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### ► To cite this version:

Anne Aguilera, Leslie Belton Chevallier, Caroline Guillot, Laurent Proulhac. Measuring the incorporation of mobile phone into everyday life and travel behaviour Methodology and main results of a survey. EUROPEAN TRANSPORT CONFERENCE, Nov 2011, Glasgow, United Kingdom. 20 p. hal-00696460

**HAL Id: hal-00696460**

**<https://enpc.hal.science/hal-00696460v1>**

Submitted on 21 May 2012

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# Measuring the incorporation of mobile phone into everyday life and travel behaviour

## Methodology and main results of a survey

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### Abstract

This paper has two goals. Firstly, it aims at proposing a method for the measurement of spatio-temporal continuity (*via* the concept of reachability), flexibilisation of life and permeability between private and professional activities by using quantitative data and by focusing on situations of mobility which we think are crucial regarding the links between mobile phone use and transformations in lifestyles. Secondly, the objective of the paper is to test the hypothesis under which these transformations are gradual and depend on the duration of use of the mobile phone (process of appropriation): in other words we hypothesize that the more people are familiar with the mobile phone, the more the evolutions mentioned above (reachability, flexibilisation and blurring of the boundaries) can be observed. Data come from an original survey of 2,000 French adults made in the spring 2008. Results confirm that the more the people are familiar with the mobile phone, the more they use it to communicate and coordinate with friends and family, and the more the mobile phone is incorporated into their everyday life. In addition, the more people are familiar with the mobile phone, the more they use it while on the move. Finally, the process of flexibilisation of everyday life and of blurring between private and working life is growing with the duration of ownership. Moreover results that the flexibility of everyday life and the level of improvisation are tend to increase with the duration of ownership.

### 1. Introduction

The question of the relationship between the diffusion of communication tools and the physical mobility of individuals is not new and arose with the arrival of the fixed telephone and, more recently, the

development of the Internet and especially the e-commerce. The extraordinary diffusion of individual and especially portable communication tools, like the mobile phone, has recently given a new impetus to this topic in the fields of transportation economics, geography and sociology (Aguiléra and Guillot, 2010). The researchers in question consider that it is not so much the relationship between the use of technologies and the number of trips which is of interest as the potential changes in the nature of trips and their circumstances as a result of the gradual changes in our lifestyles these technologies bring about (Mokhtarian, 1990). The view that is taken is that mobile ICTs will gradually enrich our spatial and temporal practices (Ling and Haddon, 2003). Indeed, the widespread use of mobile technologies and especially mobile phones holds the potential to transform everyday life and especially travel behaviour in many complex dimensions. In particular since the mobile phones can be used when people are on the move or, more generally, outside homeplace and workplace, offers a possibility of spatio-temporal continuity for everyday activities. People are henceforth constantly reachable, while in reality they can control for it (they can switch the phone off, they don't answer systematically, etc.) (Aguiléra et al., 2009).

Spatio-temporal continuity can contribute to make evolve many aspects of everyday life: in particular, mobile phone usage makes people more likely to shorten their planning horizon (Hjorthol, 2008) and to adopt more flexible lifestyles: indeed, they can call when they are late, when they have forgotten the shopping list, they can meet friends more spontaneously, call when they are late, etc. In addition, mobile phone usage can contribute to blur the boundaries between family life and working life and also to make private and public time more permeable (Quan-Haase and Collins, 2008; Wacjman et al., 2008). However, these aspects are difficult to appreciate, especially quantitatively, and most existing studies in this field use quantitative data that are generally based on interviews.

This paper has two goals. Firstly, it aims at proposing a method for the measurement of spatio-temporal continuity (*via* the measurement of reachability), flexibilisation of life and permeability between private and professional activities by using quantitative data and by focusing on situations of mobility which we think are crucial regarding the links between mobile phone use and transformations in lifestyles. Secondly, the objective of the paper is to test the hypothesis under which these transformations are gradual and depend on the duration of use of the mobile phone (process of appropriation): in other words we hypothesize that the more people are familiar with the mobile phone, the more the evolutions mentioned above (reachability, flexibilisation and blurring of the boundaries) can be observed.

The second section of the paper gives a review of literature on the relationship between the processes of appropriation and incorporation of the mobile phone, and presents some of the transformations of everyday life and the links with the situations of mobility. The third section presents the data and the methodology. Data come from an original survey which provides elements about the use of mobile phone especially when people are on the move (in the street, in a car, in public transport), and also in a certain number of places (like airports). It consisted of a survey by questionnaire of 2,000 French adults made in the spring 2008 in the framework of the MOBITIC project founded by the French National Agency for Research (ANR). The fourth section uses several indicators to provide evidence that the duration of

ownership of the mobile phone influences its use and also its level of incorporation into everyday life. The fifth section analyzes the relationship between the duration of ownership, individual reachability and the blurring between private and professional life. The sixth section concerns the links between the duration of ownership and the flexibilisation of everyday life. Finally, the conclusion summarizes the main findings and proposes several directions for future research in this field.

