dube 2003. We chose a framework from Farjoun (2010), since the framework combined the duality and dualism of change and stability, thus allowing us to investigate the role of SNS as change and stability mechanism.

In the framework, there are two input mechanisms: stability and change, which enable two different outcomes: stability and change. They divide space into four quadrants (Q1-Q4). Quadrants Q1 and Q4 present the dualism view, and quadrants Q2 and Q3 present the duality view. Inside the each quadrant the manifestations, of simply, the ways, in which the input mechanisms enable the outputs, are listed.

Quadrant Q1 present *Exploitation*, the state when stability mechanisms, including habits, routines, institutions, discipline, tight coupling, limits, commitments, control, and low variance, result in stable outputs, namely: continuity, low variance, predictability, regularity, and reliability. The main manifestations of Exploitation are the following:

- Q1.1: Control reduces variation, e.g. Quality assurance of production reduces the percentage of faults and thus reduces quality variation.
- Q1.2: Standardized routines and formation lead to efficiency and undermine innovation, e.g. SOP help to establish the short-term efficiency, but need to be updated on regular basis in to make sure not only ongoing changes are reflected, but also new technologies are adapted.
- Q1.3: Commitment and specialization enhance reliability and reduce adaptability, e.g. fixed roles in project team might lead to efficient resource and task allocation, but also might result in adaptability lost, when one project member is able to perform only his role and does not know any information about others.

Quadrant Q4 illustrates *Exploration* state, which is characterized with change inputs (search, mindfulness, redundancy, openness, preoccupation with failure, imagination, and variety), and change outputs (adaptability, high variance, innovation, and flexibility). The main manifestations of Exploration are the following:

- Q4.1: Redundancy and loose coupling promote flexibility and innovation, e.g. agile methodology, used during software development project, promotes the product flexibility since the software development team might quickly react on the changing requirements of the customer.

- Q4.2: Experimentation promotes adaptability and undermines reliability, e.g. Google Friday projects, when employees are working on their own projects.
- Q4.3: Doubt stimulates discovery and change, e.g. “Doubt is the father of invention” Galileo.

Quadrant Q2 shows how the change inputs may result in the stable outcomes. The main manifestations of Q2 include the following:

- Q2.1 Redundancy and loose coupling increase reliability, e.g. Wikipedia is an online user-produced encyclopedia, where a mass of independent and loosely coupled editors facilitate error detection (Farjoun 2010).
- Q2.2 Moderate experimentation mitigates drastic failures, e.g. “Trial-and-error risk taking, rather than risk aversion, is the preferable strategy for securing safety” (Farjoun 2010, p. 209).
- Q2.3 Doubt and mindfulness foster security and continuity, e.g. mindfulness, which is associated with creativity and openness to new information, helps individuals to work with nonroutine events (Farjoun 2010).

And Q3 demonstrates the ways in which stability mechanisms provoke the change outcomes. The main manifestations of Q3 include the following:

- Q3.1: Control enables design and invention, e.g. “Flexible organizations benefit from bureaucracy while avoiding some of its major weaknesses” (Farjoun 2010, p. 211).
- Q3.2 Routines and formalization help manage the non-routine, e.g. “Incident control systems used structuring mechanisms, constrained improvisation, and cognitive management methods in emergencies” (Farjoun 2010, p. 213).
- Q3.3 Commitment and specification enhance adaptability, e.g. “Boundaries serve as catalysts, not only constraints: they focus attention, which can motivate and stimulate the discovery of solutions” (Farjoun 2010, p. 213).

Based on the above description, we see that this framework differentiates four co-existing states, and provides the insight in the change and stability categories by splitting each state into input mechanisms, manifests and outputs. The framework was used in data collection, data analysis and deriving the conclusions.

During the data collection, the framework helped to performed the structural search of the information: we associated Q1 “Exploration” and Q4 “Exploitation” with governing regime, while Q2 “Change enables stability” state presented the Temporary system, which emerged from protesters coming together, and Q3 “Stability enables change” state was interpreted as a new government of Egypt, the new system, which was still stabilizing.

