THE UNIVERSITY OF HULL

Three-dimensional Conversation

The Shift to a Public, Asynchronous and Persistent Exchange in Malta

being a thesis submitted for the Degree of Philosophy

in the University of Hull

by

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November, 2013

Abstract

An observation of the evolution of the marketing messages of Telecommunications Company Vodafone between 2007 and 2013 sheds light on the significant changes that occurred in the communications arena throughout this period. The shift is not a hypothetical one; it is real and reflected in the shifting usage profiles of millions of mobile users. Moreover the shift is not limited to the changes in the technology which enables mediated conversation. Reference is made to existing literature to define the activity under study, understand the historical context of conversation, both in the mobile and online space, measure the present shifts and explore how findings can contribute to a better understanding of the future. In the context of the existing body of work and the significant changes that occurred over the past years, the research aims to propose a new model of conversation in response to the chosen research question, which asks, "how is conversation evolving as a result of take up of new media in Malta?"

A two-step approach is adopted. The first research stream makes use of a data set of usage logs of a sample of smartphone adopters on the Vodafone network. A comparison of the usage logs before and after adoption is used to shed light on the influence of the device on the users' conversations. The analysis is supported with two secondary experiments, one relating to the usage of mobile Internet on specific days during the year and the other extending the experiment to everyday conversation on Facebook. The second research stream consists of a review of the new media landscape with a specific focus on key themes. The findings are used to corroborate a model of shifting conversation. The model proposes that conversation is captured in three dimensions - a shift from synchronous to asynchronous conversation, from private to public and from transient to persistent exchanges.

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Abbreviations

3G	Third Generation mobile network
CDR	Call Detail Records
CMC	Computer Mediated Communication
IRC	Internet Relay Chat
ISP	Internet Service Provider
OS	Operating System
OTT	Over-the-top Applications
SIM	Subscriber Identity Module
SVE	Shared Virtual Environments
VLSC	Very Large Scale Conversations
WELL	Whole Earth Electronic Link
WWW	World Wide Web

Acknowledgements

This project is surely the *craziest* thing I have ever done so far. It is *crazy* because of the extent of focus, patience and perseverance it has required. I am not fully to blame for the endeavor. Many have inspired me to focus on the area, appreciated the work with bucket loads of patience and helped me persevere till the end.

First and foremost I would like to thank my tutor Toni Sant. He is the one who made me do it! He has listened to my ideas, guided me along the way and answered my long list of questions. With him I would like to thank the rest of the team at the School of Arts and New Media and fellow students, not least Alex Grech.

Secondly I would like to thank the people who have appreciated the work and been patient enough with me. I would like to thank the team at Vodafone for sponsoring this work and supporting me with their advice and input. Thank you to close friends who have seen less of me but still encouraged me to get to the finishing line.

Thirdly, I would like to thank the people who have helped me persevere till the end. I would like to thank Andrew for setting my benchmark, my close friends and family who have read the material and given extensive feedback, including David, Glorianne, Miriam and Elizabeth. A big thanks to my parents who have seen me through it all.

Finally, I would like to thank Daniela. She inspires me to dream out loud in full colour and then gets her hands dirty to help me make it happen.

1. Introduction

1.1 Context

“Hello, How are you?” said a Vodafone campaign in 2007. While going into what looks like an open-air concert, amidst a crowd of fans who are running in to watch the act, one mobile user is answering her phone. In response, a series of situations follow, as if on the other end of the line. In one instance a family is stuck in traffic, in another instance a group of friends are in a limousine enjoying a night out. One could hypothesise that this thread of mediated interaction feeds into a common offline event such as the concert in the advert. Other instances include family time, attending a concert, being rescued or watching a game. The concluding scene of the advert is a wide angle of the crowd, possibly symbolising the size of the network. Just before the final scene, Vodafone’s advert states “the people you need are only a touch away” (Nickleics, 2007).

Years down the line, telephony has evolved. If one had to replay the same advert today, the crowd would be bigger, the phone would be slimmer, the antenna would be hidden, and one would be spoilt for choice on how to stay in touch. In a sense, the people you need would rarely be out of reach, they would already be up to date on how you are and a “hello” would not necessarily be the most appropriate thing to say.

In an advert Vodafone ran in the UK three years later (Jayflex, 2010) the setting is different – a couple are arguing before heading to work. The exchange continues in a mediated fashion and includes picture messaging, web searches and video sharing. The advert features no crowd and there is no conversation opening or closing. More importantly the advert features no voice calls or SMS. The shift towards new media alternatives as portrayed in the 2010 advert shifts the focus to the "data" part of the "voice-data-phone" trio from which Vodafone's name originated (Russell & Pitcher, 2011).

In 2013, yet another three years down the line, Vodafone launched The Kiss (Grey London, 2013), a global campaign promoting a set of new tariffs. The spot, which features a couple kissing as they grow up and age together, does not even hint at mediated communication. The brand is positioned as an enabler of life long intimate relationships; in whichever format the conversation occurs. A comparison of the adverts highlights the evolution of the brand positioning with reference to the interplay between user behaviour and technology affordances.

The three adverts mentioned above were produced at equally spaced points in time, spanning over six years. The adverts highlight a progression in the way the operator chose to portray communication, which is simply a reflection of the evolution of mainstream conversation. A comparison of the adverts side by side highlights a changing relationship between the user and the medium. In the first instance, the users just call each other whilst in the second advert, the conversation is varied and the user is always seen looking at the device screen rather than holding the device to his ear. This progression is a very powerful one. In the first advert, Vodafone is promoting the power of its technology offering to enable conversation, even when users are not in the same place. In the second advert the focus is on the new modes of conversation available on the phone. In the third advert, the medium is not important and the focus shifts on to the relationship.

Figure 1: Scenes from Vodafone's 'How are you?' advert campaign in 2007

Figure 2: Scenes from Vodafone's 'Power to you?' campaign in 2010

Figure 3: Scenes from Vodafone's Red advert campaign in 2013

The evolution in Vodafone's marketing messages sheds light on the significant shifts that occurred in the communications arena throughout this period. These shifts are not hypothetical; they are real and reflected in the shifting usage behaviour of millions of mobile users.

1.2 Objectives and significance of study

The objectives of this study are to:

a) Extend the literature relating to conversation by revisiting work from the social-sciences, computer-mediated communication and the wider communication literature.

b) Provide a model for the analysis of conversation in the new media. A three-dimensional model is formulated to this effect.

c) Assess the impact of enhanced and ubiquitous connectivity, taking smartphone adoption as a case study.

d) Gain a better understanding of the conversation going on in the new media.

e) Extend these findings into the future by providing a scenario analysis of the conversation space.

The starting point of the research is the act of conversation and the way new variants of the activity are being enabled by applications and connected devices. Specifically, this study is an investigation in the way conversation is evolving in the context of waves of change that occurred in the communications arena between 2007 and 2013.

On conversation, Goffman (1981:74) writes: "the box that conversation stuffs us into is Pandora's…on these occasions, it's not merely that the lid can't be closed [but] there is no box". The statement is ever so true when one considers the new ways for holding conversation. He makes reference to a set of complex rules that govern our face-to-face interactions and which we are mostly unaware of. In the author's terms, these rules "underpin how we make sense and navigate in our social world". As the online and offline worlds converge, and hence the mediated and face-to-face encounters make up one seamless conversation, it becomes more important to extend the inherent rules of conversation to the mediated space. Understanding the development of new interactive features being made available

on the sophisticated connected devices implies a better understanding of the changing rules of interaction.

Even in the mediated space these rules determine our behaviour in our social world. The more disruptive these developments and the faster the emergent behavior becomes mainstream, the more significant is the understanding of how this impacts conversation. As the online world is made accessible through smartphones, the choice between traditional means of communication and the new alternatives, made available as apps, side by side with the "Call Button", becomes part of the research inquiry. The wider choice is seen in how the conversation occurs and also in what goes into the conversation. Conversations can revolve around a textual-exchange, but even this is one of many other formats. The app ecosystem enables users to complement textual and verbal exchanges with images, videos and audio content, taking on the end-to-end architecture of the Internet and enabling different exchange formats and diverse modes of conversation (Naughton, 2012).

Previous work speaks about conversation moments (Goffman, 1963; 1981). Revisiting these moments in the context of always on connectivity brought about by ubiquitous mobile networks and sophisticated smartphone devices is an integral part of the research inquiry. Whilst the moments the research speaks about relate to encounters, bound by a common geographical location and a "small number of participants [that] come together", the new affordances enable users to go beyond the boundaries of space and time, carrying out conversation in large-scale social networks equivalent to crowds made up of thousand of users. This is by far not the first piece of research to revisit such conversation moments yet various works in the area take one of two perspectives - the technological or the social. As will be seen throughout Chapter 2 and 3, either perspectives are useful in understanding the evolving modes of conversation and excluding one or the other does not provide the full picture of what is really happening. In the present study the two aspects are tackled jointly. This stance is extremely useful as it focuses on the interplay between new technological affordances and the emergent user behavior, both of which shape conversation.

The environment in which the inquiry is being undertaken contributes to its significance. The research is carried out in Malta, the most densely populated country in the European region (Eurostat, 2014). Malta is a small island-state and this in itself adds value to the research inquiry, in that it presents particular characteristics that challenge norms in bigger regions. In this part of Europe, the community is closely knit, most people being related in some way and there is a high probability of encountering friends and family face-to-face. In the same period, the island has exhibited significant increase in the number of Internet subscribers and the uptake of new media services such as Facebook (Internet World Stats, 2014a, 2014b). This makes the choice to hold a conversation across media a user driven one, with the alternative face-to-face options being equally accessible. In this region, it is almost inevitable that conversation, both mediated and not, intertwine into one stream of exchanges. In this context, the local environment provides a good ground for the shift in conversation to be amplified with a certain level of intensity. [See Appendix 1 for full review of the Maltese case study]

Last but not least, the significance of the topic is also a result of the implications of conversation as the basic unit of communication (Goffman, 1981) and the way relationships evolve. Whereas archaeologists and historians often describe human history in terms of a series of ages, relating to the tools used at the time, such as the New Stone Age and the Bronze Age, human existence may also be described in terms of ages in which 'tools' for communication shaped the conversation, each impacting significantly on the social life of the time (DeFleur & Ball-Rokeach, 1989).