## **2. Literature review**

### 2.1 - The processes of appropriation and incorporation of the mobile phone in everyday life

#### *The social and individual appropriation*

Mobile phone has spread rapidly, becoming an essential tool for a major part of the population: in just five years (from 1997 to 2002), the number of mobile phone owners in France increased from 3.5 million to 37.8 million (Jauréguiberry, 2003). The mobile phone has spread eight times faster than the landline phone, and also faster than the personal computer (Credoc, 2001). If, in June 2002, almost one out of two people had a mobile phone, in June 2003, almost two out of three possessed one (Credoc, 2003). The data of 2004 given by Chronopost Institute show that 77% of the working population had at least one mobile phone. 67% were for personal using and 18% for professional using (which the invoice is paid by the employer) (Cette, 2005). The mobile phone is therefore widely spread in France. This reflects a successful social and also individual appropriation (Afom, 2007). Indeed, mobile phone is getting a new profile. It has been becoming a banal object but not a “forgettable” one. On the contrary mobile phone has become an essential object, completely integrated into our everyday lives (Martin, 2007) and our identity (Amri and Vacaflor, 2010). In other words, mobile phone is appropriated into individual and collective lifestyles, habits and routines (De Certeau, 1990; Flichy, 1995; Silverstone and Haddon, 1996; Katz, 2003).

#### *Forms and intensity of appropriation*

However appropriation can take different forms. It can be total, and in this way literature speaks about incorporation: the mobile phone becomes part of the body, it is a “technology of the self” (Amri and Vacaflor, 2010). This is the interpretation of a sort of domestication of the mobile phone (Silverstone et Haddon, 1996). When Kaufmann (2001) points up his theory of incorporation, he explains that this familiarity with the body lessens any reflexivity. The mobile phone is then used by automatism permitting to reply to social requirements. The problem is that this incorporation can be limited by considering the phone as a non-essential object rather than a part of the self.

But appropriation does not always mean incorporation. Indeed the use of the mobile phone can be limited by external factors and directed by some explicit rules. For instance, mobile phone is forbidden while driving or travelling by train in order to not disturb other people. In addition, individuals set themselves some constraints (for example by turning off they phone to avoid being constantly reachable). These constraints reflect a limited incorporation.

Appropriation and incorporation can be appreciated by many indicators, such as the characteristics and the features of the tool itself (small, personalized ring tone, etc.). As Martin (2007) explained, the size of

the tool may become a decisive factor. According to its size, the mobile phone can be placed in the pocket, then close to the body, or worn in the belt, or in the handbag, or not. The way of using the tool and carrying it are evidences of the individual appropriation of the mobile phone. Others indicators can be used, such as the number of phone calls (and/or SMS) given and received during a typical day, but also the act of turning off the phone or not, returning for it or not if it's forgotten at home, looking at it constantly during a meeting or after class, etc.

Furthermore, many variables (such as age or generation) can be associated with different forms of appropriation. In this paper, we will focus on the length of ownership of the mobile phone. Surprisingly this variable has seldom be used to analyze the process of incorporation of the new technologies. In this paper, we assume that the more people are familiar with the mobile phone, the more they use it and the more it contributes to make evolve their daily life because of an individual learning<sup>1</sup> process. The evolutions in question concern the reachability of the individuals the permeability of their activities, but also the increase of more flexible and more improvised lifestyles.

## 2.2 - Extended reachability

As previously explained, the paradigm of appropriation consists in addressing issues of use and integration of the mobile phone into the everyday life. The way individuals use the mobile phone to communicate (chat with others and socialize) or to coordinate (to schedule a meeting for example) enables to account for the forms of appropriation of the device, and moreover, for the changes in their relationship with time and space.

In theory, mobile devices, including mobile phone, provide greater spatiotemporal continuity of everyday activities: they afford new possibilities for performing activities, in particular during journeys (Laurier, 2004) or more broadly nomadically i.e. in situations of mobility (when in transit in an airport, in a hotel, etc.). Hence a growing number of activities, both private and professional, are no longer systematically associated with particular locations. In particular our reachability is theoretically unlimited or at least greatly extended through space and time. While the office or home phone is explicitly connected to the person's geographic location and either professional or private life, the mobile phone is primarily a personal communications tool that connects to a person in different locations as well as between these locations. By permanently having a mobile phone on our person, we cancel out spatiotemporal barriers in a way.

In theory too, a person can contact and be contacted at any time and in any place as long as that person has his or her mobile phone. The main point is that periods of reachability extend to situations of mobility and travel, in other words to all places that are not traditionally "fixed" (home, office) where the presence of a landline (whether it be personal or not) allows us to expect to contact someone or to be contacted.

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<sup>1</sup> Some studies focused on the process of ICT learning, but far less on the uses of mobile phone and personal computer (Le Douarin, 2002; Lelong 2002). Some of them, especially focused on the mobile phone, dealt with the steps of development of the self in order to explain, for example, how teenagers could intensively use mobile phone (Ling and al., 1999).