This simple segmentation helped to collect and sort the data, which included articles from different sources (newspapers, reviews, reports, blogs), studies of Egypt Revolution (from perspectives of history, political science, sociology, information systems), interview records with Wael Ghonim, and the “We are all Khaled Said” Facebook page. Overall, we have 26 articles from mass media and 8 research articles on the topic of Egypt revolution. The articles cover the historical perspective (e.g. previous revolutions), Twitter revolution and post-revolution stage.

We used the framework during the data analysis. We found examples of inputs, manifests and outputs in the collected data, and we interpret them in the context of change or stability. Quotations from the selected sources of data were put into the table, which reconstituted the framework. Since there were still some missing points and the overall picture was not clear, the additional data was collected. Thereafter we draw the result of each state (Q1, Q2, Q3 and Q4, see Figure 1).

4 CASE DESCRIPTION AND ANALYSIS

4.1 Case Description

Twitter Revolution of Egypt took place in the Republic of Egypt from 25th of January to 11th of February 2011. The protests, and the revolution, took form of demonstrations, riots, plaza occupations, riots, civil resistance and disobedience, labour strikes, which were followed by brigandism, shop breaks, clashes between business owners and prowlers, and evacuation of all tourists from the country. The main demands of the protesters brought up legal and political issues, namely: overuse of power by policemen, 30-year-long state of emergency, violation of freedom to vote and even speak, corruption, and, of course, the economic issues of high unemployment rates, inflation and low real wages. Protesters accused the Hosni Mubarak political regime, and demanded the end of it, the cancel of the emergency law, and freedom, justice and a new, non-military government.

The story of the Revolution began with a Facebook page called “We Are all Khaled Saeed”, which was devoted to a young man Khaled Mohamad Saeed, killed by Egyptian police in Alexandria in June 2010. The Facebook page posts “expressed rejection of all Egyptian people to all acts of bullying practiced by the Egyptian police” (Mansour, 2012, p. 10), which attracted thousands of visitors, even though the Facebook penetration rate quite low, reaching just 5%, and most users came from the same economic background: they were young (18-30 years old), educated (holding at least University degree), and had relatively high income. This part of society appeared as a long-term consequence of the Government investment in technological parks, and subsequent development of IT outsourcing business. These investments, together with fortunate climate for oil-exporting countries, lead to economic midst, even though the bigger part of population was poor, and it is necessary to highlight that the Revolution emerged in the middle of the economic boom.

Another specific characteristic of the Revolution is broad use of the SNS during the Revolution. Social networking sites, as well as other ICT instruments like SMS, were used in the several ways by all the participants (protesters, their families and friends, government, international society). First, participants used the SNS to coordinate their actions and spread the information among peers; second the SNS were used to obtain the knowledge from Tunisia, and third, people could request for necessary resources. Third, government tried to turn down the Internet, and gained access to mobile services, and tried to spread the pro-Mubarak slogans. And the international society tried to find the truth from the “citizen media”, support the protesters, and to discuss and evaluate the event.

Despite the government efforts, on 11th of February, President Mubarak stepped down as president, turned power over to Supreme Council of the Armed Forces and resigned from office. This event symbolized the end of the Twitter Revolution, and was followed by nationwide celebration, and long, complicated post revolution period. It is quite interesting, that the first step of the temporary government was a Facebook page, created to communicate with the people of Egypt.

4.2 Case Analysis

We have interpreted data and characterized four states, namely Q1 “Exploration” and Q4 “Exploitation”, which are associated with the Mubarak regime, Q2 “Change enables stability” which reflects the Temporary system of interacting protesters, and Q3 “Stability enables change” state which was seen as a consequent government of Egypt, the new system, which was still stabilizing.

In state Q1 Exploration, we observed the three manifests: Q1.1 “Control reduces variation”, Q1.2 “Standardized routines and formation lead to efficiency and undermine innovation”, and Q1.3 “Commitment and specialization enhance reliability and reduce adaptability”. Table 2 presents the interpretation of manifests for the case.