1.3 Research Questions

The main research question is:

How is conversation evolving as a result of take up of new media in Malta?

The study also aims to answer the following secondary questions:

a) *Which conversations are shifting to the new media and which are those that are not?*
b) *What does increased connectivity imply and which rules of social interaction are changing?*
c) *How will conversation evolve in the future?*

1.4 Conceptualising key terms

The following section reviews the key terms used in the study:

1.4.1 Conversation

The Oxford Dictionary defines conversation as "talk, especially an informal one, between two or more people, in which news and ideas are exchanged" (Oxford University Press, 2014). This is really a simple definition and as reviewed in this section, other more sophisticated ones exist in the scholarly literature. However, even this straightforward definition is not enough to capture the evolution of conversation triggered by the new media and the emergent user behavior. The definition follows older notions of conversation. For example, in eighteenth-century Britain, conversation referred to the informal interchange of information and ideas by spoken words (Miller, 2006). Both definitions emphasize talk in the form of spoken words; informality and the exchange of information, be it news or ideas, between people.

New technologies have enabled new ways for holding a conversation. One of the most basic is the mediation of the exchange through a phone call. It is the same exchange of information by means of spoken words, yet mediated and bridging geographical distances. In itself, the mediation extends the sense of presence that

face-to-face encounters carry with them. This changes the dimension of intimacy in conversation. From a notion of conversation as an intimate exchange to one that happens miles away and is abruptly concluded when one hangs up. Above all, it starts to widen the definition of conversation.

Adopting a socio-linguistic stance, spoken words can be broken down into replies and responses such that talk is seen as a communication system, justifying the structure of adjacency pairs and two-part exchanges (Goffman, 1981). Yet this view assumes a sequence made up of questions and answers. In everyday conversation this sequence is not always followed and some questions are answered much later in the exchange, or not given an answer at all. This leads Goffman to elaborate further on this two-part exchange approach. The notion of questions and answers is revised to an exchange made up of statements and replies. Further elaboration leads to the idea of conversation as a set of 'moves', as in a game. The idea of moves draws attention to the unspoken parts, which are still important to convey meaning. The replies per se may not be spoken words but merely utterances, both spoken and not. Note that answers can take not only a truncated verbal form but also a wholly non-verbal form, in this case a gesture serving solely as a substitute – an "emblem" to use the terminology of Ekman and Friesen (1969) – for lexical materials. This is even seen in instances of affirmation without spoken words:

> The first pair part establishes a conditional relevance in the time slot that follows. Whatever comes to be said there will be inspected to see how it might serve as an answer, and if nothing is said, then the resulting silence will be taken as notable – a rejoinder in its own right, a silence to be heard (Schegloff & Sacks, 1973:299)

This leads to the view of conversation as a more sophisticated exchange made up of interplay of verbal and non-verbal parts, leading researchers to state that "what is said is obscure; what is meant is obvious and clear" (Gunter, 1974:17). In fact, most of the debate comparing face-to-face encounters with mediated communication is the ability of the latter to replicate the non-verbal aspect of talk in its original form. At the same time, such a debate suggests that conversation is not simply the spoken bit exchanged between two people (or more) but a moment in time.

Hence an evolved definition of conversation declares it to be:

> "Talk occurring when a small number of participants come together and settle into what they perceive to be a few moments cut off from (or carried on to the side of) instrumental tasks; a period of idling felt to be an end in itself, during which everyone is accorded the right to talk as well as to listen and with reference to a fixed schedule" (Goffman, 1981:13)

The comparison of the mediated alternatives to the face-to-face encounter assesses the ability of the former to replicate the richness of the latter (Joinson, 2003). The mediation of spoken conversation through the phone may be seen as a lesser version of the face-to-face encounter. The phone call does not do much to replicate the non-verbal messages making up the moment. However, the smartphone, with its ecosystem of social networking apps, provides new tools to enrich that specific moment in time, all the time.

The new tools enable users to replicate a conversational instance through media other than the spoken format, such as written text. The definitions so far have asserted talk and spoken word as conversation currency. However, shifting the focus on the non-verbal aspect, could text also contribute to the exchange of messages? In the context of speed of reply networks, which are quasi-synchronous in time, can textual exchanges make up a conversation? More recent literature, specifically in the area of computer science and mediated communication, defines conversation "as a series of interrelated communicative acts, aimed at defining and reaching a goal" (Efimova & De Moor, 2005:1). This definition is in line with that of Goffman (1981) where conversation is viewed as a set of moves, as in a turn-taking game. Communication acts are in fact 'acts', and hence are not limited to the spoken word. In the context of conversation as a series of communication acts, or in Goffman's terms, moves, it is fair to say that conversation is an exchange in which everyone is accorded the right to not only talk and listen, but in the textual sense, write and read. Complementing this line of thought is research that tackles conversational practices through blogging (Efimova & De Moor, 2005; Okabe et al., 2005), email (Kumpula et al., 2007) and chat (Markman, 2009), all of which are heavily dependent on the textual exchange.

However, the new smartphone world does not stop at text to enrich the conversation. Building on the written version of conversation, I extend the notion of unspoken conversation to non-textual conversation in the written format. Approaching conversation as a communication pattern where "the significant activity is the production of messages and delivery of input in a dialogue structure" (Jensen, 1998:186) leads to consideration of alternative means complementing the written bit, as if these options are pauses and speech breaks, or similarly the 'white spaces' of the exchanged text, both of which frame and resound the core meaning.

The new media has enabled users to fill these 'white spaces' with Likes and Tags which are equivalent of affirmation and other types of responses, not necessarily requiring textual turn-taking moves. In themselves these expressions are vague and seen separately on their own, often meaningless. However, in the sequence and in the order they happen, they shape the conversation.

This widened view of conversation is not limited to the users' ability to like or tag content. Images, videos and audio feed into and trigger a conversation. This variety of media enables users to relate memories, some going back years whilst others a few hours. Memories are an integral part of conversation. The new social networking apps carry these memories in sequence, providing a constant stream of content around which the conversation happens.

The definition by Goffman (1981) also highlights "a small number of people" that come together in these moments of conversation. The large-scale social networks have enabled a paradigm shift in terms of who can participate in the conversation. Not simply because group conversation can include hundreds, and even thousands of protagonists, but also because users can simply listen. It is as if they are part of a large audience in the theatre of conversation. In this audience, users can take one of three listening roles, originally defined in the early literature tackling offline conversation. The three types of listeners include those that over-hear, those that are ratified participants but not addressed, and those that are ratified and addressed. These roles make up the new boundaries of the conversation moments, with protagonists popping-in and out of the exchange.

In the context of Goffman's definition, which I provisionally use as a starting point, I adopt the view of conversation as a moment in time, focusing on what is said but also what complements it. The developments in the new media are providing new ways for users to enrich these moments. A segment of the published research attempts to assess the mediated exchange on its ability to replicate the face-to-face encounter. Yet the new tools enrich moments of conversation in a completely new way. The exchange is richer in terms of the content that is shared, the people who participate in it and how it happens. These are not the same moments that Goffman makes reference to, yet this is also conversation and should not be mistaken with other notions of communication. The response to the below questions further elaborate on this point.

1.4.2 Is it conversation or communication?

The literature on conversation is found amongst a wider segment of published work related to communication. Interpersonal communication is in fact mostly related to informal exchanges between people, amongst which is conversation. Not limiting conversation to a verbal exchange makes the distinction between conversation and communication less clear. It is therefore useful to distinguish between the two terms. One can have communication without conversation, but not vice versa. In this way, conversation is declared to be one communication pattern of various.

	Information issue by centre	*Information issue by consumer*
Programme control by centre	Allocution	Registration
Programme control by consumer	Consultation	Conversation

Figure 4: Matrix of Communication Patterns (Bordewijk & van Kaam, 1986:580)

The model of communication patterns (Figure 4) cross-tabulates two roles in a communication exchange - the controller of distribution against the information producer. At each intersection, either a consumer or a central provider takes the

roles of controller and distributor in the activities of programme control and information issue respectively. In the matrix, conversation is defined as an exchange in which participants issue the information and control its distribution. Other patterns exist and vary by who takes these two roles. For example, in allocution there is a central provider of information, distributing information to consumers. The central provider takes the role of controller of the programme and information issuer, as in the case of a televised broadcast.

The developments in the new media have made these modes of communication less distinct. Media enable different modes of communication. Watching television has originally been classified as allocution. Yet when this is complemented with a *televoting* facility, an SMS number through which users can choose one of a set of responses, then the allocution mode is complemented by the registration one. If the televised programme has an online presence on one of the various social networks, you would also have a conversation on the content, during or after the programme has been broadcast. In this way, the distinct patterns of communication intertwine and become less clear. The research window of the present study only approaches these developments from the perspective of changing conversation and puts less focus on the way mass media is becoming interactive.

The new interactive features made available in the new media bring the notion of interaction closer to that of conversation. Yet even in this case, the focus of the work is the evolution of conversation and hence it is necessary to distinguish the activity under study from another type of activity, interaction.

1.4.3 Is it conversation or interaction?

Conversation in the new media suggests flexibility in the exchange making up the conversation. This flexibility is seen in the number of people who can join the conversation, the length of that moment in time, the contents of the conversation and where, or rather how it is mediated. Such a view of conversation verges on the notion of interaction.

Interaction is a multi-discursive concept and takes on a different meaning in the different contexts one discusses it (Jensen, 1998). Homing in on the social aspect, interaction can be identified narrowly as:

> "that which uniquely transpires in social situations, that is, environments in which two or more individuals are physically in one another's response presence" (Goffman, 1983:2).