But the mobile phone also expands reachability to include these “fixed” locations, at times when previously one would have been hard to reach: during a meeting, at lunch break, etc. The reachability during mobility becomes a “new” practice of communication (new because newly inscribed in space):

*“To use a phone while walking in the street seemed incongruous few years ago. It is not a “natural” attitude, except for technophiles people always looking for new behavioural practices. But we observe that people, including those reluctant to this practice, eventually adopt it, for it is an almost mechanical result of the fact that mobile phone has become individualized and a companion in their daily trips because it is in their pocket. People will then answer to calls they receive on the street or call other people to optimize a “free” time. The use eventually spreads. The street is no longer a place removed from a communication practice previously reserved for specific places (home, workplace, public booth for specific purposes such as constrained calls)”* (Rallet et al., 2009)

In the context of a geographical space meshed with interfaces for physical meetings and virtual connections, *“individuals become potentially reachable anywhere, any time, in the form of connections in mobile situations (possibility to connect during a travel but not while physically moving during the communication) or during mobility (while physically moving)”* (Rallet et al., 2009). However reachability can be the subject of “multiple small trade-offs” (Licoppe, 2002) and people can choose to voluntarily limitate their reachability during certain period of time or in certain locations (Aguiléra et al., 2009).

In this context, our hypothesis is that the longer the individual owns a mobile phone, the more he/she tends to be reachable, especially during the situations of mobility. Thus, individuals who put limits to this reachability would be those for whom incorporation is limited, and for whom the length of ownership of a mobile phone is short.

### 2.3 - Permeability of activities

Extended reachability can indisputably contribute to blur the borders (which were not impenetrable anyway) between private and professional life, between the reachability for private reasons and the reachability for personal reasons. This is due, in part, to the fact that for most people the mobile phone is both private and professional. It is also because a telephone number is no longer a synonym for a particular location and therefore a particular activity, since the mobile phone moves with the person. Rey and Sitnikoff (2004) also emphasize that it is more and more usual to work during meeting or travelling, to take work at home or to notice how work tasks take a growing part on our domestic life. Inversely, private life is increasingly invading professional life. Bardin (1986), in his statement *Private communication in the place of work*, emphasizes on the importance of this phenomenon and on the regularity of some communication private practices at work especially with the members of the household.

In this paper, we assume that the longer the duration of ownership of a mobile phone contribute to accentuate the phenomenon of overlap between the spheres. In other words, the more someone is familiar with the mobile phone, the more he uses it in both private and professional spheres, for both private and professional reasons.

## 2.4 - Flexibility and improvisation

Mobile ICTs make it possible to rearrange activity schedules more often, and some researchers take the view that improvisation is becoming more prevalent and that a shift is taking place towards “real time” operation with greater flexibility in both private and professional spheres (Aubert, 2004; Line et al., 2010; Townsend, 2000). Indeed, in theory the mobile phone allows to report a decision until the last minute, e.g. to live in “real time” or in a “very short time” (Guillaume, 1994; Jarvenpaa and Lang, 2005). Thus the individual would be tempted to constantly improvise by reprogramming his/her day continually and to become more flexible by shortening his/her planning horizon (Hjorthol, 2008). As a result a culture of improvisation could develop, but also a culture of emergency (Jaureguiberry, 2003). People could be able to make more activities (including communication with other people) during a day, but each activity could be shorter, or more fragmented (Lenz and Nobis, 2007), and/or some activities could overlap. This hypothesis is still discussed insofar as, on the one hand, activity schedules remain highly structured, both spatially and temporally, by social and institutional norms that have remained largely unchanged (Green, 2002) and, on the other hand, individuals construct resistance strategies: for instance they do not systematically answer to phone calls (Aguiléra et al., 2009; Belton and De Coninck, 2006). This does not mean that there have not been any changes. Indeed we can observe some lessening of rigidity, particularly as a result of mobile telephones: there is less pressure to be on time, members of the household can rearrange some activities in real-time, especially appointments (Hjorthol, 2008), and there is less prior organization of the time and place of meetings.

In that respect our hypothesis is the following: the mobile phone users improvise more and have more flexible lifestyles when they have owned the phone for a long time. In other words resistance to flexibilisation and improvisation is supposed to be higher among new users but also among non users.

## **3. Data and methodology**

### 3.1 - The MOBITIC survey

The MOBITIC project involved fifteen French researchers from various organizations and disciplines over a three-year period (2007-2010). The group’s objective was to shed light on the relationship between the usage of mobile communications devices, particularly the mobile phone, and individual physical mobility. While the question of the links between the development of personal communications devices and individual physical mobility is not a new one the dramatic spread of personal communications devices in general – and mobile ones such as the mobile phone in particular – has brought new attention to this issue in fields such as the economics of transportation, geography and sociology.

One of the most important facets of the MOBITIC project was the telephone survey, which aimed to gather information on:

- Mobile phone uses
- Practices of everyday mobility (including mobile phone usage on the move)
- The organization of everyday life

- Social and family networks
- Individuals' socio-economic situation and their household

The survey was carried out in the spring of 2008. It involved 2,040 respondents living in France and over the age of fifteen. Of these 2,040 people, almost 71% (1,626) had a mobile phone. By only looking at the adults (more than 18 years old), 80% of the people surveyed in the MOBITIC project in 2008 have a mobile phone which is consistent with the fact that in 2008 79% of the French adults had a mobile phone (CREDOC, 2009).