Q1 Exploration		
Q1.1	Control reduces variation	<ul style="list-style-type: none">• Before the revolution, the government violated public and personal freedom; there were no political reform, economic and social

Q1 Exploration		
		<p>disruption – no variation over the 30 years.</p> <ul style="list-style-type: none"> The government used strict laws to control the citizens in effort to reduce uncertainty (Attia et al. 2011). Only traditional media, which showcased pro-Mubarak content, were allowed to report the news and events (Attia et al. 2011).
Q1.2	Standardized routines and formation lead to efficiency and undermine innovation	<ul style="list-style-type: none"> Government believed that SNS distracted people from the economic and political issues, the police brutality, and that SNS draw the society attention to the things that are piteous (Mansour 2012). SNS were used to “ventilate” people, and help regime to remain stable (Mansour 2012). Till the last minute, when protesters went and occupied the Tahrir Square in Cairo, the government did not believe that people will get together because of SNS use (Mansour 2012).
Q1.3	Commitment and specialization enhance reliability and reduce adaptability	<ul style="list-style-type: none"> Government used guns at Tahrir Square, but ‘despite the strength of the regime derived from the power of the supporting arms and money, the tools used by the protesters were much stronger in impact’ (Mansour 2012). Government tried to shut down the internet network all over the country, but it did not help: people who could not find the information went to Tahrir Square to find what was happening, and this increased the number of protesters (Mansour 2012).
<p>Outcomes:</p> <ul style="list-style-type: none"> <i>Outcome 1:</i> The adaptability of the current political system was too low, and this resulted in system stability break <i>Outcome 2:</i> Stability break made President Hosni Mubarak to fire his Cabinet and install Omar Suleiman as a Vice President, after Wael Ghonim, the charismatic leader of the Revolution, got his freedom, and finally, President stepped out. 		
SNS Role: Social Networking Sites were treated as “traditional media” and played the role of Attendant.		

Table 1 Q1 Exploration manifests in the Twitter Revolution case

In state Q4 Exploitation, we find the evidence for all manifests: Q4.1 “Redundancy and loose coupling promote flexibility and innovation”, Q4.2 “Experimentation promotes adaptability and undermines reliability”, and Q4.3 “Doubt stimulates discovery and change”. Table 3 presents the interpretation of manifests for the case.

Q4 Exploitation		
Q4.1	Redundancy and loose coupling promote flexibility and innovation	<ul style="list-style-type: none"> Tahrir Square uprising emerged in the midst of an economic boom (Walt 2011): the communication between government and Egyptian society was loose, which led to end of the regime.
Q4.2	Experimentation promotes adaptability and undermines reliability	<ul style="list-style-type: none"> Government tried to accelerate technological progress by investing in technological parks, while trying to lessen dependence on oil exports and reduce poverty. Microsoft, Oracle and Hewlett-Packard are among 120 firms that operate in Egypt’s Smart Village high-tech park. Egypt developed IT outsourcing business with young, well educated, high-tech savvy and English-speaking population. This part of a country population (5% using SNS) began the revolution after.
Q4.3	Doubt stimulates discovery and change	<ul style="list-style-type: none"> Government tried to control traditional media which resulted in boom of ‘citizen’ media, which was based on the SNS. After the access was gained, the government distributed SMS about pro-Mubarak rallies, but the protesters included circumventive techniques to spread the information and were more efficient.
<p>Outcomes:</p> <ul style="list-style-type: none"> <i>Outcome 1:</i> Current System Exploration led to changes in society, and forming of new temporary system, which shifted the political regime. 		

Q4 Exploitation
<ul style="list-style-type: none"> • <i>Outcome 2:</i> The attempts to remain stable, and to use well-known, or innovative technologies resulted in changes, but changes were not controlled by the governing regime
SNS Role: Social Networking Sites, which penetration rate was increased by the Government, promoted the protesters' ideas. SNS played the role of promoter.

