

The Effect of Stress Generated by the Use of Social Networks at Work on Users' Productivity: Results of an Exploratory Study

SALMOUN Khaoula^{1st}, CHAFIK Khalid^{2nd} and EL HASSANI Hajar^{3rd}

¹National School of Management Tangier, GREMSI, AdelmalekEssaadi University. Morocco

²National School of Management Tangier, GREMSI, AdelmalekEssaadi University. Morocco

³Polydisciplinary Faculty of Larache, Management, Innovation and Organizational Governance Research team
Adelmalek Essaadi University. Morocco

• Corresponding author: khaoula.salmoun@gmail.com

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Abstract: This research examines the effect of stress, generated by the use of social networks at work, on productivity. The design of the model that outlines this phenomenon was the outcome of our exploratory study. Therefore, we relied on a field study based on an initial model of the stress/NICTs relationship; we conducted this research using a qualitative method but with a positivist approach, via semi-structured interviews which allowed us to design a model that explains the relationship between stress induced by social networks and productivity. This model refers to two theoretical bases: The transactional theory of stress (Lazarus, 1976), and the phenomenon of techno-stress (Tarafdar, 2011). Our model tries to address the following main question of research: How can we explain the impact of stress induced by the use of social networks- on productivity at work?

The second stage of this research is dedicated to the empirical treatment, which will also be in the form of a qualitative study given the nature of the research question and it will be carried out with the collaboration of managers of small and medium-sized enterprises (SMEs), since they epitomise the most representative target.

Key words: stress, social networks, productivity, stress inhibitors, stressors

Introduction

The appearance of social networks (S.N) is one of the major changes that our world has witnessed in the past decade; those networks have added a new dimension to the way people communicate around the globe, on a personal, professional, and structural level. Thus, the use of S.N has generated new opportunities, but also new risk menaces related to data leaks, risks of intrusions, rumours, and misinformation. For instance: the reputation of a company online can be questioned because of one

comment, which explains the interest we have towards examining the effects of the use of S.N at work both on the user and the corporation.

The aim of this research is to analyse and explain the plausible effects of S.N use on stress and, if appropriate, its impact on users' productivity. Therefore, we will try to answer the following research question: **How can we explain the impact of stress induced by the use of social networks on productivity at work?**

The idea's genesis for this research was processed in a serial and a deductive manner:

- Phase 1: as a starter, we began our research generally and the exploratory study specifically with the following question: "How can we explain the impact of stress due to the use of ICT (information and communications technology) on the employees' productivity at work?". Based on updated facts regarding the negative effects of technology, we were able to relate the following parameters: stress, ICT, productivity and eventually develop the research's main question.
- Phase 2: Based on the results of the study, we realized that it wouldn't be appropriate to associate and gather all the technological communication means under the same umbrella with other stressor factor, as each technology is distinguished from the others by its own set of characteristics. Hence, we have specified the communication technology in question, which would be "social networks".

1.1 Theoretical framing of the relationship between stress, NICTs and productivity

Nowadays, with the demands of competition and the stakes of economic growth, the human being, whether employed or not, is subject to an increasing amount of stress that might generate serious consequences. Furthermore, the impact of stress goes beyond the personal sphere (physical and psychological effects) to reach the corporate and societal sphere. According to Alis and al (2011), *"the term stress means tension, and it was originated by 19th century's engineers who used the word to quantify the resistance of materials to the wind, wear and tear, and corrosion. Similar to technical materials, human material can resist aggressions but to a limit. It can be said that as soon as someone is under stress, they can experience the first symptoms of stress"*.

Nevertheless, looking for a specific exact definition of "stress" is a complicated task, ambiguous even. Given the diversity of explanations and operationalisations of the term, its complexity is also fuelled by the fact that stress is a multidisciplinary concept, and that it has often analysed under different fields: (Management, Medicine, Sociology, Psychology, Law, etc.), which has resulted in a variety of definitions and categories:

- **Definitions centred around the stress components:**

Stressors based approaches define stress as an exerted force that leads to a reaction and a response. Among these approaches, we have the demand-control approach, which regards the combination of low decision latitude and high work demands as being associated with high stress and mental health issues. This approach explains that the existence of some stressor factors generates tensions and undesirable reactions. However, the reactions of individuals to a stress factor are not homogeneous (Sonnetag and Frese, 2003).

Approaches based on the concept of reaction or response that condition the existence of stress by the presence of a specific type of reaction regardless of the situation's characteristics (Selye, 1956).

However, this type of conceptualisation neglects the fact that we can have several reactions to the same

Research's Category	The main idea	References
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situation, depending on each person, and that with efforts to adapt, the reactions of the same person can be altered.

- **Definitions centred around the stress process**

This type of conceptualise the stages of stress, for instance: the transactional theory by Lazarus' (1976) that implies that the psychological stress is “some important transaction *that has been taking place between the person and the environment; in other words, we have response evidence of a psychological event that is anything but trivial in the eyes of the affected person*”.