An important key word in the definition is 'physically'. The author in fact treats the telephone and e-mails as reduced versions of the primordial real thing. The idea of a reduced version comes from the assumption that these mediated alternatives lack the non-verbal aspect of the face-to-face encounter.

However, the new media is providing new tools to make up for this. From emoticons to status updates, from carefully curated user profiles to sophisticated video chat. Whether these tools fill the void of the reduced versions which Goffman speaks about is a debate to be done later on in this work. What is however important at this stage is when are these tools part of the conversation or not. In other words, when does conversation stop being conversation and become interaction.

> "Within sociology, it is possible to have communication without interaction (for example listening to the radio and/or watching TV) but not interaction without communication" (Jensen, 1998:188).

On a similar note, there is interaction without conversation but not conversation without interaction. This leads to the conclusion that instances of conversation involve interaction and are one form of communication. Going by the definition of conversation, interaction is conversation when it involves the exchange of information between a number of people. Dancing and jamming are both examples of interaction that is not conversation.

The conversation is also changing due to new interactive features brought about by developments in the communications arena, leading researchers to adopt a technological deterministic stance, attributing the cause of change to technology.

1.4.4 Is it conversation or interactivity?

The technological developments which have come about in the past years are challenging the boundaries of the definitions discussed so far, not least conversation, but also interaction and communication. These new developments often add up to new interactive features that enable users to exchange information in a totally new way. Online websites were also at some point a one-way transmission, yet have become a hub for conversational exchanges as designers plug-in all sorts of interactive tools.

A discussion on interactivity by Jensen (1998) highlights the distinction between interaction and interactivity. Interaction suggests that conversation is defined by focusing on the exchange between the protagonists. Interactivity on the other hand suggests that the definition of conversation is determined by the affordances of the medium to enable interaction. The term is closely tied to technology. Jensen reviews models that map different technologies on the basis of interactivity (Stuer, 1995; Szuprowicz, 1995) and proposes his own cube of interactivity (Figure 5).

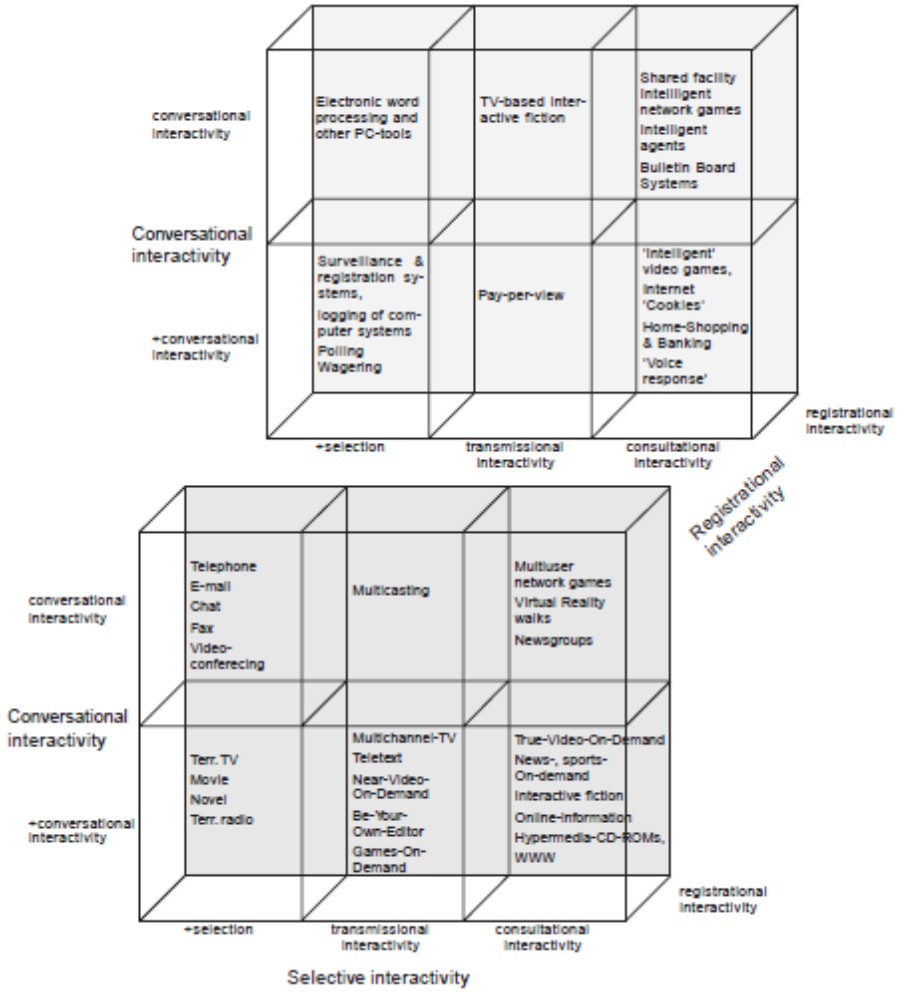

Figure 5: The Cube of Interactivity (Jensen, 1998)

The model refers to conversation-like interactions such as bulletin boards, an early version of online discussion groups. Jensen reorganises his classification in three dimensions - conversational interactivity, registration interactivity and selective interactivity, built around the matrix of communication patterns. Conversational interactivity is the measure of a media's ability to allow a two-way message exchange where users can produce their own information. The ability of the medium to adapt to the users through registered user information is referred to as registration interactivity. Selective interactivity focuses on the media's ability to let the user select. Selective interactivity puts on a scale consultational and transmissional interactivity. On this scale, transmissional interactivity is associated with media which offer less choice than those related to consultational interactivity.

Assessing media as such, the telephone is considered to be a medium that enables users to be protagonists in a two-way conversation, limiting choices of which calls get through and which do not, and with little adaptation to the user. In this way the medium enables high conversational interactivity and low selective and registrational interactivity. In comparison, bulletin boards, not only offer two-way conversation, but also adapt to the user by filtering content from his friends, allowing the user to choose which stories to follow. As a result, bulletin boards are mapped on to the model at a higher selective and registrational interactivity than the telephone.

It is important to note that the cube of interactivity maps onto it the media and not the message, in that it focuses on the technology enabling conversation rather than the different types of communication exchanges. Therefore it maps bulletin board systems and not a type of public conversational instance. This approach is less effective as it needs to reflect new media and new technology affordances in the existing ones. The approach is also limiting as the same media enable different variants of interactivity on the same platform, making their mapping rather difficult.

A more robust framework is that by Kiousis, who defines interactivity as:

> the degree to which a communication technology can create a mediated environment in which participants can communicate (one-to-one, one-to-many, and many-to-many) both synchronously and asynchronously and participate in reciprocal message exchanges (third-order dependency). With regard to human users, it additionally refers to the ability of users to perceive the experience to be a simulation of interpersonal communication and increase their awareness of telepresence (2002: 379).

Kiousis highlights aspects of interactivity that capture three dimensions. Firstly, the definition suggests an environment where sender and receiver are not necessarily exclusive, in that the exchange can be one-to-one, one-to-many or many-to-many.

Kiousis's definition also refers to both synchronous and asynchronous modes of information sharing. The other definitions of conversations have not specifically focused on asynchronous conversation yet this is a fundamental feature of mediated exchanges. Initially, this shift was caused by the speed of reply networks however the affordances of new applications and developments in technology have expanded the ways in which conversation occurs in delayed time, making this mode of conversation a user choice.

Through the asynchronous exchange, the moments in time mentioned in Goffman's definition shift to a persistent stream of exchanges, in which the conversational moments become more concise and add-up to a persistent mode of communication. This refers to the work by Licoppe (2004) on presence, which Kiousis makes reference to by the notion of telepresence. Licoppe suggests that the mediated exchanges do not simply replicate a conversation as if the participants are in the same room. In this type of relationship management "(physically) absent party gains presence through the multiplication of mediated communication gestures on both sides, up to the point where co-present interactions and mediated distant exchanges, seem woven into a single, seamless web" (Licoppe, 2004:135).

Most of the early literature on conversation may be categorized in that which defines conversation amidst alternative ways to communicate, such that conversation is one communication pattern; and that which delves into the convergence of the mobile and online space, contrasting the new mediated alternative with more conventional ways of holding a conversation, capturing aspects of changing user behaviour in the context of new technology affordances. In both categories the notions of communications, interaction and interactivity are discussed side by side that of conversation. Such an approach is triggered by conversation moments that include interaction, communicate a message and are evolving with the new interactive features. In this work I adopt Goffman's definition of conversation as the starting point. Later on in Chapter 3, the model of conversation is built around the new forms of interactivity and the other aspects of interaction and communication, which influence the conversational moment.

1.5 Thesis Structure

The aims, methods and results of the research are organized in eight chapters. Chapter 2 relates the path to the smartphone. Academic work is discussed in context of the significant developments in the communication landscape that led to the invention and mass uptake of the smartphone. Literature relating to user behaviour in the mobile and online space precedes that which discusses the convergence of the two worlds.

Chapter 3 sets out the dimensions of conversation, which are at the basis of the proposed three-dimensional view. The starting point of the discussion is a model by Joinson (2003). Some aspects of this model are pursued in the new model of conversation, whilst others are purposely left out. Literature on perpetual contact (Aakhus & Katz, 2002) and the notion of space and time (Castells, 1996) is used to build the third dimension, that of persistence. The concluding section of the chapter presents the three-dimensional model of conversation and discusses this in context of the other models in the literature.

Chapter 4 sets out the analytical framework, starting off with the adopted research stance in terms of the ontological, epistemological and methodological response. The second part of the chapter builds on this and unfolds the research design. The research design is made up of two sections. The first section introduces the smartphone adoption case study. A second section reviews the new media landscape by making reference to a selection of applications and services that relate to the period of analysis. The chapter concludes with a section on the ethical considerations undertaken in the study.

The analysis relating to smartphone adoption is carried out in Chapter 5. The analysis goes on to compare the shift in usage profile of the low-end smartphone users with the usage logs generated by users of higher-end smartphones. The discussion on smartphone adoption is also supported by secondary experiments to corroborate the findings.