Table 2 Q4 Exploitation manifests in the Twitter Revolution case

In state Q2 “Change enables stability”, we find the support for all manifests: Q2.1 “Redundancy and loose coupling promote flexibility and innovation”, Q2.2 “Experimentation promotes adaptability and undermines reliability”, and Q2.3 “Doubt stimulates discovery and change”. Table 4 presents the interpretation of manifests for the case.

Q2 Change enables stability		
Q2.1	Redundancy and loose coupling increase reliability	<ul style="list-style-type: none"> • <i>Loose coupling:</i> By the beginning of the Revolution, Facebook penetration was just 5%, and most users were from the one age & economic category (18-30 years old, educated, with comparatively high income), and the protesters loosely connected in real-world. • <i>Redundancy:</i> First, most part of Egyptian SNS users have accounts in several SNS, including Facebook, Twitter, and YouTube. Second, most users formed very strong ties over SNS: they became close friends “offline”. Third, protesters used Word-of-Mouth online (with help of SNS) and offline, for example, to warn neighbors about the danger. Fourth, SNS replaced need for a charismatic leader: even when Wael Ghonim was arrested, people still went to protest.
Q2.2	Moderate experimentation mitigates drastic failures	<ul style="list-style-type: none"> • With SNS arise and penetration, protesters obtained three categories of actions, connected with political participation: (1) activities that can be executed efficiently both on and offline, (2) activities that can be carried out only online, and (3) activities that can only be executed offline. • Active part of Egyptian society tried all three: (1) Online and offline – start and coordination of protests (Twitter Revolution itself); (2) Only online - gained the attention of the international society, then they “took part” in Tunisian Revolution, and part of people participated in Revolution just online (without going to Tahrir); (3) “Offline” – before the SNS use, there were several revolution attempts.
Q2.3	Doubt and mindfulness foster security and continuity	<ul style="list-style-type: none"> • Use of SNS helped to overcome gender and religious barriers, serving as mindful environment: (1) Egyptian Copt Christian took part in Revolution: “one of the significant symbols of the Egyptian revolution was the image of the cross entangled with the crescent” (Khiabany 2012). (2) Women took part in Revolution, online and offline, and there were no rape incidents. • SNS built continuity among rebels: SNS helped in gathering information about how to deal with police from people in Tunisia (which shows how SNS helps to overcome geographic and political boundaries), and how to get to Tahrir square, and allowed people to look for people (relatives, or friends) and request for resources
Outcomes:		
<ul style="list-style-type: none"> • <i>Outcome 1:</i> Over the short time, Egyptian society changed their attitude towards government and situation 		

Q2 Change enables stability due to SNS.
<ul style="list-style-type: none"> • <i>Outcome 2</i>: SNS-mediated system was working as reliable news agency monitoring the events of the revolution around the clock: people were using it to understand what's happening, and support one another. • <i>Outcome 3</i>: SNS use in Egypt and the Arab region increased after the Revolution, demonstrating the idea that the innovation became routinized
SNS Role: Social Networking Sites, which helped to build the reliable and stable system, were used as a catalyst: information black out did not help the Government.

Table 3 Q2 “Change enables stability” manifests in the Twitter Revolution case

In state Q3 “Stability enables change”, we find the support only for two out of three manifests: Q3.1 “Control enables design and invention”, Q3.2 “Routines and formalization help manage the non-routine”, and Q3.3 “Commitment and specification enhance adaptability”. Table 5 presents the interpretation of manifests for the case.

Q3 Stability enables change		
Q3.1	Control enables design and invention	<ul style="list-style-type: none"> • Twitter Revolution affected the way people behave and think: SNS and mobile phone technology increase after the Revolution, mobile phone operator Vodaphone <i>created ad</i> “face of revolution”
Q3.2	Routines and formalization help manage the non-routine	<ul style="list-style-type: none"> • The new military regime created a Facebook page to make a dialog with the people – SNS became routinized and formal. • Technology has proven that it has an equivalent role in the social and political movement along with the role occupied by the economic and entertainment (Mansour 2012)
Q3.3	Commitment and specification enhance adaptability	Evidence was not found
Outcomes:		
<ul style="list-style-type: none"> • <i>Outcome 1</i>: New political and economic system is still developing after emergence of Temporary system and its slowdown, and the process is longer due to influence of long-term demands and needs. • <i>Outcome 2</i>: Nevertheless, the New System stabilized the situation in country, and enabled changes: almost all demands of the Revolution were met. 		
SNS Role: The new government tried to routinize the SNS use, and here the SNS played the role of stabilizer.		