- **Definitions centred around the stress pattern**

These approaches don't take into consideration the process and focus on relationships. Such as Warr's vitamin model (1987) which claims that “*nonlinear relationships exist between job characteristics and job satisfaction; some workplace aspects have an impact on the individual, i.e., there is no additional effect, meanwhile other work characteristics have a curvilinear pattern in between the level of that work's characteristic and the concept of well-being. She goes to compare these characteristics to vitamin D, which is positive to an extent, but each further increase of the dosage has a negative effect...*”.

- **Objective and subjective definitions of stress**

Objective approaches focus on the presentation of stressors and their induced reactions, without introducing a personal evaluation of the environment and its adaptation efforts. Subjective approaches, on the other hand, analyse stressors by taking into consideration the perception of the individual, e.g., Harrison's P-E Fit theory (1978), stating that “*stress is due to an incongruity between the individual and the environment; thus, it is neither the individual nor the situation alone that causes stressful experiences and stresses*”.

The inability of users to cope, in a healthy way, with the new technologies interpreted the link between the use of NICTs and stress (Brod, 1984). In fact, the emergence of the internet and its latest technical features (web 2.0) have led to a much richer and more complex information scene; with more information available, and accessible through a wide variety of media and communication channels (David et al, 2008). This advanced information systems and technology has radically changed the communication practices and approaches as well as the strategies. Furthermore, these new dimensions and changes in work patterns are perceived by the user as stressors or stress triggers. Below, Table 1 represents an outline of the studies relating the use of the new technology to stress.

NICTs as inhibitors	This current particularly specifies social networks, implying that the characteristics of SNs allow moderating the negative impacts of stress. Hence, they absorb the impact of stressors.	Brooks et al (2017) ; Mondukpé (2017) ; Anhupria et al (2017).
NICTs as creators of stressors	According to this current, the NICT/stress relationship is considered as a sub-heading of the techno-stress phenomenon, by considering that the use of NICTs in the workplace produces stressors grouped into five factors (overload, complexity, insecurity, uncertainty, dispersion). These factors cause users tension and other consequences that concern several parameters (satisfaction, commitment, performance, etc.).	Tarafdar et al (2011) ; Ragunathan et al (2008) ; Cindy Felio et al (2011) ; Kalika et al (2014) ; Yin et al (2014) ; Debra et al (2011) ; Ayyagari (2007); Barley et al (2011).

Table 1: Synthetic table of studies linking new technology and stress

The research efforts in the field of stress and communication technologies are divided into two currents:

The first current of research considers communication technologies and specifically social networks as stress suppressors (Brooks et al 2017), this particular field of research studies the moderating effect of social networks related to the stress/outcome relationship while focusing on the characteristics of these networks that allow involvement, commitment and engagement...

Meanwhile the second current of research adopts a more of a technology-based approach where the phenomenon of techno-stress has received a considerable attention. According to this current, the use of communication technologies in the workplace can trigger stress for the user.

Within this framework, of stress creators, we are ought to point out that communication problems, generally speaking, are permanent problems, which have been identified for many years, although they have received a new push through technological development. These problems are associated to two main criteria: the quantity and the quality of the information provided (Bawden and Robinson, 2008), based on these two criteria a set of factors have been identified and considered as stressors due to the use of NICTs. Below, Table 2 summarises some of these stressors:

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Table 2: Stressors due to digital communication or the use of SNS

Stressors	Definition	Authors
Overload / Techno-overload	the quantity and diversity of information is amplified through ICTs (e.g., SNS)	Felio (2011) ; Kalika et al (2014) ; Tarafdar et al (2007 ; Nathan et al (2008) ; Yin et al (2014) ; Debra et al (2011).
Reachability	It is the permanent solicitation and connectivity via ICTs	Felio (2011) ; Kalika et al (2014).
Dispersion or interruption	It is an "illegitimate" detachment from the accomplishment of a main task that we should be fully immersed in	Felio (2011) ; Datchary (2004) ; Thomas (2004) ; Dabbish (2004).
A sense of urgency, immediacy	The media accelerates work rhythms by inducing increasingly rapid response times (Taylor et al, 2008); this situation generates a sense of urgency and rush for the user.	Cindy felio 2011, kalika et al 2014, Boukef, 2005 ; isaac et al. 2007 ; taylor et al, 2008
Techno-Insafety	Techno-insecurity refers to "situations in which users feel threatened by the loss of their jobs, either due to the automation of ICTs or due to a better understanding of the ICTs	Yin et al (2014) ; Nathan et al (2008) ; Tarafdar et al (2011)

Thus, we will mainly focus on the impact of stress -due to the use of NICT -on productivity, which can be defined as: *“The ratio of what is taken out of a system to what is put into it. Efficiency is one of its synonyms and it can be explained as an output measured according to a standard or a unit of measurement, OR, as the ratio of the output of a system to the resources consumed in the input”* (Hohmann, 2009; P: 7).