Chapter 6 reviews the media landscape. The review makes reference to applications and services that relate to the years between 2007 and 2013. The review is done in context of a wider definition of conversation, the notion of conversation as a persistent stream, a sophisticated approach to the public dimension and a longitudinal perspective of the evolution of user behaviour. These four implications frame the review throughout the chapter.

The robustness of the proposed model is also its validity in the future. Chapter 7 extends the discussion in the preceding chapters into the future. Two scenarios are presented with reference to the three-dimensional conversation model. The first scenario proposes that the future will exhibit the expansion of the conversation space whilst the second scenario proposes the repositioning of the three-dimensional space.

Finally, in Chapter 8, the study concludes with an overview of the work achieved, a discussion on the research limitations and suggestions for future research. A summary of findings and contributions is also provided.

2. The path to the smartphone

> "With the invention of the telephone in 1876, it was possible for the first time in history to have real-time conversational interaction at a distance. Back then, the technology was astounding. Early demonstrations of its capability attracted large crowds, most of whom were awe-struck, though some thought it mere legerdemain. By contrast, in the twenty-first century the telephone has for a billion people become, literally, a fixture of everyday life. Only by its absence do we deem it worthy of comment (such as in school classrooms and prisons or in poor countries). The miracle of telephone conversation is too readily forgotten by laypeople and scholars alike. However, the telephone's becoming mobile has refamiliarized many people with the amazement felt by its early witnesses." (Aakhus & Katz, 2004:1)

It has been at least 138 years since the invention of the telephone (Graham, 1875) and some 10 years since the quote above has been published. The quote is inspired by the 'amazement' of the 'telephone's becoming mobile'. It highlights a journey that humans have gone through. From being astounded at the possibility of carrying out conversation without the restriction of distance; to it becoming a 'fixture of everyday life' for more than a billion people (ITU, 2011). The journey continues and as happened with the telephone, even the smartphone, which amazed many by the possibility of staying in touch without the restriction of a fixed place, will come to be taken for granted. Along this journey, we shift the conversation - first across distances, then across places, eventually going beyond the limitations that have so far shaped it.

This is what this chapter refers to as the path to the smartphone - a journey that started earlier than the invention of the telephone. De Fleur and Ball-Rokeach (1989) relate the transitions that led to the connected state that followed: The age of speech and language suggests that talk started between 90,000 to 40,000 years ago. Prior to that, our ancestors spoke through signs and signals. Language came later and was in use around 35,000 years ago. It only transitioned into writing 5,000 years ago. Print technology dates back to 1455. The printing press may be said to have revolutionized conversation, the development and the preservation of our culture. Yet the journey did not stop. Print enabled the newspaper and the age of mass communication. Later on, alongside it were technologies like radio, TV, film and electronic media such as the telephone. Computers then came around, transforming us in the information society, bringing with them a world wide web of information.

Computers also made popular the notion of interactivity (Jensen, 1998). However, Web 2.0, as it was called, marks the arrival of the social web, the web as a social space, not simply a worldwide machine for information storage and retrieval. In parallel the telephone became mobile and the smartphone emerged.

The significance of the smartphone in this path is what it brings together. In earlier transitions human behaviour intertwined with the technology of that time. Language established a more sophisticated level of meaning, whilst writing allowed us to communicate across time. Print made it easier to share what had been written whilst other mass media replicated it through audio and visuals. TV and radio enabled us to be virtually present in places where we had never been physically. The telephone enabled further this type of presence, yet in a more intimate way. Computers, with the Internet as the backbone, widened the possibilities of conversation and information sharing 'worldwide'. They facilitated the conversations that came about in the previous eras, transforming print, TV and film. The smartphone, brings the intimate conversation of voice calls together with the wider conversation going on in the age of computers, and makes it mobile.

It is in this context that the path to the smartphone frames an evolving conversation, transforming with one transition after another. To this extent, the exponential take up of the smartphone (Statista, 2014) should be understood in a wider context and not be limited to the technological perspective it brings about. The smartphone is as smart as its users make it to be. As a result, the path to the smartphone is not simply the evolution of the technology that brought about this device, but the evolving user behaviour which makes the most of enhanced connectivity and smarter tools to keep in touch. It is this setting which triggers the need to revisit conversation.

This chapter tracks down the trajectory towards the smartphone in three waves:

a) In the first wave of change, users shifted their voice calling from the fixed telephone devices to the mobile phone. This shift started to change the meaning of place and made the network a more personal one.

b) Adjacent to this development path is the initial use of the online media as communication tools, marking the second wave of change. The Internet medium provided the user with a bigger network and a suite of tools to communicate with.

c) Finally, the convergence of the mobile phone and Internet access brought these two waves of change closer, amplifying previous behaviour and opening the doors for an emergent shift in user conversation.

2.1 Voice calling and the path to the mobile phone

The mobile phone marks a shift in voice calling itself. The next section reviews the diverse uses of the mobile phone as users made the most of mobility and new technology affordances. The shift to the mobile phone also marks a shift from place to people.

2.1.1 Diverse uses of the mobile phone

Calling brings to the phone our inherent need to socialize. It is not a surprise that with more connectivity, users call more and exhibit different modes of calling. Baron (2008) highlights the different uses of the mobile phone, deriving in part from cultural norms. She compares this to the norm of driving on the left or on the right. Relating these norms to the use of mobile phones in the early part of the twenty-first century, Baron highlights different attitudes towards the timing and mode of usage of the mobile phone. Baron quotes a survey compiled by TeliaSonera (2004). In the survey, only the minority of Danes think it's "OK" to keep their mobile phones on during a party. In contrast, four of every five Swedes are comfortable doing so.

Donner (2007) documents the acts of "beeping" or "missed calling" as emergent user behaviour, which goes beyond the intended use of the inventors. In the research, Donner categorises these in callbacks, pre-negotiated and relational beeps. Pre-negotiated beeps could mean anything that is agreed beforehand. In some cases they might be indicating that one of the participants is waiting for the other at some agreed place; in school environments it could mean that an important lesson is about to start. A relational beep on the other hand is like waving and denotes that one person is thinking of the other. On a different wavelength of intimacy, Pertierra (2005) highlights the use of 'mis-sent' messages in the Philippines. These messages are sent to random users, as if by mistake, to start a conversation and expand their circle of friends.

The work by Ito and Okabe further explores the diverse uses of voice calls and texts. Their research studies youths in Japan, and the use of texting and voice calling to maintain relationships. Their work links these usage patterns to what they term as "longstanding intergenerational tensions and cultural politics" fuelled by a post-period of economic prosperity (2005:6).

The diverse uses of the mobile phone highlight the importance of the user in the evolution of technology. The user also brings his social context to the conversation as in Ito and Okabe.

2.1.2 The shift from place to people

Even though mediated conversation did not start with the mobile phone, the take up and diffusion of the technology did shift the dynamics of interaction. Fixed calling connected places, so much so that the bulky telephone directories featured home or office addresses with each contact. The mobile phone detached the place from the contact. In the mobile phone network connections relate to people and not places. Usage logs created between the sender and receiver, highlight a layer of relationship data, which prior to the existence of mediated interaction would have had to be researched through observation and interviewing. Eagle et al. (2007) reviews usage logs of 94 subjects over a period of nine months. Data sources include call logs, the subjects' location obtained through base station data, and the proximity of the subjects. The accuracy of the network data in predicting relational ties between users is estimated by comparing the findings of the quantitative research to self-reported relational data. Such data is also used to infer network structure (Faloutsos et al., 2008). This research uses data sets made up of millions of users and tens of millions of voice call conversations. These and other contributions not only infer the network structure but also study the type of relationship ties through the analysis of repeat calls and call length (Jari et. al., 2007).

The shift from place to people does not limit interaction with a place. In engaging in conversation through a mobile device, users interact with the place they are in at that time. The users' ability to immerse themselves in the conversation leads researchers to observe the users' interaction with the physical place. Ling (2008) observes users walking around the city with little attention to the surrounding world. He notes that while being heavily absorbed in texting, users still manage to cross the road and avoid bumping into other users walking past them. This literature builds on his previous work in the area (2004). The author reviews the adoption of texting amongst teens. His research also confirms that mediated conversations occurring through the mobile device have become more individualistic as the mobile phone shifted from a family possession to an individual one. Rheingold highlights a similar behaviour in his account of Shibuya Crossing. He writes about the moment when the lights turn green and 1500 people,

crossing the road from eight different directions, divide their attention amongst three places: the physical world, the world of commercial propaganda and texting, "a third sphere in which terse communications link people in real time and physical space" (2002:2.). This level of immersion in the place of conversation is more and more an integral part of the context and meaning of the exchange.

2.2 The Internet and the path to online social networking

Users have also exhibited significant shifting behaviour in the online medium. This wave of change is very important in mapping the path to the smartphone. The behaviour is also the result of shifts within the different levels of the institutional ecology (Benkler, 2006:395). As in the mobile space, shifts occurred at the device level with a wider network of fixed connectivity and more affordable and sophisticated equipment. The latter also included personal and portable computers, which, coupled with wireless technology, started to detach place from machine.

The bigger shift however may be attributed to shift in the logical layer, the one related to the software on the machines. Starting with email, the online medium presented the user with the possibility to connect to other users, as opposed to places. Users joined online social networks that also enabled them to exchange all sorts of interactions in the form of text, audio, images and other files. Similar to the shift in the mobile space, computers that were connected to places started to offer online social networking services, which brought about a network of individual users.

2.2.1 Early social networking

As early as the mid-eighties, the Whole Earth Electronic Link (WELL), was one of a few networks. Rheingold introduces the WELL as a "computer conferencing system that enables people around the world to carry on public conversations and exchange private electronic mail (e-mail)" (1993:1). The author has the perspective of an early user of the WELL, who saw this "virtual village" grow from

a few hundreds to eight thousand between 1985 and 1993. The WELL incorporated three types of activities that are relevant to the developments of communication services online:

Firstly, the WELL enabled the exchange of private e-mail. E-mail is in itself a large-scale social network that came to be before the invention of the World Wide Web (WWW). The diffusion of e-mail has triggered various researchers to use it as a case study. Like mobile, e-mail provided insights on network theory due to its scale and diffusion since inception. The topology of large-scale e-mail networks is found in Ebel et al. (2002). Evidence of the take up of the service is research which focuses on managing e-mail clutter (Vuillemot et al., 2010).