### 3.2 - A comparison between four groups of individuals

To analyze the incorporation of mobile phone into everyday life four groups of individuals have been compared in this study (Table 1). Three of them are composed of people who have declared to hold at least one mobile phone. They are differentiated by the duration of ownership: people have a mobile phone for less than 2 years in the first group, between 2 and 5 years in the second and for more than 5 years in the third group. The fourth group (20% of the sample) is a group of non users.

The choice of the duration was not simple due to the lack of literature on this subject. The “less than 2 years” mobile phone owners are supposed to be at the beginning of the process of appropriation. They learn how to use the phone and its functionalities (call, SMS, contact list, etc.). The “between 2 and 5 years” mobile phone owners are more mature and tend to use more functionalities. They may have had several phones and then may have experimented different ways to perform the same action. At the end, the “more than 5 years” owners are considered as the more skilled ones, those who have experienced different technologies, networks, etc. According to the diffusion cycle of mobile phone, the “less than 2 years” owners (those who acquire a mobile phone after 2006) are considered as laggards. The “between 2 and 5 years” owners (those who had their phone between 2003 and 2006) are the late majority and the “more than 5 years” gather the early majority, early adopters and innovators without distinction. It is important to emphasize on the experimental dimensions of this choice. These 3 categories appeared to be the most relevant in 2008. Nowadays the choice would certainly be different and intervals should be extended in order to fit to the diffusion of the mobile phone in France.

Finally people who don't have mobile phone are in the fourth group. We don't know if they have ever had one in the past. Nonetheless, we will consider the “no phone” people as those who have made the choice not to appropriate it (because they don't want or they can not afford). Several questions were asked to the four groups described bellow. But the main part was for the mobile phone owners. When it is relevant we will compare the four groups, but in most cases only the three groups of users will be considered.

*Table 1: 4 groups to distinguish different steps of appropriation among mobile phone owners*

<b>Mobile phone ownership duration</b>			
Group 1	Group 2	Group 3	Group 4
Less than 2 years	Between 2 and 5 years	More than 5 years	No mobile phone



	After 2006	2003-2006	Before 2006	Never or ?	
Numbers (Mobicit)	189	413	1027	414	2043
% (Mobicit) - 15 years old or more	9.2%	20.2%	50.3%	20.2%	100%
% (France) - 18 years old or more	4%	14%	60%	22%	100%

Sources: Authors and CREDOC (2009)

#### 4. Duration of ownership and process of incorporation into everyday practices

In this part of the paper and also in the following we aim at measuring and better qualifying the process of incorporation of mobile phone into everyday life and its relationship with different aspects of lifestyles. Therefore only the three groups of people owning a mobile phone are analyzed and compared. The objective is to show that the more people are familiar with the mobile phone, the more they use it and the more they are “dependent” on it i.e. the more it is incorporated into their everyday life.

##### 4.1 - Methodology

We propose to measure the incorporation of the mobile phone into everyday life by three questions. The first is classical and concerns the number of daily phone calls. The two others are more original and try to evaluate a sort of “dependency” to the mobile phone. First, each respondent was asked about the nature of the objects he would bring with him if he had to go during an entire day (without returning home). A pre-determined list of objects was proposed to the respondent, including of course the mobile phone, and several answers were possible. Second, each respondent was asked the following question: “Would you get your phone back if you noticed that you forgot it at home?” The yes answer means that the mobile phone is very important for the individual, that it is incorporated into his/her life.

##### 4.2 - Results

As expected, the daily number of phone calls is positively associated with the duration of ownership (Table 2): the longer the ownership of the mobile phone, the more calls the person makes. A similar result had previously been found by K. Aoki and E.J. Downes (2003) concerning the number of received calls.

Table 2: Mobile phone ownership duration and number of average declared daily number of mobile phone calls

	Daily number of phone calls							Total
	0	1	2	3	4	5	6 and +	
<i>Less than 2 years</i>	21 (11,1%)	64 (33,9%)	39 (20,6%)	17 (9,0%)	6 (3,2%)	20 (10,6%)	22 (11,6%)	189 (100,0%)
<i>Between 2 and 5 years</i>	42 (10,2%)	133 (32,4%)	86 (21,0%)	59 (14,4%)	14 (3,4%)	35 (8,5%)	41 (10,0%)	410 (100,0%)
<i>More than 5 years</i>	64 (6,2%)	292 (28,4%)	201 (19,6%)	108 (10,5%)	57 (5,6%)	130 (12,7%)	175 (17,0%)	1027

(100,0%)

	127	489	326	184	77	185	238	1626
Total	(7,8%)	(30,1%)	(20,0%)	(11,3%)	(4,7%)	(11,4%)	(14,6%)	(100,0%)

Khi<sup>2</sup> = 36.48 ; DF = 12 ; p<0.01

However the process of incorporation of mobile phone into everyday life is better described by the way that each group of people has answered to the two other questions which tried to evaluate the level of mobile phone “dependency”.