For his part, Bernolak (1997) defines productivity by adding to the notion of quantity the facet of quality of production of an employee using the given resources, i.e., we increase productivity, if we produce more or better goods from the same resources. Below, Table 3 presents a set of studies that have addressed the stress/social networks/productivity relationship:

Table 3:Review of various research on the stress/NICTs/productivity relationship

Article's title	Main goal of the research	The methodology adopted
Impact of Online Social Networking on Employees Productivity at Workplace in University of Gondar - A Case Study (Yeshambel, 2016)	The aim of this study is to examine the scope of social media use and its impact on employees' productivity.	Analytical research and the data was collected via surveys and an interview as part of a cross-sectional enquiry.

<p>Effect Of Online Social Network- ing on Employee Productivity (Ferreira et al, 2009).</p>	<p>This research specifically analyses the effect of (Online social networking) OSN on em- ployees' productivity and its consequences when used without restriction.</p>	<p>The data collection process started with quantitative exploration and measure- ment, followed by a qualitative analysis phase through interviews and formal surveys with main concerned.</p>
<p>Social networks in corporartes: An enhancer or a barrier to productiv- ity? (Cudicio et al 2014)</p>	<p>This article aims to clearly define IM and to see how its specificities are a major contrib- utor to its success while discussing the productivity implications and the impact of technology on the latter.</p>	<p>To conduct this exploratory study based on a social practice - communication within organisations - the authors have chosen a qualitative approach centered around a limited number of significant cases.</p>
<p>Workplace Impact of Social Net- working (Bennett et al, 2010).</p>	<p>The research seeks to explore the link be- tween social networks and organisational culture, and to examine whether social networking tools are capable of revitalising and reshaping an organisation's culture and brand, which can eventually lead to opti- mised ways of working and increased levels of productivity and employees' satisfaction.</p>	<p>The study examines the positive and negative perceptions of social networks in the workplace and provides a litera- ture review on the topic.</p>
<p>The organisational dimension of ICTs productivity: The case of e- mail in the services sector (Rol- land et al, 2007).</p>	<p>This study seeks to identify the main organ- isational impacts of e-mails.</p>	<p>The study is conducted using a qualita- tive methodology focused on several semi-structured interviews with senior executives and software solution provid- ers.</p>

Based on these studies, we have realised that the evaluation of productivity in relation to the use of NICTs is in need of further clarification. Therefore, Cudicio et al (2010) state in their study that the complexity of measuring productivity using instant messaging lies in the fact that the conclusions of productivity assessment remain similar despite the difference in the methods used. For their part, Roland et al (2007) highlight a very interesting idea, concerning the level of equipment and the level of use of technology. In fact, the authors explain that the presence of ICTs does not necessarily lead to a high degree of use, and the analysis of their impacts leads to completely different conclusions. They also indicate that e-mail (the communication technology studied in their paper) creates a problem of usage control when assessing productivity.

1.2 A conceptual framing of the relationship between stress, ICT, and productivity

1.2.1 Theoretical frame of reference

To explain our problematic and to support the correlations made in the connection between NICTs/stress/productivity, we used as a theoretical framework of reference:

Table 4: Argumentative support for the referential framework choice

Referential framework	Choice justification
Transactional theory	This theory, as we have previously stated, defines stress as a combination of an individual and the environment, and this approach allows us to emphasize the back-and-forth flow between the employee and the work environment (which is conducive to the development of stress).
<i>The technostress phenomenon</i>	The following approach and the structure of its correlations has been an inspiration that we pursued for translating the examined phenomenon into a pattern and correlations between the used parameters. It also allowed us to identify the stressor factors, to define productivity as an output parameter and finally to transform the users' perception into measurable explanatory parameters.