Table 4 Q3 “Change enables stability” manifests in the Twitter Revolution case

As we can see from Tables 2-5, SNS may play four different roles: (F₁) SNS as an *attendant*, stability mechanism enabling stable output; (F₂) SNS as a *stabilizer*, change mechanism enabling stability; (F₃) SNS as a *promoter*, change mechanism, enabling changes; (F₄) SNS as a *catalyst*, stable mechanism enabling changes. Figure 1 summarizes these findings, which are discussed further.

	Stability	Change
	F1. SNS as attendant	F2. SNS as a catalyst
Stability	Adaptability was too low, SNS were treated as “traditional media” RESULT: Regime became inefficient and stagnant	Temporary regime used SNS as a catalyst: RESULT: Temporary regime was stable & efficient
	F3. SNS as a stabilizer	F4. SNS as a promoter
Change	New regime tried to use SNS, but system is not stable yet, RESULT: SNS could help to stabilize the regime	Investment in ICT led to formation of SNS users in Egypt. RESULT: SNS promoted the beginning of revolution

Figure 1 Summary of Findings

5 DISCUSSION AND CONCLUSION

In-depth analysis of materials, which shed light on different aspects of the Egypt Twitter Revolution, helped us to get some insights into the opinions on roles, which played Social Networking Sites, broadly used by the revolution participants. The roles were revealed through the analytical framework, which balanced the duality and dualism of stability and change. The following were the findings of the analysis: Social Networking Sites are perceived as change as stability mechanisms, and the SNS may be portrayed as having one of these different roles: (F₁) SNS as an *attendant*, stability mechanism enabling stable output; (F₂) SNS as a *stabilizer*, change mechanism enabling stability; (F₃) SNS as a *promoter*, change mechanism, enabling changes; (F₄) SNS as a *catalyst*, stable mechanism enabling changes.

Our analysis showed that when SNS are used as *attendants*, it appears that the potential of this type of the information system is highly underestimated, and the information system is not and cannot be controlled as traditional media, which might lead to unpredictable results, as revolution. Social Network Site as a *stabilizer* might look as a counterintuitive finding, but if we remember that SNS is a specific form of ICT, we realize that this result support the previous researchers. For example, Orlikowski in her ethnography (1991) showed how information technologies intensified the existing form of control, which demonstrates the similar role of a stabilizer, which supports the existing structure. The *promoting* role of SNS is not surprising, if we think about established way of SNS use, namely: online marketing, SNS-based promotions and e-WOM. And, finally, the *catalyst* role of SNS is reflected in the works devoted to Twitter revolutions, where authors highlighted, mentioned or explained the SNS or IT use by protesters.

Based on the above, we can observe the *duality* of Social Networking Sites as stability and change mechanisms in case of Twitter Revolution. Duality, in contrast with dualism, which sets two different states in opposition, presumes that the opposite states are interdependent, rather than opposite and separated. Duality allows the existence of “continuous innovation”, which is the balance between “effective exploitation” and “flexible exploration”, and the four different roles of the social network sites support the ideal of ICT as a driven force of continuous innovation (Corso et al. 2010).

We hope that revealed and described opinions on roles of Social Network Sites make a contribution to SNS literature, and may provide some ideas to organization managers, or politic analysts in their ongoing “continuous innovation battle”, since they may be interested in public opinion mining, fast and reliable information diffusion, effective search and request for the necessary resources not only during extreme cases (e.g. revolution or flooding), but also in performing everyday tasks.