First, we observe that the longer the ownership, the more people declare that they would bring their mobile phone with them (Table 3). The second question asked people if they got their mobile phone back when they have forgotten it at home. The second part of Table 3 shows clearly that people are more likely to get their phone back if they own a mobile phone since more than 2 years and especially more than 5 years. These results confirm the hypothesis upon which mobile phone is progressively incorporated into everyday life and tends to become essential to the individual’s everyday activities.

Table 3: Mobile phone ownership duration and need of mobile phone in everyday life

	Would you bring your mobile phone if you should leave a whole day?		Would you get your phone back if you noticed that you forgot it at home?		
	No	Yes	No	Yes	Total
<i>Less than 2 years</i>	45 (23.8%)	144 (76.2%)	132 (70%)	57 (30%)	189 (100%)
<i>Between 2 and 5 years</i>	69 (16.8%)	341 (83.2%)	275 (67%)	135 (33%)	410 (100%)
<i>More than 5 years</i>	102 (9.9%)	925 (90.1%)	588 (57%)	439 (43%)	1 027 (100%)
Total	216 (13.3%)	1 410 (86.7%)	995 (62%)	631 (38%)	1 626 (100%)

Khi<sup>2</sup>=32.6 ; FD=2 ; p<0.001      Khi<sup>2</sup>=18.6 ; FD=2 ; p<0.001

The analysis of other questions of the MOBITIC survey will now help us to precise the relation between mobile phone and everyday life, i.e. the way the mobile phone is used to make evolve several aspects of everyday life: reachability, the relationship between private and professional life, and finally flexibility and improvisation.

## **5. Reachability in mobility and permeability of private and professional activities**

This fifth part aims at verifying the existence of a positive relation between the ownership duration, the reachability of the mobile phone user and the permeability between his/her everyday activities, especially between the private and the professional activities. For this purpose we analyze the extent to which people make them reachable and communicate, especially in different situations of (physical) mobility.

### 5.1 - Methodology

One of the questions asked to the people who had a mobile phone regarded how they felt when they got a call while on the move. The exact formulation of the question, and the suggested responses, were as follows:

“When you are on the move do you answer calls?”

Answer 1: Almost always, unless something crops up.

Answer 2: Only important ones.

Answer 3: No – I listen to my messages and read my text messages.

Answer 4: No, never.

To simplify and to have correct statistical tests, answers 1 and 2 were gathered in “Always and Sometimes”.

The question below has also been asked for different typical situations of mobility (in a bar, in an airport, etc.) in order to precise where exactly do people answer their calls and so where they feel comfortable or not uncomfortable enough to hang up. The selected places were: on the street, on a bar/coffee, in public transport, in a car, in a train station and finally in an airport. In these cases, the possible answers were labelled as frequency (Often, Sometimes, Never). Again answers 1 (often) and 2 (sometimes) are gathered in the above tables for statistical reasons. These questions aimed at verifying if people were really reachable “every time and in every place”. Moreover, we wanted to analyze if ownership duration could explain the attitude toward reachability in mobility.

In addition, the permeability between professional and personal life has been measured in three ways. A first question concerned the reachability of people for personal reasons at the workplace. A second question asked people about the propensity to receive professional calls outside working hours. Finally people were asked about the inconveniences of the mobile phone and the nature (private or professional) of these inconveniences.

### 5.2 - Reachability and communication in mobility

Table 4 indicates that old users (group 3) are more likely to answer calls during travel than recent users. The difference is relatively slight but nonetheless statistically significant. This is a first confirmation of the hypothesis upon which the mobile phone contributes to the process of construction of spatio-temporal continuity of everyday activities. It confirms several previous studies showing that mobile phone is used to

coordinate with household members and friends on an almost real-time basis (Licoppe, 2002). However the MOBITIC survey shows that there is no difference between group 2 and 3 which suggests that only new users (those who have a cell phone for less than 2 years) behave differently during travel. After 2 years we don't observe any difference in terms of call answering (reachability) during travel.

Table 4: Mobile phone ownership duration and attitudes toward phone calls during travel time

	Answers always or sometimes	Don't answer but check messages	Never answers	Total
<i>Less than 2 years</i>	148 (78%)	25 (13%)	16 (9%)	189 (100%)
<i>Between 2 and 5 years</i>	349 (85%)	47 (11%)	14 (4%)	410 (100%)
<i>More than 5 years</i>	879 (86%)	115 (11%)	33 (3%)	1027 (100%)
Total	1 376 (85%)	187 (11%)	63 (4%)	1 626 (100%)

$$\text{Khi}^2 = 13.25 ; \text{DF} = 4 ; p < 0.05$$

Furthermore, Table 5 shows that the duration of ownership positively influences the probability to call on the mobile phone from various types of places. However the differences between the groups are more or less important according to the type of place, which constitutes another interesting result. More precisely we find that the difference between our three groups of users is narrow (while remaining statistically significant) for the coffees/bars and the streets. Only 10% of the respondents declared to make phone calls from a coffee or a bar (frequently or from time to time) which underlines the weight of social norms but also reflects the fact that the survey has been made in 2008: the proportion is probably higher today. Anyway the proportion of people who declared to make phone calls from coffee or bars is twice as high for old users (group 3) compared with new users (group 1).