1.2.2 The suggested conceptual model

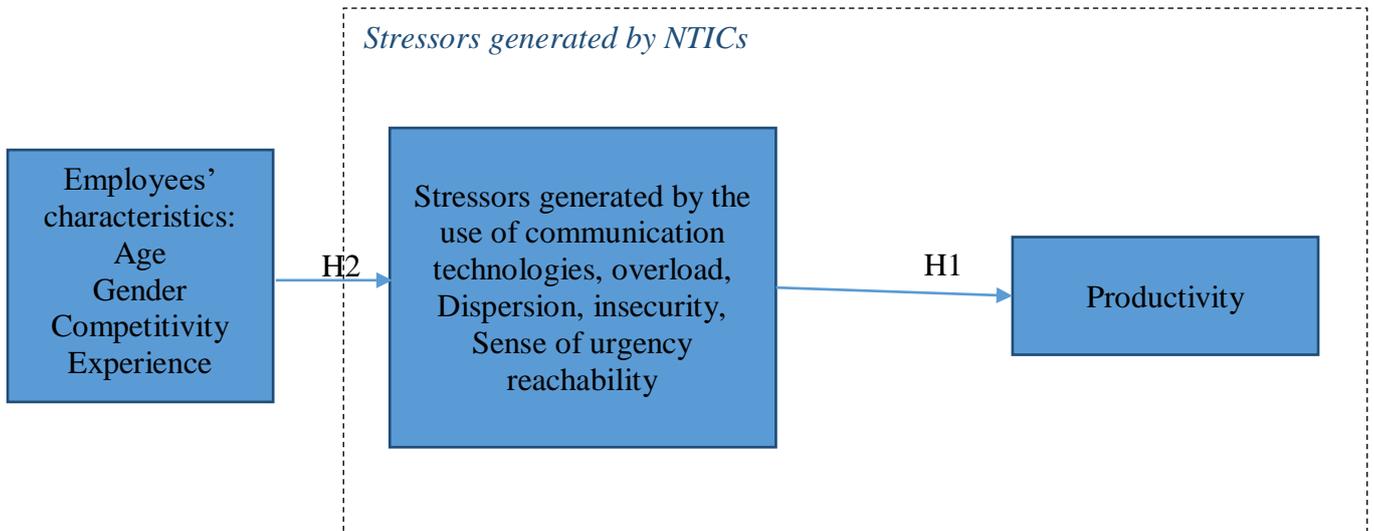
Based on the transactional theory, that highlights the role of NICTs users' perceptions in producing stress, and the model of Tarafdar et al (2011), that links the phenomenon of stress to the technological environment. We were finally, able to conceive our initial conceptual model that describes the pre-established relationship between stress due to the use of NICTs at work and users' productivity. This model or approach is a combination of three main parameters as the following:

Stressors: They represent all the conditions linked to the use of NICTs that act as stress stimulators. They are concluded from the existing documentation on the relationship between stress and ICTs (see Table 2).

Individual characteristics: a set of user-related characteristics (Age, Gender, Competence, and Experience) that can moderate the stressor/productivity relationship by affecting the perceived view of stressors, hence their impacts on productivity

Productivity: it's the output parameter and the result of stress caused by NICTs; It concerns the individual level and it's measured in terms of the time spent by an employee on NICTs to produce the required results depending on the nature of their job.

Figure 1: The initial model of the impact of NICTs generated stress on productivity



The model above suggests the existence of a cause-effect relationship involving the three parameters. It, therefore, proposes two main hypotheses, broken down into nine sub-hypotheses, as follows:

H1: Stressors due to the use of NICTs have a negative influence on productivity.

- H1a: Information overload negatively influences productivity.
- H1b: Dispersion has a negative influence on productivity.
- H1c: The sense of urgency negatively influences productivity.
- H1d: Dispersion has a negative influence on productivity.
- H1e: Insecurity negatively influences productivity.

H2: Individual characteristics positively influence stressors.

- H2a: Having an experience positively influences stressors.
- H2b: competence positively influences stressors
- H2c: Gender positively influences stressors.
- H2d: Age positively influences stressors.

2. Research Methodology

Choosing a research methodology depends on the topic researched, the nature of the study (exploratory, confirmatory, etc), the accessibility of certain populations, and the resources available to the researcher (Rambhujun et Benraiss, 2008, p: 41). Thus, we developed our exploratory research, following the positivist paradigm, but with a qualitative methodology based on deduction and that's for multiple reasons that we will explain deeply in the following lines.

The qualitative approach is defined as “any type of research that produces findings not arrived by statistical procedures or other means of quantification” (Strauss & Corbin, 1998). The use of a qualitative approach for the exploratory study can be justified by three main reasons:

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- The nature of the topic of the research (Pierre,2005): The conception and the nature of our research question require apprehending, understanding, and describing the reality and not measuring it, the “how” used when formulating a research question is a sign that refers to the need for describing a phenomenon through reports and life narratives...
- The flexibility of the investigation (Wacheux, 1996; Abbassi, 2015): the development of the theme during the exploratory phase required a back and forth between the field and the theory following the different paradigms.
- The nature of data (Edvard,2009): the stressors mentioned at the model level and that present the input variables are quite complex and related to the employee’s experience, hence they are difficult to operationalize or categorize.

This being said, we used the case method, through the proximity and the interaction of the investigator with the object of the study, this method allows us to understand the studied phenomenon in its complexity (Rambhujun et Benraiss, 2008). Therefore, via this method, we will be able to identify the global and specific characteristics of the interviewees’ real life, question the formal and informal practices, and understand and explain the reactions and intentions of the respondents. According to Yin (2003), this method is perfectly suitable for explanatory, descriptive, confirmatory, or exploratory studies, which test or generate theories.

Furthermore, we decided that the transition to the fieldwork in the exploratory phase would be done through semi-structured interviews, administered by an interview guide (see appendix 1), to develop the model and refine the links between the variables.

The analysis of the exploratory study was carried out according to the “Case Method”, that consists of a case-by-case analysis initially (a thematic content analysis, interview by interview), followed by a cross-sectional analysis (a comparative analysis that generalizes the observation across several representations of these themes (Borman et al, 2006)).