Secondly, interaction on the WELL occurs in the form of group chat. Chat is one of various alternatives to voice conversation in the mediated space. As an early alternative feature of the Internet, chat is a case study of a number of research contributions discussing Computer Mediated Communication (CMC). Due to the quasi-synchronous property of chat, research explores its use as an alternative to face-to-face conversations, studying it from the perspective of discourse analysis (Simpson, 2005). Other works test the ability of chat discussions to achieve their objectives in comparison to face-to-face meetings (Markman, 2009). The latter work suggests that the opening and closing of a chat-based meeting is difficult. This study is one of many that attempt to compare CMC to face-to-face meetings. Other contributions include Spears and Lea (1992) and Walter (1996).

These features bring to the fore the third activity found in the WELL – social networking, the possibility to be part of a virtual social network. In understanding the shift in behaviour that users are exhibiting it is also important to note the shifts that have occurred in the way relationships are managed online. Rheingold highlights that the relationships in the WELL started off online:

> "Three months after I joined, I went to my first WELL party at the home of one of the WELL's online moderators. I looked around at the room full of strangers when I walked in. It was one of the oddest sensations of my life. I had contended with these people, shot the invisible breeze around the electronic water cooler, shared alliances and formed bonds, fallen off my chair laughing with them, become livid with anger at some of them. But

there wasn't a recognizable face in the house. I had never seen them before." (1993:2)

The three types of activities hint at similar shifts, which are shaping the new conversation occurring over smartphones:

a) The shift to email represented the shift to a person-to-person type of conversation as with the shift from fixed to mobile calling, and later texting.

b) Group chat in the WELL represented the alternative means by which users could keep in touch. Years later, a suite of applications is accessible through the smartphone, offering users different ways to hold conversation.

c) Finally, the WELL presented the users with the possibility to be part of a virtual social network, a shift from the fixed place to a virtual place, an online gathering of friends.

2.2.2 Social Networking thirty years on

Thirty years on, the shifts exhibited by users of the WELL and similar early social networks are amplified in a world of social networking sites and applications. These online spaces plug into sophisticated platforms and are accessed by users through their device, all day long. Today, social networking occurs within a bigger network that enables users to shift their offline relationships online, staying in touch in more ways than one and curating their online persona in a much richer manner.

A bigger network

The evolution path of social networking is influenced by the exponential growth of social networks, hence the online presence of many offline friends, and the content exchanged. This was not the case on the WELL and contrasts with Rheingold's experience.

The size of these networks is evident in quantitative analyses that use these networks as case studies. Contributions include that of Sack (2000) discussing the

Very Large Scale Conversations (VLSCs) and proposing a Conversation Map, a dedicated browser to view social network interactions occurring on Usenet, an Internet discussion system conceived in 1979. Similar group formation in large social networks is studied through data logs generated by LiveJournal (Backstrom et. al, 2006).

Rheingold's experience was also limited by the way interaction could occur. Online social networking has also evolved in the type of exchange, a shift in the content layer of the communication ecosystem. Users are sharing much more than text. YouTube, which may be thought of as an online platform for video distribution, has exhibited social networking behaviour (Lange, 2007). The use of media circuits highlights the social networking behaviour of users on the YouTube platform (Rouse, 1991). These video exchanges exhibit conversation-like behaviour (Benevenuto et al., 2009) through statistical analysis of usage data on YouTube.

Offline to online

Rheingold's quote highlights that the relationships on the WELL had started online. Interaction was only complemented by identity when the author met his online friends offline. The developments in the social networking arena have enabled users to invest in their online persona and be more selective with regard to their network of friends, the equivalent of a buddy list in instant messaging. As more users got online, social networking extended offline relationships.

Researchers reviewing more recent social networks (Lampe et al., 2006) distinguish between social browsing and social searching. The latter defines the activity of searching for one's offline friends online. In this activity the users get access to more information about their current friends. Social browsing refers to one's initiative to get to know new people through the site, possibly with the intent of meeting them offline as in the case of the WELL. This activity seems to have become the less popular of the two (Lampe, 2006).

Boyd (2004) also reinforces the co-existence of social browsing and social searching on networking sites. As in Rheingold (1993), the author is a self-

proclaimed active participant of the site. Boyd notes that the network structure on social network Friendster is based on declared Friendsters. Hence in contrast to older versions of chat rooms or discussion groups, one first identifies the user and then interacts. This feature gives rise to the activity of social searching, finding one's offline friends on the Friendster network to get to know more about them.

Social searching is also possible due to the additional focus on identity. Whereas in the WELL, and similar networks of that time, users identified themselves with nicknames, more recent networks put more focus on the user profile. The focus on the user profile as a stage for the user to run the show is also seen in blogging.

Blogging

Blogging, which became popular after the days of the well, preceded the social networking world in the twenty-first century. Blogging may be seen as the first step towards an interactive web, the first shift from the web as a mass medium to the web as a tool for interpersonal conversation, hence a more social place. Blogging complements the idea of the user as a producer of own content as in the case of user-generated video content on YouTube or the performances of the Camgirls reviewed by Senft (2008). Apart from allowing the user to produce and publish own content in the form of a blog, blogging platforms such as Blogger or Wordpress allow users to comment and reply.

Efimova and de Moor (2005) analyse blogging behaviour and highlight conversational practices. Conversation through blogging marks a shift, in that any content, whether it resides on declared social networking or not, becomes a matter for conversation. To this extent, blogging and the conversation occurring around this content go beyond the blogging space triggering it.

This view of web content as social currency is an integral part of the path towards the smartphone. This notion can be contrasted with an earlier assessment of interactivity of websites (McMillian, 2002). The Four-Part Model of Cyber-Interactivity brings together the matrix of communication patterns (Borderwijk & Van Kaam, 1986) and the Grunig Two-Way Symmetrical Model (Grunig & Grunig, 1989). In the model, Mutual Discourse is classified as the mapping of two-way

communication where the sender and receiver have high control of the exchange. The discussion on Mutual Discourse as an interactive feature of online sites, highlights the different stand point the online medium was in, and therefore, the shift in conversation which happened in the run up to the smartphone. McMillan states that:

> "Mutual Discourse may often represent both the greatest technological challenge and the greatest potential threat for Web site developers. In these unfettered environments that allow a free-flow of two-way communication, all visitors to the site have the potential to participate in the site as both senders and receivers. This may be appropriate in some cases, but some organisations may wish to consider carefully if they are willing to invest in a level of interactivity that gives everyone everywhere the opportunity to contribute in a way that may either praise or condemn." (2002:14)

McMillan's assertion contrasts with the speed of diffusion of social media applications, such as the commenting or sharing features integrated in different types of websites translating content in social capital for networking. In fact, a key characteristic of conversation occurring on blogs is its distributed nature, in that the exchange is not limited to the blog from where it started. Research tracks comments related to the blog post together with reference to the post in other blogs, highlighting how these create a conversation like practice.

Blogs are inherently an online user profile with a timeline of posts and exchanges. In essence, this format is very close to the user profile in online social networking sites, that fuel the notion of the online persona.

The online persona

One predominant activity related to social networking sites and identity is the popularity of the status message (Jansen, 2010; Utz, 2010). Jansen highlights how the status message knows its beginnings from 'Away messages' in email and chat. Jansen attributes the popularity of the status message as a useful way to make sense of information clutter. The author follows on the notion that "the abundance of information available creates a shortage of attention in people" (2002:3). The status message allows people to get to know what's important from their friends, reducing the need to filter out the clutter and consume as much information.

However, Jansen highlights a second feature of the status message, its public property. Status messages are not like email in that they are available to a wider network of contacts.

In the world of social networking, the status message is just one part of the public information that builds users' persona. Literature segments social network information available on the user profile in three categories – self-generated information, friends-generated information and system-generated information (Utz, 2010). These streams of information about the user are seen to influence impression management. This information is contained in the users' social media profiles, which also includes photos related to the user and a list of friends. Through her analysis Utz suggests that the information provided by the user, his friends and the social networking platform itself, impact the user's impression in different ways. Friend information, as one type of information, is seen to impact the user's popularity online.

Users have invested significantly in managing their impression online. The users' effort is not limited to the information they make available on their profile. The CamGirls case study (Senft, 2008) may seem like an extreme case of impression management, yet apart from representing a segment of online behaviour that is still present today, it also sheds light on the various efforts done by users of different social networking sites to manage their online persona.

The friend network

The stronger focus on the self is also the result of one's exposure to a bigger audience than that of thirty years ago. The resultant social browsing and social searching lead to a declared network of friends that is not necessarily reflective of the real social ties between users. Published work notes that the relationship structure on most social networking sites is binary and hence one is either a friend or not, with no weight being given to the type of relationship and reciprocity. Some Friendsters are selective of who to add as a friend yet most add anyone, without filtering out those with whom they have no real relationship. Even though one could argue that this lenient manner of adding friends devalues the network, it also

contributes to increase the possibility of making new friends, who might even be three to four friends away of your close friends.

A comparison of user activity in other social networks continuous to highlight the existence of two networks - the declared network of friends and the network of interactions between members: A review of social networking site Facebook shows that network ties are very volatile in activity and that the strength of a network tie tends to weaken over time. The research also highlights that activity between weaker ties is often triggered by the site's mechanisms. As a case in point, Facebook's birthday reminder application generates 54% of activity between weaker ties (Viswanath et. al, 2009).