This study has several limitations. First, the described roles of the SNS are revealed for “entertainment SNS”, Facebook and Twitter, where internet mems and funny “error” tweets occurred (Starbird 2012) even during the violent clashes between protesters and government forces. And it is quite obvious, that there is much more Social Networking Sites, which are used in different ways, e.g. professional networks like LinkedIn, or enterprise SNS, which are usually inner organizational portals, connecting several enterprise sites. The second limitation is that the results are based on the secondary data (articles, blogs, and research articles), and all the materials used were written in English, since there were no possibility to look, translate and analyse the materials, which were originally written in Arabic, and, probably reflected more information about the perception towards the events occurred, and SNS use.

We see several directions for further research. First, one might be interested in analysing and comparing the SNS use in other cases of Twitter Revolution (2009 Moldova civil unrest, 2009-2010 Iranian election protests, 2010-2011 Tunisian revolution) and SNS-driven protests (Ukraine Orange Revolution 2004-2005, Russian Snow Revolution 2011-2013), and we believe that this broader research of SNS roles might be enriched with the analysis of SNS use in the American politics. Second, the other types of social networking sites might be analysed, and this would help to understand how the prominent features of SNS design change the way of their use.

References

- Chevalier, J. A., & Mayzlin, D. (2003). The effect of word of mouth on sales: Online book reviews (No. w10148). *National Bureau of Economic Research*
- Corso, M., & Gastaldi, L. (2010). Managing ICT-driven Innovations to Overcome the Exploitation-Exploration Trade-off: A Multiple and Collaborative Research Methodology in the Italian Health Care Industry. In *11th Int. CINet Conference, Zürich (CH), Sep* (pp. 5-7).
- Dane, E. (2010). Reconsidering the trade-off between expertise and flexibility: A cognitive entrenchment perspective. *Academy of Management Review*, 35(4), 579-603.
- Dewey, J. (1917). Duality and dualism. *The Journal of Philosophy, Psychology and Scientific Methods*, 14(18), 491-493.
- Dubé, L., & Paré, G. (2003). Rigor in information systems positivist case research: current practices, trends, and recommendations. *Mis Quarterly*, 597-636.
- Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13(1), 210-230.
- Farjoun, M. (2010). Beyond dualism: Stability and change as a duality. *Academy of Management Review*, 35(2), 202-225.
- Feldman, M. S., & Orlikowski, W. J. (2011). Theorizing practice and practicing theory. *Organization Science*, 22(5), 1240-1253.
- Kalish, Y., & Robins, G. (2006). Psychological predispositions and network structure: The relationship between individual predispositions, structural holes and network closure. *Social Networks*, 28(1), 56-84.
- Karahanna, E., Xu, S. X., & Zhang, N. (2015). Psychological Ownership Motivation and Use of Social Media. *Journal of Marketing Theory and Practice*, 23(2), 185-207.
- Leivadiotou, E., & Markopoulos, D. (2010). Cyber communities and Electronic Word-of-Mouth: The use of Facebook in the promotion of hospitality services
- Orlikowski, W. J. (1991). Integrated information environment or matrix of control? The contradictory implications of information technology. *Accounting, Management and Information Technologies*, 1(1), 9-42.
- Rui, H., & Whinston, A. (2011). Designing a social-broadcasting-based business intelligence system. *ACM Transactions on Management Information Systems (TMIS)*, 2(4), 22
- Schreyögg, G., & Sydow, J. (2010). CROSSROADS — Organizing for Fluidity? Dilemmas of New Organizational Forms. *Organization Science*, 21(6), 1251-1262.
- Tilson, D., Lyytinen, K., & Sørensen, C. (2010). Research Commentary—Digital Infrastructures: The Missing IS Research Agenda. *Information Systems Research*, 21(4), 748-759.
- Trusov, M., Bucklin, R. E., & Pauwels, K. (2009). Effects of word-of-mouth versus traditional marketing: Findings from an internet social networking site. *Journal of marketing*, 73(5), 90-102.
- Turner, S. F., & Rindova, V. (2012). A balancing act: How organizations pursue consistency in routine functioning in the face of ongoing change. *Organization Science*, 23(1), 24-46.
- Yin, R. K. Case Study Research, Design and Methods (2nd ed.), *Sage Publications*, Beverly Hills, CA, 1994
- Zhang, Z., Li, X., & Chen, Y. (2012). Deciphering word-of-mouth in social media: Text-based metrics of consumer reviews. *ACM Transactions on Management Information Systems (TMIS)*, 3(1), 5.