Phone calls from the street are largely more frequent for all the groups of users: in average the three third of the respondents communicate when they are in the street. However people who hold a mobile phone for more than 5 years (group 3) are more likely to call from the street than the others (groups 1 and 2), even if the difference is narrow.

The difference between the three groups is larger when we consider two other kinds of places (cars and airports/railway stations) for which the duration of ownership increases significantly the propensity to make phone calls (Table 5). Again, the difference is larger between on the one hand groups 2 and 3 and on the other hand group 1 (new users).

These findings suggest that the first two years of use are an important period of incorporation of mobile phone into everyday practices.

Table 5: Mobile phone ownership duration and attitudes toward phone calls in different places

In a pub or in a café			
	Yes Often and Sometimes	No Never	Total
<i>Less than 2 years</i>	12 (6.5%)	172 (93.5%)	184 (100.0%)
<i>Between 2 and 5 years</i>	30 (7.5%)	370 (92.5%)	400 (100.0%)
<i>More than 5 years</i>	112 (11.2%)	889 (88.8%)	1001 (100.0%)
Total	154 (7.0%)	1431 (90.3%)	1585 (100.0%)

Khi<sup>2</sup> = 7 ; DF = 2 ; p<0.05

In the street			
	Yes Often and Sometimes	No Never	Total
<i>Less than 2 years</i>	134 (70.9%)	55 (29.1%)	189 (100.0%)
<i>Between 2 and 5 years</i>	289 (70.8%)	119 (29.2%)	408 (100.0%)
<i>More than 5 years</i>	784 (76.6%)	240 (23.4%)	1024 (100.0%)
Total	1207 (74.5%)	414 (25.5%)	1621 (100.0%)

Khi<sup>2</sup> = 6.46 ; DF = 2 ; p<0.05

In public transportation			
	Yes Often and Sometimes	No Never	Total
<i>Less than 2 years</i>	62 (33.3%)	124 (66.7%)	186 (100.0%)
<i>Between 2 and 5 years</i>	138 (34.3%)	264 (65.7%)	402 (100.0%)

<i>More than 5 years</i>	301 (30.0%)	702 (70.0%)	1003 (100.0%)
Total	501 (31.5%)	1090 (68.5%)	1591 (100.0%)

Khi<sup>2</sup> = 2.81 ; DF = 2 ; ns

<b>In car</b>			
	Yes Often and Sometimes	No Never	Total
<i>Less than 2 years</i>	79 (42.7%)	106 (57.3%)	185 (100.0%)
<i>Between 2 and 5 years</i>	216 (53.5%)	188 (46.5%)	404 (100.0%)
<i>More than 5 years</i>	566 (56.1%)	443 (43.9%)	1009 (100.0%)
Total	861 (53.9%)	737 (46.1%)	1598 (100.0%)

Khi<sup>2</sup> = 23.19 ; DF = 2 ; p<0.001

<b>From a train station or an airport</b>			
	Yes Often and Sometimes	No Never	Total
<i>Less than 2 years</i>	71 (38.4%)	114 (61.6%)	185 (100.0%)
<i>Between 2 and 5 years</i>	191 (47.4%)	212 (52.6%)	403 (100.0%)
<i>More than 5 years</i>	537 (53.2%)	473 (46.8%)	1010 (100.0%)
Total	799 (50.0%)	799 (50.0%)	1598 (100.0%)

Khi<sup>2</sup> = 15.14 ; DF = 2 ; p<0.001

### 5.3 - Permeability between private and professional life

As expected the MOBITIC survey suggests that the permeability between everyday activities is positively correlated with the duration of ownership of a mobile phone.

On the one hand, we observe that reachability at the workplace increases with the duration of ownership (Table 6): people are more likely to answer personal calls at the workplace when they own a mobile phone for more than 2 years. Indeed, the difference is larger between those who hold a mobile phone for more than 2 years (groups 2 and 3) and the new users (less than 2 years, group 1) than between group 2 (between 2 and 5 years) and group 3 (more than 5 years). It is consistent with another result of the survey: the frequency of use of the mobile phone with family and friends also increases with the duration of ownership but there is quite no difference after 2 years of ownership.

On the other hand, the permeability between private and professional life is confirmed by the fact that the frequency with which workers receive professional calls outside working hours increases with the duration of ownership (Table 7). Contrary to previous result group 1 (less than 2 years) and group 2 (between 2 and 5 years) differentiate from group 3 (more than 5 years). Hence it seems that people are more likely to make professional life more permeable to private life than the contrary, which is confirmed by other studies (Belton, 2011).