The sample was essentially made up of executives that use communication technologies, selected with the help of a professional network and with the snowball sampling technique without specifying criteria regarding profiles, types of companies, and sectors, with the aim of capturing the most appropriate sample for our study.

We have conducted nine face-to-face semi-structured interviews lasting between 20 and 60 minutes, and we utilized not-taking and/or audio recordings in order to transcript and analyse the results afterwards. Table 5 shows the details of our sample.

Table 5: Sample details

Position occupied	Gender	Years of experience	Education Level
Commercial	Male	+10 years	Bachelor's degree
Purchasing manager	Male	+10 years	Master's degree
Project manager	Female	5 years	Master's degree
Administrative officer	Female	5 years	Master's degree
Communication officer	Female	5 years	Master's degree
Personal Development Officer	Female	8 years	Master's degree
Client advisor	Female	5 years	Master's degree
Logistics manager	Male	20 years	Doctorate
General Director	Male	30 years	Master's degree

3. Results of the exploratory

3.1 Descriptive analysis

Our sample is composed of male and female professionals and managers, who hold different positions in different companies and sectors, with more than 5 years of experience, and a level of education of more than 3 years. Table 6 below summarises the description of the exploratory study's sample.

Characteristics	Values	Frequency
Gender	Male	4
	Female	5
Experience	5 years	4
	10 years	1
	+ 10 years	4
Education level	Bachelor's degree	1
	Master's degree	8
Company's activity	Commercial	1
	services	4
	Industrial	4

Table 6: The characteristics of the sample

3.2 Case-by-case analysis

The case-by-case analysis will follow the order below:

- Topic 1: The adopted communication technologies.
- Topic 2: Interviewees' characteristics (experience and competence) and their effects on the stressors.
- Topic3: The stressors due to ICT influence negatively the productivity.

A. *The adopted communication technologies :*

The following table shows the technologies used per interviewee:

Table 7: The communication technologies used

	Mobile Phone	E-mail	Social Media
Interviewee 1	*	*	
Interviewee 2	*	*	*
Interviewee 3	*	*	
Interviewee 4	*	*	
Interviewee 5	*	*	*
Interviewee 6	*	*	*
Interviewee 7	*	*	
Interviewee 8	*	*	
Interviewee 9	*	*	

We observe that our entire sample uses the mobile phone and emailing, while only three out of nine cases use social media networks.

It should be highlighted that these three cases that use social media belong to small and medium-sized companies.

B. *Interviewees' characteristics (experience and competence) and their effects on the stressors.*

The following table presents the structure of the respondents according to their characteristics:

Table 8: The effect of individual characteristics on the stressors.

	Gender	Age	Experience	Competence
N°1	Male	+40 years old	Over time we become more mature in terms of managing this stress.	Know how to manage the duration and content of the call, know how to say no.
N°2	Female	29 year-old	Over time, we get familiar with this type of problems, and we become able to manage stressful situations.	Interpersonal and writing skills, if the messages are not well written and transmitted, that could create misunderstandings or a waste of time in order to understand and adjust them.

N°3	Male	+30 year-sold	Over time and age, we get familiar with this type of problems and consequently we develop defence mechanisms.	Some personal traits help to manage this stress and to avoid these negative impacts.
N°4	Female	29 years old	The more we get experience, the easier it's gets to deal with this stress, unlike beginners (although being young ensure a better concentration capacity).	Self-control, interpersonal skills, organisation, and prioritisation.
N°5	Female	30 years old	The older and more experienced ones have a better proficiency in these networks, so it's easy for them to make the cut.	Soft skills influence the management of these communication tools.
N°6	Female	36 year-sold	It positively influences this stress-productivity relationship.	The writing skills and the message conception creates stress: it is important to stay on alert to test the feedback and to be actively responsive.
N°7	Female	28 year-sold	Through experience, we are able to develop solutions to take advantage of these tools without being stressed.	Self-control and organisation
N°8	Male	53 years old	It is the experience that allows us to develop the necessary skills for stress management.	The competence needed are the relational and communicational ones.
N°9	Male	43 years old	Experience allows us to develop techniques to cope with stress.	The organisation, Prioritisation, and moderation.

C. The stressors due to ICT influence negatively the productivity:

Interviewee n°1: The technology used by this interviewee is mainly the mobile phone. For him, this tool has a positive influence on productivity as it accelerates work and saves more time.

According to this interviewee, the stressors generated by this technology create positive stress for work: The overload is healthy for the functioning, it allows to dominate all the necessary information, it requires being organized and respecting the priorities. The reachability also allows to keep in touch with the customers and stimulates them more and more with the condition of managing calls' time, being pragmatic in the discussion, and knowing the appropriate tool to use for each communication (messages, e-mails, etc). However, for him, dispersion is mainly linked to poor priorities management, and the urgency is mainly related to the phone, whereas the insecurity is not experienced with these two tools.

Generally, for this studied case, the more we communicate, the more productivity increases.