Another case study, this time focusing on Twitter, confirms the divergence between the declared set of social links and the interactions that actually occur on the site (Huberman et al., 2009). The research suggests that apart from the declared followers' network, there is an activity network that is closer to the un-declared network of friends. In the review a friend is classified as a Twitter contact when the user has at least directed two posts at him. It is interesting to note that Twitter's friend structure is not binary as in the Friendster and Facebook case. In other words, a Twitter follower is not necessarily followed back.

The above sections contrast early social networking with social networking behaviour exhibited by users later on in the course of years. The evolved behaviour is in line with shifts in the conversation. The bigger network of users online enables a more public conversation. The conversation is presented to an audience in different formats, some of which enable the user to invest a considerable amount of time in shaping the message. This is also in line with shift to an asynchronous type of conversation. This mode of conversation also contributes to the users' efforts to shape their online persona and manage their image online. The larger friend lists also enable the users to keep in touch with a large group of users in a more persistent manner.

One can draw parallels between the different uses of the online medium and the presence of social networking behaviour throughout. In the different online media

practises we find three common activities revolving around the core use of the web service. Users of these networks administer their friend lists, manage their image through their profile information and exhibit a conversation like behaviour, be it in the form of text, video or a combination of media which make up media circuits. Not surprisingly then, the emergent use of these online tools varies from the original intention of their creators, making all content social capital for conversation, and the online networks a virtual place where users connect. This is however limited by access to the network and the device used. The next section reviews the marriage of the above developments in social networking with the persistent connectivity provided by the mobile phone.

2.3 Mobile internet and internet on mobile

2.3.1 Making the link

The convergence of mobile phones and infrastructure providing Internet access on the go presented uses which took longer for users to embrace and for the industry to make the most of. In the earlier part of the 21st century, operators were still struggling to make the most of their investments in third generation (3G) networks. By 2007, most countries had a situation where the faster 3G networks were there but the usage wasn't (Kalba, 2008).

Key players in the mobile industry had made various attempts to make the most of expensive 3G spectrum brought by the operators in the previous years. Efforts included the launch of new applications that intended to justify Internet access on a mobile device. At the device level, feature phones included cameras, colour screens and various attempts at touch screen technology and video calling. With this new functionality, texting was just one alternative to voice calling. Operators, such as Vodafone and NTT Docomo, had introduced multi-media portal services such as Vodafone Live and iMode respectively, bringing together games, music and other content in one application. These efforts saw mobile operators playing the role of an Internet Service Provider (ISP), with an effort to bring what was popular online, to the mobile device. Terminology used referred to the service as the "Mobile Internet" but this was to change a few years down the line.

At the time, the industry was still struggling to sell the idea of the phone as a smartphone. Some possibly thought that the idea of the smartphone was reserved for the tech-savvy, so much so that a mass media campaign such as the one aired by Vodafone in 2007 did not even feature a smartphone.

In contrast, online, users were moulding the Internet into a more social space. Social networks became more popular with some networks attracting millions of subscribers. Sites such as Facebook and Myspace, conceived just a few years earlier, grew exponentially in subscriber numbers. The growth was not simply one of user numbers but also one of content. YouTube saw exponential growth in videos uploaded on the site. This also created forms of sharing and creating content, disrupting established business models and usage norms.

User resistance to the smarter phones also reflected the key characteristics of voice calling, which is synonymous with the phone. Calling not only requires membership in the network, but also knowledge of the specific telephone number the user needs to dial. In contrast to social networking sites, users do not share their profile and hence do not make available their friend list. Exchanges take the form of synchronous voice conversation that is mostly exclusive to the sender and receiver, bar the users' physical environment. As a result the medium is less participative, it is harder for users to join in the conversation and in such instances participants have to be in the same place as one of the users. In contrast to online communication, the synchronous property of voice calling does not allow juggling between one conversation and another. However, as the mobile devices became a window to the online medium the above properties began to shift.

2.3.2 Connecting

Primarily, the smarter side of the phone started to become more important to the users. An insightful piece of literature is the work done to study the use of portable devices in the lives of young professionals in Tokyo. The work builds on the connectivity with people and place. In the research, portable devices are defined to be "the whole range of portable objects that people use to interface with people and environments" (Okabe et al., 2005:1), including but not limited to the mobile

phone. In the list of objects, the research reviews the use of keys, ID cards, loyalty cards and prepaid cards for micro transactions.

The path to the smartphone includes a number of attempts to make the most of additional device features such as the camera, the bigger screen and better audio capability. Apple, a multi-national corporation that designs, develops and sells consumer electronics, software and computers, was part of various attempts to get to the smartphone. The Motorola ROKR, launched just two years before the iPhone in conjunction with Apple, was conceived with the idea of combining a mobile phone, a digital camera and a built-in iPod (Isaacson, 2011:465). A key difference between ROKR and the iPhone is the ease by which users connect to the Internet and the additional functionality brought by apps, helping users to make the most of their devices to converse differently.

In 2007, Apple launched the iPhone. The device was a game changer in that it brought the mobile phone closer to being a multi-purpose platform. The device adopted a full touch screen design that made it easier to create a custom user interface for the different applications. One simple example is the availability of a QWERTY keyboard when writing a message and a simpler phone dial interface when calling. The device also aimed to be a breakthrough Internet communications device. In contrast to previous attempts, the websites visited through the device where the same websites that the users visited through their desktop PCs. It was not the “mobile Internet”, or the custom built container which brought content to Vodafone Live or iMode, but the “Internet on mobile” (Khan, 2007). Through the ease of zooming in and out of the pages, users could access the Internet in a very similar way to what they were used to on their computers.

Users were also presented with a suite of new applications that further reinforced the notion of a smarter phone. Apple’s project also came with a new operating system and introduced the concept of an App Store (Apple, 2008). Opening up the App Store to the developer community gave rise to thousands of applications that could be developed around the capabilities of the new device. The concept of a suite of applications goes beyond bringing the web to the phone. The concept

builds on the idea of software for PCs. Software packages provide additional functionality that the device does not have, making the most of portability.

The user response to the App Store highlights a shift of activity occurring through the phone. The App Store, which launched with 500 different applications and grew to over 900 thousand apps by 2013 celebrated 50 billion downloads, from 500 million in January 2009 (Apple Press Info, 2014). This user behaviour was however limited to the Apple ecosystem of devices.

In the same year Google, a multi-national corporation specializing in web services and search, launched the Android operating system and the Android Market with more than two thousand applications. By 2013 the Android Market totalled more than 850 thousand applications (AppBrain, 2013). The Android Market follows the launch of the Open Handset Alliance, the collaborative initiative, which conceived the Android Operating System, and its Android OS, both led by Google and involving many other players. The initiative contributed to changes in the device space with key phone manufacturers adopting Android as an operating system and replicating the Apple user interface. However, most significantly, the Android ecosystem contributed towards a more open institutional ecology which users had embraced online. Google's Android OS is significant in that in extended the developments to a more open space, giving more flexibility for the user to shape the new technology.

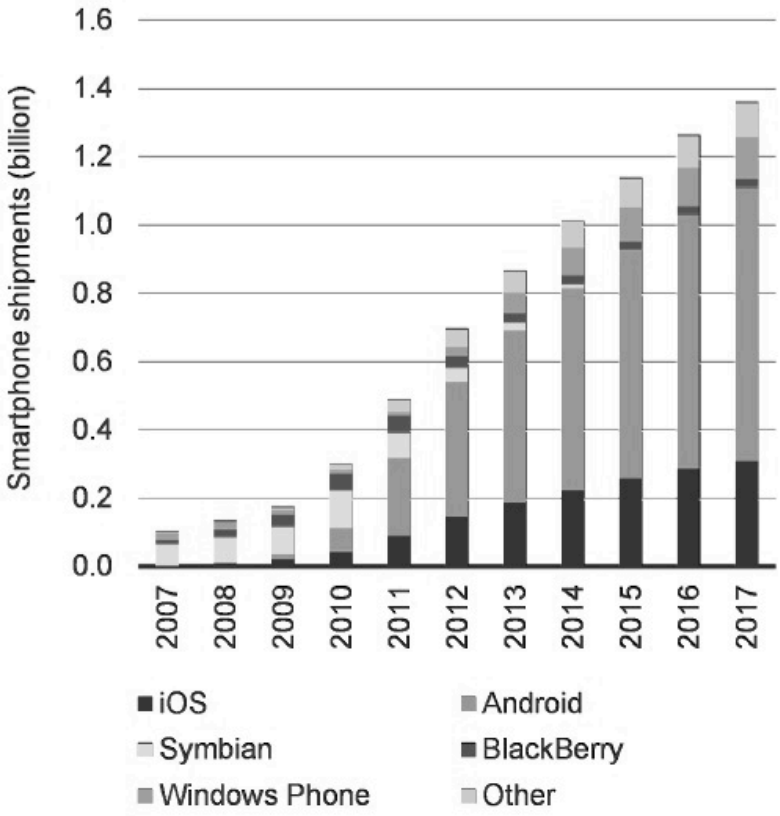

Figure 6:Worldwide Smartphone Shipments (De Renesse, 2012)

Other application stores followed. The Blackberry App World was launched in 2009 (Beaumont, 2009) and more recently a new Blackberry 10 platform was rolled out (The Verge, 2013). Windows also launched its Windows Phone 8 operating system (Hatchimonji, 2012) .

The Windows 8 operating system is another significant step towards the convergence of the online and mobile worlds. While Android extended the operating system across different mobile devices, Windows 8 aimed to introduce one common interface for smartphones, tablets and PCs. Having a common interface for the various devices in the ecosystems brings the same devices closer to the end-to-end network. The smartphone, being one of these devices, enables the network of mobile phone users to shift from an optimized network for voice communication to an end-to-end network capable of transmitting any type of data, a key characteristic of the Internet (Naughton, 2012).

These developments all made the smartphone a really smart device. However, more importantly, it is the user response that makes the smartphone, and the conversation, smart. The discussion on the growth of social networks, such as

Facebook and YouTube, is preceded and influenced by a growth trend in the network of connected users in general. The increased popularity of the mobile phone is not simply the result of lack of mobility of the fixed telephone. The exponential mobile penetration growth seen in the past years (Figure 7) highlights a shift to a different mode of conversation. One aspect of this type of conversation is the ability of the protagonists to be continuously in touch, triggering a persistently connected community of users. Smartphones make up less than 30% of the total mobile phone devices in the world however this is a significant growth from just 10% of users in 2009. This minority of users is exhibiting a different type of behaviour which hints at what a more connected world will be like.