Table 6: Reachability at the place of work/study for personal calls

	Always	Only to important calls	Only listen the message	No reaction	Total
<i>Less than 2 years</i>	43 (30.9%)	18 (12.9%)	51 (36.7%)	27 (19.4%)	139 (100.0%)
<i>Between 2 and 5 years</i>	95 (32.2%)	61 (20.7%)	102 (34.6%)	37 (12.5%)	295 (100.0%)
<i>More than 5 years</i>	291 (43.5%)	145 (21.7%)	179 (26.8%)	54 (8.1%)	669 (100.0%)
Total	429 (38.9%)	224 (20.3%)	332 (30.1%)	118 (10.7%)	1 103 (100.0%)

$\text{Khi}^2 = 35.24$  ;  $\text{DF} = 6$  ;  $p < 0.001$

Table 7: Frequency with which workers receive professional calls outside working hours

	One call par day at least	One call per week at least	Fewer than a call per weak	Total
<i>Less than 2 years</i>	12 (16.0%)	15 (20.0%)	48 (64.0%)	75 (100.0%)
<i>Between 2 and 5 years</i>	21 (11.2%)	29 (15.4%)	138 (73.4%)	188 (100.0%)
<i>More than 5 years</i>	122 (20.0%)	138 (22.7%)	349 (57.3%)	609 (100.0%)

Total	155 (17.8%)	182 (20.9%)	535 (61.4%)	872 (100.0%)
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$$\text{Khi}^2 = 16.28 ; \text{DF} = 4 ; p < 0.01$$

Because reachability and permeability between everyday activities increases with the duration of ownership, the proportion of mobile phone users who declare that new technologies (especially the mobile phone) causes inconveniences in terms of solicitation/disruption/disturbance is greater among old users (group 3): they are 35% in group 3 but 30% in the two others groups. Moreover the MOBITIC survey made a difference in term of the nature (private or professional) of these inconveniences. Results show that private reasons are seldom mentioned and that in addition the answer to this question does not differ from the three groups. Professional reasons are more frequently mentioned and interestingly they are more frequently mentioned by old users (group 3) than by recent users (group 1 and 2) even if the difference with the two other groups is narrow (but remains statistically significant). It tends to demonstrate that the overlap of private and professional spheres is appreciated only in one sense.

## 6. Flexibility and improvisation

In this sixth part we compare the three groups of users and (when it is relevant) the group of non users (group 4). The objective is to test the hypothesis under which the duration of use of a mobile phone leads to more flexibility and more improvisation.

### 6.1 - Methodology

The quantitative measurement of concepts like flexibility and improvisation is very difficult especially because these concepts partially overlap. Therefore they can not be measured by only one question. The MOBITIC survey proposed a set of four question concerning different situations of everyday life. Most of them were also asked to the non users.

A first question concerned the management of unexpected events. All respondents were asked if they felt that the mobile phone helped them to manage unexpected events. The three other questions were about coordination practices with colleagues, friends and relatives. Thus, a second question concerned the attitude when going to a meeting: people were asked if they were used to inform the other participants about their arrival (systematically, only in case of a delay, or never). A third question was about the attitude before going out with friends: respondents were asked if they were about their attitude towards planning (high, smooth, or improvisation). A fourth and last question asked people if they were used to call about the shopping list during shopping. The first three questions deal with both flexibility and improvisation whereas the fourth concerns more exclusively improvisation.

### 6.2 - Results

#### *Management of unexpected events*

In average 38% of the individuals have declared that the mobile phone helped them to manage unexpected events which can be interpreted both in terms of flexibilisation and improvisation (Table 8). This proportion is remarkable similar in the three groups of users (about 43%) but is notably smaller for



the group of non users (84%). Therefore it seems that users tend to perceive immediately the benefits of mobile phone in terms of management of unexpected events while non users do not evaluate such benefits.

Table 8: Management of unexpected events

	No	Yes	Total
<i>Non users</i>	348 (84%)	66 (16%)	414 (100%)
<i>Less than 2 years</i>	108 (57%)	81 (43%)	189 (100%)
<i>Between 2 and 5 years</i>	240 (58%)	170 (42%)	410 (100%)
<i>More than 5 years</i>	573 (56%)	454 (44%)	1027 (100%)
<b>Total</b>	<b>1269</b> <b>(62%)</b>	<b>771</b> <b>(38%)</b>	<b>2040</b> <b>(100%)</b>

$$\text{Khi}^2 = 106.45 ; \text{DF} = 3 ; p < 0.001$$

#### *Coordination practices*

The MOBIIIC survey shows that the mobile phone is frequently used to confirm one's attendance at a meeting when one is delayed (Table 9). This result complements other studies showing how mobile phone creates a relaxed perception of punctuality among users (Geser, 2004) which is a sign of flexibilisation. However, no difference is observed between the three groups of users: therefore it seems that this flexibility offered by the mobile phone is quite immediately incorporated into everyday practices. Our survey shows also that non users do not inform when they are late, which is not surprising but tends probably to become less and less socially accepted with the diffusion of the mobile phone.

The attitude towards planning is more differentiated among users which suggests the existence of a process of shortening of the planning horizon. Indeed non users are more likely to plan their rendez-vous with friends whereas smooth planning is more frequent among mobile phone users which is consistently with our hypothesis (Table 9). However the proportion of people characterized by total improvisation does not differ between the four groups even if non users are less likely to improvise totally. In addition, we observe that recent users (group 1) are more likely to improvise totally and less likely to plan smoothly: may be in this case the process of incorporation leads people to realize that total improvisation is not a good choice (probably because it generates inconveniences) and between planning and total improvisation, the smooth planning allowed by the mobile phone is preferable.