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Interviewee n°2:Based on our interview with interviewee n°2, we understand that productivity (an increase in the firm's turnover) at work is positively influenced by these technologies. According to her responses, the impact of communication-related stressors does not affect their performance: First, the information overload is not due to these technologies but to the improper distribution of tasks among the members of the work team, moreover this overload management becomes part of the work routine.

The dispersion is a result of the use of these tools, but still, its effects do not influence the achievement of monthly objectives (productivity).

The sense of insecurity is linked to the number of subscribers and their reactions and management, which creates a time loss, especially during the launch of events, despite that the delay remains manageable.

The sense of urgency: due to the need for a quick and correct reactivity, which influences priorities (urgent, important) "*daily basis operations, and subsequently communication*"

Interviewee n°3:As already mentioned, the third interviewee uses only mobile phone and emails to communicate with clients and his team members, in his responses he distinguished between the 2 tools, according to him they are not used for the same purposes, and they do not have the same effects on the productivity. The nature of email communications (memorisation, archiving, follow-up, etc) offers organisation, timesaving, and the time needed for the preparation of answers, and therefore it does not create an overload or dispersion, as it allows a better respect and arrangement of priorities which in turn eliminates the sense of urgency. Whereas, with the mobile phone it's not the case since generally the response is immediate, the number of calls and received information is abundant, the barriers of time and place are eliminated... so he is burdened more when it comes to the mobile phone since its causes him an overload, dispersion, reachability, urgency, and insecurity.

Verbatim: it is disruptive if there are a lot of calls, if there is a lot of information to memorise if the answer must be immediate...

Overall, we find that according to this interviewee email has a positive influence on productivity unlike the mobile phone.

Interviewee n°4:the4th interviewee states that mobile phone and email use cause the following stressors: overload, dispersion, and a sense of urgency; And she adds that their impact on productivity is always positive because of organisation, good management of priorities, and stress awareness.

Verbatim: Yes, it creates dispersion, but I reduce the impact of this problem by respecting priorities' order.

Interviewee n°5:The nature of responsibilities of this interviewee (communication officer) requires her to use all these technologies especially social networks to reach the target both widely and quickly as already stated.

According to this interviewee, in order to be productive, she has to be reachable all the time and quick in terms of responsiveness, which cause her stress and disperses her effort and concentration. She also states that the sense of urgency is higher with social networks as reactions are uncontrollable and viewed by everyone. She confirms that the impacts of these stressors can be controlled via organisation and prohibition of domestic use.

Interviewee n°6: this interviewee affirms the presence of all stressors when using phone, email, and social networks; She adds that the stress experienced while using these communications channels is related to the concern of improving productivity, for example, reachability and connectivity are accepted just for the sake of achieving goals according to deadlines. The same goes for the sense of insecurity, it can be sensed in light of comments and advertisements that may be inappropriate and affect the company's image, etc.

In fact, for her it is the motivation to improve productivity, that helps to overcome these stressors.

The latter states a very important idea when it comes to stress, she claims that this stress due to these technologies will not influence productivity unless it is experienced for a long period of time.

Verbatim: In the absence of stress management, productivity will be influenced and vice versa, if we work each time on reducing and adapting to stress, we make it positive.

Interviewee n°7: she shares the same opinion as the previous one, she affirms the existence of stressors aside from the insecurity, which is according to her related to social networks; Nonetheless, she confirms that their impact on productivity is always positive because of the motivation that allows her to overcome these inconveniences and achieve the desired productivity.

Interviewee n°8: This interviewee affirms the presence of stressors except for insecurity, knowing he only uses his mobile phone and emails. He also states that this stress due to these technologies is very beneficial for work, and these stressors are necessary for work performance if combined with delegation, respect of priorities, teamwork, motivation, and organisation.

He added that even though communication consumes almost 40% of his working time, it makes it easier for him.

Interviewee n°9: This interviewee emphasises the type of formal and informal communication. For him, informal communication complements formal communication, and he goes on to add that it is the main source of stress and that it creates an overload, reachability, dispersion, etc. He specifies that emails do not present an urgency problem, while insecurity is absent for both tools.

He also adds that it is important to balance and refuse when necessary to manage the incoming communications flows.

Verbatim: in the absence of stress management techniques, productivity will be influenced and vice versa, if we work each time on reducing and adapting to stress, we make it positive.