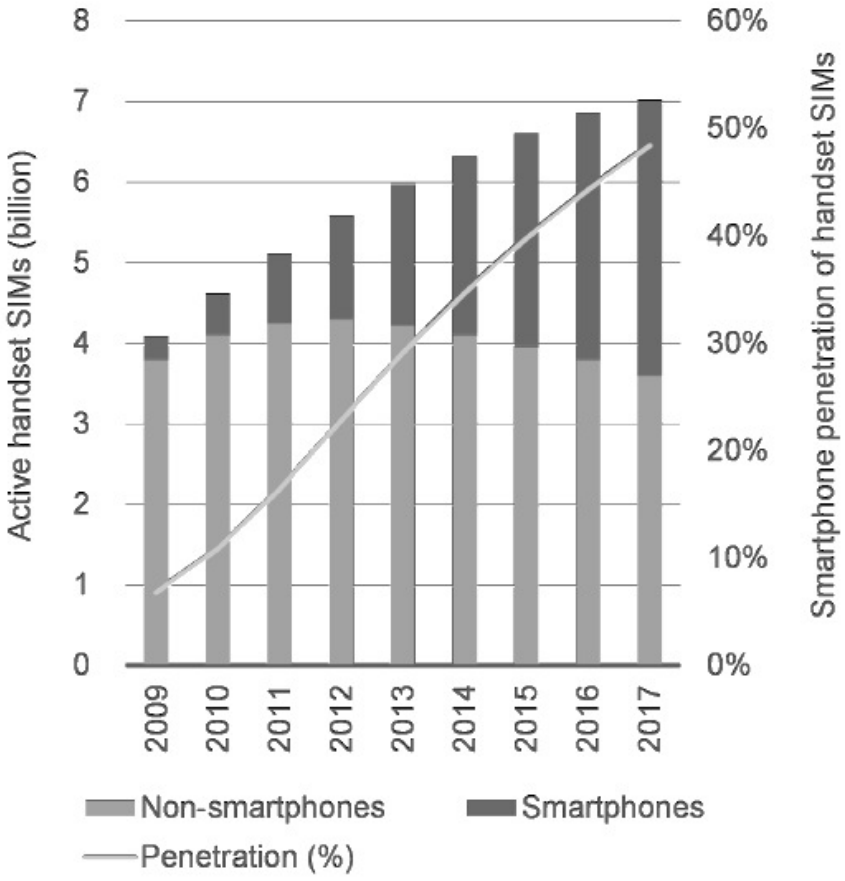

Figure 7: Worldwide smartphone penetration (De Renesse, 2012)

Over the past 5 years mobile data connections in the European Region went up from 60 million in 2007 to over 220 million five years later. Prior to this, mobile industry struggled to see any such traffic on its network. However, the new usage profile of smartphone users became more evident with the launch of the iPhone. Early adopters of the device started exhibiting data usage logs which where higher

than all the other users and historical records. In parallel voice calls started exhibiting a gradual slow down in growth year on year. In 2009, Western Europeans grew their usage by 6% over the previous year. In 2012, the growth declined to 1.7% over 2011. The trend is more visible in SMS messaging figures. As of 2013, users expected to message less than the previous year and the trend is forecasted to continue going down year after year (Figure 8).

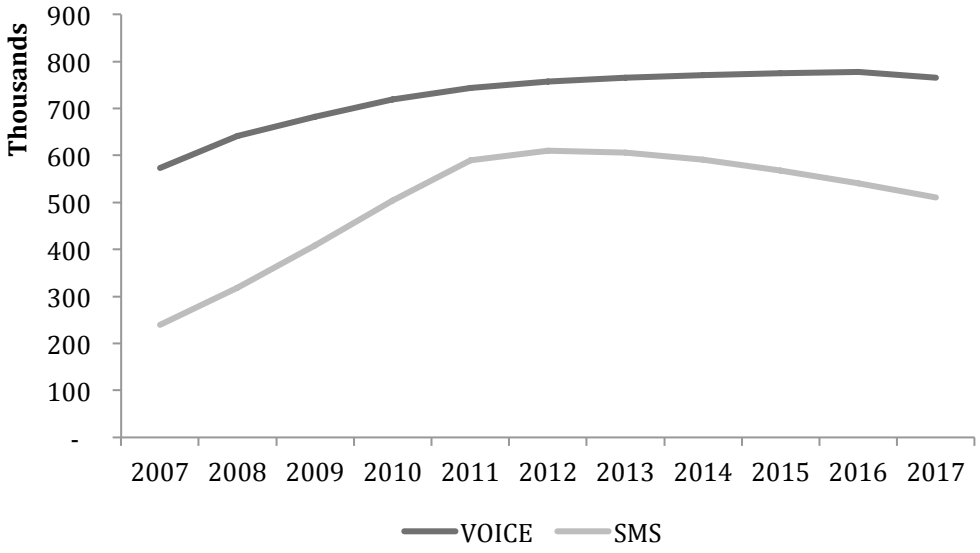

Figure 8: Voice minutes and messages sent through mobile

Enhanced connectivity in the future will not be limited to the user behaviour related to smartphone adoption. Useful to the discussion is the rate of growth of mobile connections. In 2007 there were 470 million mobile subscribers in Western Europe. Year after year, the rate of growth in connections is going down. In 2012, the growth was less than 1% overall, with the main activity being a transition from the traditional mobile network speeds (GSM) to the higher speed alternatives (HSPA and LTE). The trend is forecasted to continue (Figure 9). All this points towards a shift in the conversation, one that is not simply the result of more sophisticated phones but one in which a more sophisticated author is shifting behaviour.

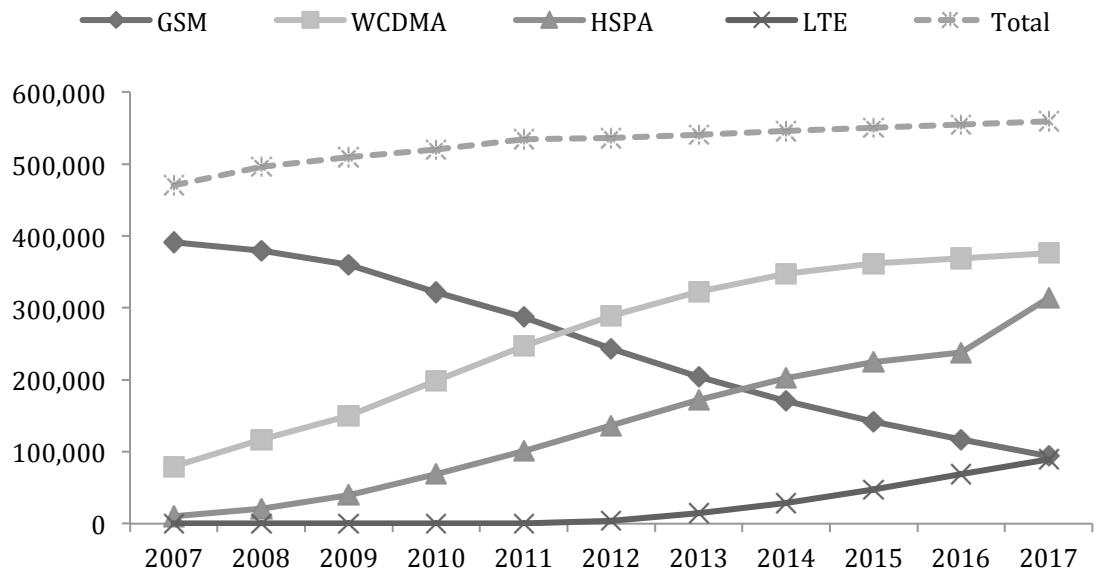

Figure 9: Mobile Connections by type of network access (IDC, 2013)

2.3.3 Shifting behaviour

Published work distinguishes between two types of behaviours: amplified and transformative. Amplified behaviour is that which happens in a faster and easier way, enabled by technological developments (Kiesler, 1997). Applications such as Skype, an Internet based voice application, or WhatsApp, a messaging application, amplify the concept of a voice call or the traditional SMS. Skype allows users to call from different devices through an Internet based network. WhatsApp on the other hand offers an alternative to traditional SMS by providing a sophisticated messaging app. Both apps offer additional features to the older variants of voice calling and messaging. In doing so they trigger a new type of conversation but not necessarily the most significant change in behaviour.

A section of the literature analyses mediated interaction in comparison to face-to-face conversation, analysing the ability of the medium to replicate the face-to-face type (Oehrle & Cline, 1993; Bordia, 1997). The new app ecosystem widens the possibilities on how to hold a conversation. Users can converse privately or in public, broadcasting their message to a community of users. The exchange could happen in a synchronous manner or in an asynchronous mode, where more focus is given to the message. These two dimensions, coupled with the persistent exchange enabled by always-on connectivity fuel a different kind of conversation.
Shifts from one voice technology to another are similar to shifts in other areas

where the newer and more innovative technology amplifies the users' behaviour in the old technology. The "amplifying effect is what we see first, never realising that there is a later transformative effect to come" (Keisler, 1997, cited in Joinson, 2003:19). This transformative effect is seen in the new modes of interaction that differ significantly from previous behaviour and that challenge the definition of conversation.

The convergence of the mobile device and access to the Internet has contributed further to the users' relationship with place. Whilst further detached from the physical place in terms of ubiquitous connectivity between users, the new mode of conversation through the phone adds meaning by relating to the places where the users are in at the time of exchange. Research discusses the term *locative-media* (Hamilton, 2009) that captures user interaction with relation to the dynamics of place.