Finally, we observe a huge difference between the three groups of users in terms of attitude during shopping, which is consistent with the hypothesis of progressive flexibilisation of everyday practices

together with ownership duration. Indeed the more people are familiar with the mobile phone, the more they are likely to call during shopping to ask for information about the shopping list.

Table 9: Coordination practices

<b>Attitude when going to a meeting</b>				
	Always inform	Inform if delay	Never inform	Total
<i>Non users</i>	56 (14%)	287 (70%)	65 (16%)	408 (100%)
<i>Less than 2 years</i>	23 (12%)	158 (84%)	7 (4%)	188 (100%)
<i>Between 2 and 5 years</i>	58 (14%)	333 (81%)	19 (5%)	410 (100%)
<i>More than 5 years</i>	112 (4%)	876 (86%)	36 (4%)	1024 (100%)
<b>Total</b>	<b>249</b> (12%)	<b>1654</b> (81%)	<b>127</b> (6%)	<b>2030</b> (100%)

$\text{Khi}^2 = 88.8$  ;  $\text{DF} = 6$  ;  $p < 0.001$

<b>Attitude before going out with friends</b>				
	Planned	Smoothly planned	Improvised	Total
<i>Non users</i>	152 (41.9%)	130 (35.8%)	81 (22.3%)	363 (100%)
<i>Less than 2 years</i>	56 (31.8%)	66 (37.5%)	54 (30.7%)	176 (100%)
<i>Between 2 and 5 years</i>	137 (35.5%)	152 (39.4%)	97 (25.1%)	386 (100%)
<i>More than 5 years</i>	289 (29.8%)	424 (43.7%)	257 (26.5%)	970 (100%)
<b>Total</b>	<b>634</b> (33.5%)	<b>772</b> (40.7%)	<b>489</b> (25.8%)	<b>1895</b> (100%)

$\text{Khi}^2 = 20.67$  ;  $\text{DF} = 6$  ;  $p < 0.01$

<b>Check something during shopping</b>			
	Almost systematically or from time to time	Rare or never	
<i>Less than 2 years</i>	52 (27.5%)	137 (72.5%)	189 (100%)
<i>Between 2 and 5 years</i>	130 (31.7%)	280 (68.3%)	410 (100%)
<i>More than 5 years</i>	406 (39.5%)	621 (60.5%)	1027 (100%)
<b>Total</b>	<b>588</b> (26.2%)	<b>1038</b> (63.8%)	<b>1626</b> (100%)

$\text{Khi}^2 = 14.7$  ;  $\text{DF} = 2$  ;  $p < 0.001$

## 7. Conclusion

This paper aimed at proposing a methodology for a quantitative measurement of different aspects of the link between mobile phone use and everyday life raised by recent literature: flexibility, improvisation, and increased permeability between private and professional life. Its objective was also to test the hypothesis under which these transformations (flexibility, improvisation and permeability) were progressive and went together with the duration of ownership of a mobile phone.

A survey has been made in France at the spring 2008. Its originality was that it largely focused on the use of mobile phone in different situations of mobility: when people are on the move or more generally when they are outside homeplace and usual workplace, or when they have to meet colleagues or friends. Indeed existing literature in the field of the link between ICTs and travel has mainly focused on the relation

between mobile ICTs and use of travel time (Lyons, 2008) and less on the link between the use on the move and the transformations of everyday life in terms of coordination and spatio-temporal organisation of activities.

Results tend globally to confirm our hypothesis. The more the people are familiar with the mobile phone, the more they use it to communicate and coordinate with friends and family, and the more the mobile phone is incorporated into their everyday life. In addition, as expected uses on the move are different according to the duration of ownership. The more people are familiar with the mobile phone, the more they use it while on the move. First, they are more likely to answer phone calls. It means that they make themselves progressively more reachable during travel because the mobile phone is progressively becoming essential. Second, they are also more likely to make phone calls during travel. However the difference between people according to the duration of ownership is greater when people travel by car than by public transport or when they are walking on the street probably because a period of time is necessary to overcome social norms in certain places and not in others. Finally, the flexibility of everyday life is greater for mobile phone users than for non-users and the process of flexibilisation of everyday life and of blurring between family and working life tends also to increase with the duration of ownership. However our data show that flexibility and improvisation remain limited which confirm other studies showing that activity schedules remain highly structured, both spatially and temporally, by social and institutional norms that have remained largely unchanged despite the growing use of mobile ICTs (Green, 2002). In addition our study suggests that people built strategies to avoid being totally flexible and finally disorganized and constantly disturbed.

This work has of course several limits. Firstly, it uses only quantitative data which are sometimes difficult to explain: qualitative data are now needed to better explain our findings. Secondly, the data are old given the recent technological evolutions: for instance today most mobile phone users have the Internet which was not the case in 2008. Nonetheless, we hope that this paper brings some methodological improvements in the large field of the relation between mobile phone, travel behaviour and everyday life. It also points out the need for better understanding of non users.

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