3.3 Cross-sectional analysis:

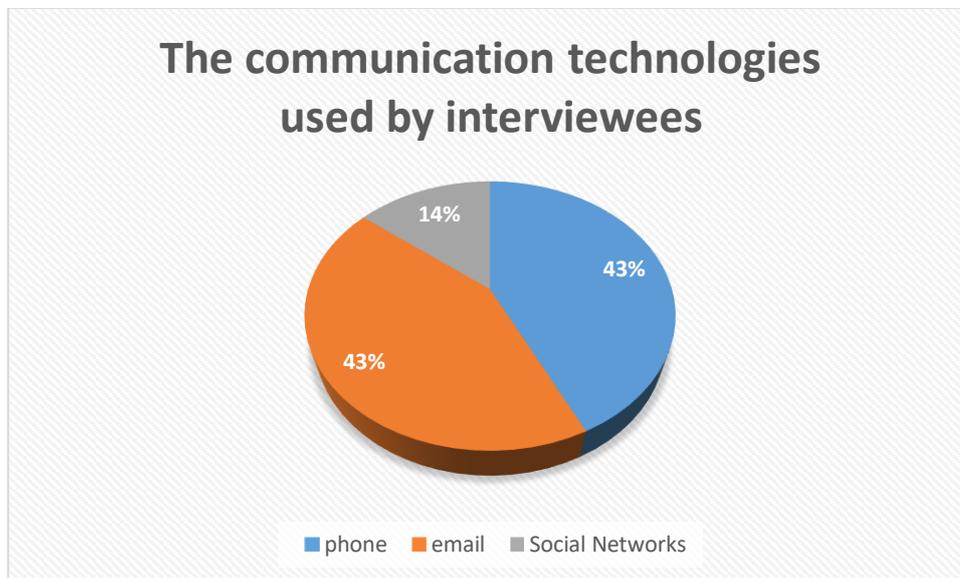
A. The communication technologies used:

The interviews reveal that the interviewees communicate mainly via three different technologies (email, mobile phone, and social media instant messages); three interviewees use a combination of all the three tools for their communication, while the remaining seven use mobile phones and emails only. Regarding the objectives of their communication, the interviewees in three major categories specify them:

- Work team management ;
- Commercial communication (with customers) ;

- Personal communication (with family, friends...).

Figure 2: Percentage of use for each technology



B. Interviewees' characteristics and their effects on stressors:

Regarding the gender: Stress is experienced in the same way among women and men with all communication tools, even the actions undertaken to control it are similar (organisation, respect of priorities, etc.)

Regarding the age: The interviewees' answers concerning stress are identical and refer to the same vision, despite the age difference between the candidates.

Regarding the experience: From the interviewees' responses, we can say that the years of experience affect stress levels. Although it is known that young people perform better using these tools, this experience allows the users to develop coping mechanisms to make stress positive and avoid its negative impacts.

Regarding the competence: for all interviewees, competence is the most effective characteristic for managing stress and benefit from these tools without any negative impacts. They specify that thanks to soft skills, how to act and react against these stressors? A commercial among the interviewees explained that "managing availability is not so easy, it requires solid interpersonal and/or soft skills: one must have the power to choose whether he or she can answer a call and must be able to manage the time and content of the call. They added that writing skills are also a stress factor as most of these tools lean on these skills, though there is a lack of training on this matter, "if the messages are not well written, it can lead to misunderstandings or wasting time in understanding and adjusting them".

D. Stressors influence productivity:

The table below summarises all the stressors adopted in the initial mode, presenting their definitions from the interviewees' point of view as well as the technology that creates the stressor.

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Table 9: The stressors related to communication technologies and the meanings attached to them

Stressors	The illustrative tool			The meaning attached to them	The impact on productivity
	Phone	Email	SN		
The overload	*	*	*	The increasing volume of information created by these tools and that needs to be managed.	Overall, despite the disruption caused by these stressors, their impact on productivity is still positive because of organisation, respect of priorities, motivations, etc.
The reachability	*	*	*	The obligation to stay online even after working hours to meet work needs.	
The dispersion	*	*	*	Lack of concentration due to multi-tasking.	
The sense of urgency	*		*	It is the speed and immediacy of reactions.	
The insecurity			*	It is the sense of care and concern that is experienced because of the proximity and openness required by these tools.	

4. The findings of the exploratory study:

We summarize the results of our exploratory study as follows:

- The stress and the experiences generated by the interviewees are not subject to the same conditions or the same work, for example, the users of social networks only feel the stressor insecurity, and that shows the need to personalise the analysis for each technology. The most convenient technology for our research in social networks.
- Gender and age had no influence on stressors; in fact, the results were identical despite the differences in gender and age, unlike the other characteristics: experience and competence (organisation, respect of priorities, and good distribution of tasks) that influence positively stressors. Moreover, a new factor “motivation” is added to these as it inhibits the negative impact of stressors.
- All users confirm the existence of stressors (overload, insecurity, sense of urgency, dispersion, and reachability) due to communication technologies, whereas their impact on work is not clear in terms of productivity since it continues to increase for most interviewees regardless the existence of these stressors.

- The assessment of productivity when it comes to the use of all communication technologies is contestable and complex as it hides the disparities in the impacts of these technologies.
- The choice of communication technologies to be used depends on the size of the corporate and its strategy; therefore, SMMEs massively resort to the use of social networks for communication and marketing given the advantages they provide.

Following up with these results, we had new options to refine our initial model, orient the working methodology, target the appropriate sample and finally to formulate new hypotheses.