Appendix A. Data Description

Mass Media Articles and SNS pages

- Al Arabiya News Channel, Egypt activists plan biggest protest yet on Friday (2011), available at <http://web.archive.org/web/20110130062958/http://www.alarabiya.net/articles/2011/01/27/135207.html> (accessed 30 April 2013)
- Alterman, J. B. (2011) This Revolution Isn't Being Televised, available at http://www.nytimes.com/2011/12/31/opinion/egypts-real-revolution.html?_r=0 (accessed 30 April 2013)
- Babylon & Beyond (2011) EGYPT: Citizen journalists chronicle unrest, available at <http://latimesblogs.latimes.com/babylonbeyond/2011/02/egypt-citizen-journalists-chronicle-unrest.html> (accessed 30 April 2013)
- Babylon & Beyond (2011) EGYPT: Protesters highlight Hosni Mubarak's wealth <http://latimesblogs.latimes.com/babylonbeyond/2011/02/egypt-ambassador-says-mubarak-transferred-authority-to-vp.html> (accessed 30 April 2013)
- Babylon & Beyond (2011) EGYPT: What it means when protesters wave shoes, available at <http://latimesblogs.latimes.com/babylonbeyond/2011/02/egypt-what-it-means-when-protesters-wave-shoes-.html> (accessed 30 April 2013)
- Babylon & Beyond (2011) MIDDLE EAST: Rappers and musicians inspired by uprisings in Egypt, Tunisia, available at <http://latimesblogs.latimes.com/babylonbeyond/2011/02/middle-east-egypt-tunisia-music-arts-entertainment-.html> (accessed 30 April 2013)
- Boyd, E. B. (2011) HOW SOCIAL MEDIA ACCELERATED THE UPRISING IN EGYPT, available at <http://www.fastcompany.com/1722492/how-social-media-accelerated-uprising-egypt> (accessed 30 April 2013)
- Cohen, R. (2011) Revolutionary Arab Geeks, available at <http://www.nytimes.com/2011/01/28/opinion/28iht-edcohen28.html?ref=egypt> (accessed 30 April 2013)
- D. Parvaz, Wael Ghonim: The face of Egypt's revolution, - video, available at <http://www.aljazeera.com/indepth/features/2012/05/2012521132331165435.html>
- Facebook page "We are all Hamza Alkhateeb" <https://www.facebook.com/hamza.alshaheed>
- Facebook page "We are all Khaled Said" <https://www.facebook.com/elshaheed.co.uk>
- Friedman, U. (2011) The Egyptian revolution dominated Twitter this year, available at http://blog.foreignpolicy.com/posts/2011/12/05/the_egyptian_revolution_dominated_twitter_this_year (accessed 30 April 2013)
- Guardian, Egypt activist Wael Ghonim tells TV station: 'I am no hero' – video, available at <http://www.guardian.co.uk/world/video/2011/feb/08/egypt-activist-wael-ghonim-google-video> (accessed 30 April 2013)
- Harding, L. (2011), US reported 'routine' police brutality in Egypt, WikiLeaks cables show, available at <http://web.archive.org/web/20110504022032/http://www.guardian.co.uk/world/2011/jan/28/egypt-police-brutality-torture-wikileaks> (accessed 30 April 2013)
- Melber, A. (2011), Can Egypt's Internet Movement Be Exported?, available at <http://web.archive.org/web/20110226072256/http://www.thenation.com/print/article/158717/can-egypts-internet-movement-be-exported> (accessed 30 April 2013)
- NPR Books, Wael Ghonim: Creating A 'Revolution 2.0' In Egypt, interview and podcast, available at <http://www.npr.org/2012/02/09/146636605/wael-ghonim-creating-a-revolution-2-0-in-egypt> (accessed 30 April 2013)
- Opinion L. A (2011) Egypt: Poetic dissent falls on deaf ears, available at <http://opinion.latimes.com/opinionla/2011/02/egypt-poetic-dissent-falls-on-deaf-ears-.html> (accessed 30 April 2013)
- Paul, B. (2011), "How social media mobilized the Arab revolution", available at http://www.siliconindia.com/shownews/How_social_Media_mobilize_d_the_Arab_revolution-nid-80376.html (accessed 30 April 2013).