A. Modifications made in terms of the research question:

Given that it becomes necessary to personalise our analysis according to the technology, as deduced from the exploratory study, we opted to reorient our research question around social networks, given the relevance and the originality that they provide to our subject. Thus, the new formula of the research question becomes as the following:

« How can we explain the impact of the stress induced by social networks use at work on user’s productivity? »

B. Modifications made in terms of the initial research model:

Following up with the results of the exploratory study, the initial model will undergo the following modifications:

- ✓ We have adapted the model to the context of social networks;
- ✓ We have adapted the meaning of insecurity to the characteristics of social networks;
- ✓ We eliminated the two factors (age and gender), as they had no influence on the stressors;
- ✓ We have given the “individual characteristics” a new designation “inhibitor” with reference to the roles that its factors play (inhibiting the impact of stressors) and which are: experience, competence or skill, and motivation.

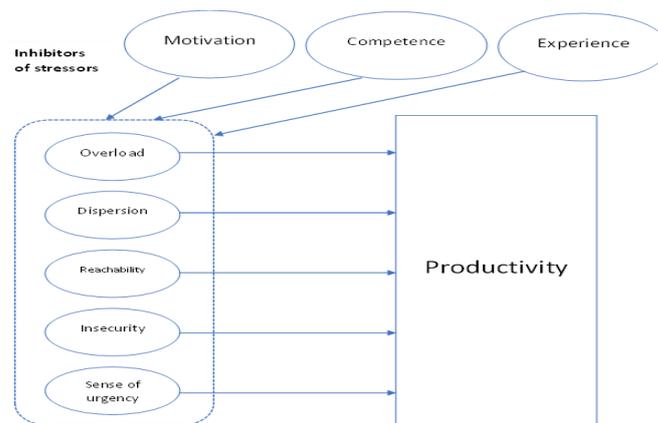


Figure 3: conceptualisation of a model about the impact of the stress induced by social networks on the productivity

The modification of the initial model generated a new formulation of hypothesis. The following table presents these new hypotheses and their sources of inspiration in a schematic way:

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Table 10: Reformulation of the hypothesis

Main hypothesis	Sub Hypothesis	Source of inspiration
H1: Stressors negatively impact productivity	H1a: Overload has a negative impact on the productivity	<ul style="list-style-type: none"> – Tarafdar et al (2010) – Ragunathan et al (2008) – Ayyagari (2011) – Felio (2011) – Kalika et al (2014) – Yin et al (2014) – Debra et al (2011) – Datchary (2004) – Thomas (2004) – Dabbish (2004) – Boukef (2005) – isaac et al (2007) – taylor et al (2008)
	H1b: Dispersion has a negative impact on the productivity;	
	H1c: Reachability has a negative impact on the productivity	
	H1d: Insecurity has a negative impact on the productivity	
	H1e: Sense of urgency has a negative impact on the productivity	
H2: The inhibitors prevent the negative impacts of stressors	H2a: Motivation prevents the negative impacts of stressors	Our exploratory study
	H2b: Competence prevents the negative impacts of stressors	Tarafdar et al 2010
	H2c: Experience prevents the negative impacts of stressors	

C. The measurement of productivity and the selected sample:

As already stated, the assessment of productivity when it comes to the use of all communication technologies is contestable or unreliable even, since it hides the disparities of the impacts of these technologies.

However, even after deciding to analyse one technology to be analysed (social networks), the evaluation of productivity is still complicated for several reasons: Firstly, the framework of social networks' use, and secondly the rate of social networks' use. Regarding the first limit, it is difficult to delimit the time devoted to professional work from the total of time spent on social networks; generally, the professional and non-professional purposes are embedded in the same browsing session. While the second limit states that the presence of social networks does not necessarily lead to a high degree of use, and the analysis of their impacts leads to totally different conclusions.

In fact, to overcome these limitations in terms of measuring productivity, we opted for a qualitative methodology, in that case, the face-to-face interviews offer proximity to the interviewees that enables us to question in-depth in order to measure productivity. Thereupon, as we already mentioned, we measured the productivity by asking the interviewees about the benefit created compared to the time spent on social networks.

The most representative target group for this phenomenon is professional and managerial employees who use social networks in the context of their tasks and work.

5. Conclusion

Our research topic was built deductively based on the results of the exploratory study. In fact, our objective at the beginning of our research was the analysis of the relationship between the generated stress by ICTs and the productivity. However, after the exploratory study that was carried out under a positivist perspective and a qualitative methodology, we had to reorient the study towards social networks given the unfeasibility of reassembling all technologies in the same model.

Following up with the results of the exploratory study, we reformulated the hypothesis and the model by adding a new parameter and eliminating others, we also reformulated the research question to the following: **How can we explain the impact of the stress induced by social networks use at work on user's productivity?**

Furthermore, the next step will be a qualitative confirmatory study (positivist approach by deduction) with the aim of trying to answer the research question more adequately. The study will be conducted with SMMs via semi-directive interviews to confirm or invalidate the formulated hypothesis.

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