- The New York Times, (2011), 18 Days at the Center of Egypt's Revolution, available at <http://www.nytimes.com/interactive/2011/02/12/world/middleeast/0212-egypt-tahrir-18-days-graphic.html> (accessed 30 April 2013)
- The Telegraph, Egypt's state of emergency ends after 31 years (2011), available at <http://www.telegraph.co.uk/news/worldnews/africaandindianocean/egypt/9303195/Egypt-s-state-of-emergency-ends-after-31-years.html> (accessed 30 April 2013)
- Think Marketing Magazine (2012), The Revolution of Social Media or, Revolution over Social Media ? [Egypt Analysis], available at <http://thinkmarketingmagazine.com/index.php/the-revolution-of-social-media-or-revolution-over-social-media-analysis/> (accessed 30 April 2013)
- Twitter of Wael Ghonim <https://twitter.com/Ghonim>
- Walt, V. (2011), Egypt's Unfinished Revolution, available at http://www.businessweek.com.libproxy1.nus.edu.sg/magazine/egypts-unfinished-revolution-10272011.html?chan=magazine%20channel_top%20stories (accessed 30 April 2013)
- Weinthal B, Lee E. (2011), TRADE UNIONS: THE REVOLUTIONARY SOCIAL NETWORK AT PLAY IN EGYPT AND TUNISIA, http://web.archive.org/web/20110227094411/http://www.defenddemocracy.org/index.php?option=com_content&task=view&id=11792083&Itemid=347 (accessed 30 April 2013)
- Whitehead, J. (2011). Social media played 'arguably critical role' in Arab uprisings, finds new report, available at <http://wallblog.co.uk/2011/06/08/social-media-played-arguably-critical-role-in-arab-uprisings-finds-new-report> (accessed 30 April 2013)

Research Articles

- Attia, A. M., Aziz, N., Friedman, B., & Elhousseiny, M. F. (2011). Commentary: The impact of social networking tools on political change in Egypt's "Revolution 2.0". *Electronic Commerce Research and Applications*, 10(4), 369-374.
- Bhuiyan, S. I. (2011). Social media and its effectiveness in the political reform movement in Egypt. *Middle East Media Educator*, 1(1), 14-20.
- Hirst, M. (2013). One tweet does not a revolution make: Technological determinism, media and social change , available at http://www.academia.edu/2645882/Final_rewrite_One_tweet_does_not_a_revolution_make_GMJ_2013_version (accessed 30 April 2013)
- Lim, M. (2012). Clicks, cabs, and coffee houses: Social media and oppositional movements in Egypt, 2004–2011. *Journal of Communication*, 62(2), 231-248.
- Khiabany, G. (2012). Arab Revolutions and the Iranian Uprising: Similarities and Differences. *Middle East Journal of Culture and Communication*, 5(1), 58-65.
- Lysenko, V. V., & Desouza, K. C. (2012). Moldova's internet revolution: Analyzing the role of technologies in various phases of the confrontation. *Technological Forecasting and Social Change*, 79(2), 341-361.
- Mansour, E. (2012). The role of social networking sites (SNSs) in the January 25th Revolution in Egypt. *Library Review*, 61(2), 128-159.
- Starbird, K., & Palen, L. (2012, February). (How) will the revolution be retweeted?: information diffusion and the 2011 Egyptian uprising. In Proceedings of the ACM 2012 conference on computer supported cooperative work (pp. 7-16). ACM.