Locative-media technology enables users to snap and share content on the spot. Ziv et al. (2006) review mobile social networking application Dodgeball, which later on rebranded to Foursquare. The review highlights how Dodgeball was able to broadcast one's place to mobile users in the vicinity. Hence if a user was in the vicinity, he would have had to check-in in a specific location and Dodgeball would have notified friends in the vicinity with the user's location.

Beyond Dodgeball, the exchanges carry data about place and time. The relationship between user and place is discussed in the work tackling co-presence. Users share information about their surroundings such that the absent part is visually co-present (Ito & Okabe, 2005). The research distinguishes between the sharing of exaggerated images of place to generate a discussion and the more frequent, less exciting images shared in sequence in a blog-like fashion. The latter behaviour highlights the users' intent to give a sense of being there with other viewers. The research also highlights the users' immersion in the mediated space, which is exhibited in the use of music players in public spaces to make one's self absent from the crowded trains and streets. The enhanced features of the smartphone allow the users to interact with their circle of friends whilst ignoring the surrounding crowds, wherever they are.

Mobile social networking apps also highlight this shift in behaviour. As the review by Ziv et al. (2006) suggests, there is an ecosystem of networking sites, some which are solely accessible on one specific medium, and others which are available both online and on mobile, which form part of the wider user experience on smartphones. As in the online space, social networking is not limited to social networking sites, and revolves around the basic features of communication through a mobile device connected to the Internet.

These trends reinforce the wave of change triggering the need to revisit the definition of conversation. The changing behaviour is observed in early adopters of the technology and niche groups of users that hint at what the future mainstream behaviour could be. The changing behaviour is also shaping a new communications landscape.

2.4 Conclusion

The path to the smartphone highlights a number of instances when the relationship between the user and the new technology was not clear. It would be wrong to assume that the shift stops at the level of technology being used. As happened with the shift to voice calls via mobile, users have exhibited a new type of behaviour that was not possible with fixed phones (Donner, 2007; Baron, 2008). The usage of the new medium should start to shed light on the hypothesis that voice conversations originally occurring in the form of a call are shifting elsewhere, changing shape and changing the user as well.

The path to the smartphone is just the enabler of a more connected user. The next chapter revisits models of conversation and pursues three dimensions that shape the shift in behaviour brought about by the more connected user.

3. Dimensions of conversation and conceptual model

The preceding chapter has reviewed the sequence of events that have led to the smartphone, not only the device per se, but also the world of ubiquitous connectivity that enables new forms of conversation. In Chapter 3 I build on this sequence of events by asking *why* this results in a new kind of conversation. In other words, which are the core aspects of conversation that are changing. The focus is not the tool itself, or the comparison of behavior exhibited in the traditional technology versus the newer one, but understanding why a new technology (or a suite of technologies) leads to different patterns of behavior. Answering this question is critical if one is to put forward a model of conversation as a framework of how this is evolving, as this study aims to do.

Previous work has discussed the evolution of technology in terms of its impact on society. Howard Rheingold thought about the tools that allow him to be "always on, always connected" and asked, "What kind of person am I becoming?" (1999). He was not alone and was not the first to do so either. In fact, in his work he makes reference to the Amish community in which the bishops evaluate each contrivance, including technological ones, with one fundamental query - whether its introduction brings them together, or draws them apart. It is useful to highlight that in the two examples, neither Rheingold nor the Amish bishops dispute the new capabilities the technology brings about. However, they go beyond the

technology and focus their query on its impact on the self and the community. This line of thinking is not limited to the smartphone. Technologies and inventions, as early as the tally marks, which preceded numbers, to writing and the printing press, all the way to the computer, have extended physical capabilities (McLuhan, 1964). As a result, this has transformed society "through both the intended and unintended consequences of widespread adoption and use" (Joinson & Piwek, 2013:2).

The new capabilities triggering widespread use have been captured in models that map the relationship between the tool and the user behavior. Authors have highlighted different aspects of the social exchange that are reviewed in Section 3.1. Yet some of these dimensions are more relevant than others in the new media landscape. Research elaborates on the constructs of time and space, out of which I derive the first two dimensions of the proposed conversation space. I extend the discussion and suggest that the new media has affordance of a third-place, re-enforcing the relevance of the chosen dimensions. Coupled with the capability of users to be always on, I propose the third dimension of the model, built on the literature of perpetual conversation. Bringing the three dimensions together I propose the new conversation space, which is at the heart of this study.

3.1 Mapping the relationship between the tool and user behaviour

Central to the relationship between the tool and user behaviour is the notion of technological affordance, which stems from the theory of affordances (Gibson, 1979). 'Affordances' is a term that relates to the environment and its inhabitants. It relates to what the environment *offers*, *provides* or *furnishes* to its user. For example, a flat surface is something we can stand on and walk on at length, but not swim in. Yet it is also specific to the creatures within the environment. Building on the previous example, creatures of the sea cannot live outside the water, and can neither stand nor walk. In a similar way, technological affordances relate to the way the new tools bring about new capabilities. These affordances do not stop at the availability of the technological feature, but its perceived and emergent use.

It is for this reason that I opt to pursue the five key dimensions as proposed by Joinson (2003). Even though the Joinson suggests that different media will differ in their affordances, he suggests five dimensions that explain the relationship between the media and the resultant behaviour. The value of the chosen dimensions, which sit at the basis of the conversation model being explored in this study, is that they adopt a link between technology and social behaviour. This link is not exclusive to Joinson's work, yet what is valuable is how it discusses the dimensions by bringing together previous theories in the research and building on them.

The first three dimensions relate to the social cues transmitted in the exchange, the constraints in terms of bandwidth and costs, and the level and type of anonymity. The other two dimensions are the synchronicity and the exclusivity of the exchange. I will discuss these dimensions in two groups below.

3.1.1 Cues, Constraints and Anonymity

By cues Joinson refers to the paralanguage cues re-enforcing the idea of the conversational exchange being more than the spoken (or written) words, as discussed in Section 1.4. The dimension builds on models that assess the capability of the mediated exchange (or the lack of it) to convey social cues. These models are categorized under the umbrella of the Cues Filtered Out (CFO) approach (Short et al., 1976; Sproull & Kiesler, 1986). The models hold face-to-face encounters as the benchmark for other mediated alternatives, which they assess by the lack of social information that is conveyed. At the same time, the CFO approach has its fair share of criticism as research suggests that had its proponents extended the experiment for longer, they would have found out that the mediated exchange eventually converges to the face-to-face one (Walther, 1992). On the same lines, Sonia Utz (2002) showed that the longer people communicate through a mediated exchange, the more paralanguage cues they use. Evidence of this is the table below, which includes 'emoticons' and acronyms, widely accepted and facilitated by messaging applications. In line with Walther's research the mediated exchange may be said to be converging to the face-to-face equivalent aided by a suite of paralanguage cues.

Emoticon	Meaning	Acronym	Meaning
:-)	Smile	LOL	Laugh out loud
;-)	Wink	ROFL	Roll on the floor laughing
:-P	Stick tongue out	LOL@	Laughs out loud at
:-(	Sad	a/s/l	Age/sex/location
:-0	Shocked	Ty	Thank you
		G (and BG)	Grin (Big Grin)

Table 1: Emoticons and social language acronyms (Joinson & Littleton, 2002)

The discussion on a technology's societal impact also depends on the amount of information it can convey. It is here where Joinson's dimension of constraints in bandwidth and cost comes in. Different technologies can be assessed on the affordances they bring about for users to share information.

> "Just as the physical characteristics of a pipeline limit the kind and amount of liquid that can be pumped through, the physical characteristics of a medium limit the kind and amount of information that can be conveyed." (Daft & Lengel, 1984:275)

Bandwidth constraints can be seen in the 160-character limit of SMS messages, or the more expensive charges when users are messaging abroad. Daft and Lengel (1984) frame the media landscape in a Theory of Media Richness. In the theory they present a hierarchy, in which personal encounters are put at the very top whilst one-way media, such as flyers, are put at the very bottom. Interactive media is found in the middle and includes the telephone and electronic mail. This set of models is relevant to the discussion in that the Daft and Lengel argue that telephone and electronic media, both categorized as interactive media, are said to lack the element of being there.

However the convergence of the Internet and the mobile phone, coupled by ubiquitous connectivity as discussed in Section 2.3, is reducing both constraints of cost and bandwidth. Taking the suggested hierarchy in the Media Richness Theory, one notes that both e-mail and voice calling are accessible through the same devices, side by side, on the device home screen. This level of convergence draws

the focus on the user choice. The Rational Actor Approach (Markus, 1994) focuses on this rational choice. It suggests that a tool's impact on society is determined by the choices individuals make about when and how to use it. The impacts of a wrong choice are seen to be the negative effects of the mediated exchange. Markus discusses this choice in a work context and suggests that the right selection of communicative media is considered to be an executive skill. The study distinguishes between routine and non-routine communications. It suggests that media at the top of the hierarchy should be reserved to non-routine exchanges whilst further down, other media may be used for routine tasks.

Anonymity makes the third dimension mapping the relationship between tool and social behaviour. Anonymity has various levels. The straightforward definition refers to lack of identification, however other variants of anonymity exist, such as visual anonymity. In understanding the impact of technology on society, models discuss the role of the self in the mediated exchange. These models are also relevant to the query of why the new media is resulting in a new conversation as they focus on what the user chooses to convey, and what he opts to keep to himself. The different facets of the self highlight that there are private aspects such as feelings, attitudes and values, which are available to us alone unless we choose to share them. On the other hand, there are aspects, such as physical appearance, that are public (Carver & Scheier, 1987). Such models argue that different media trigger different levels of self-awareness, which subsequently results in a different type of user behavior. In this setup anonymity is a user choice. It is within the users' remit to share private aspects of their identity. At the same time, different media provide different ways for users to execute their choice.

The three dimensions reviewed so far extend from models that take the face-to-face encounter as the benchmark. Setting the personal encounter as a benchmark to anything that is mediated stems from a time when the mediated alternative was less ubiquitous and less common. However, at this point in the path to the smartphone (refer to Section 2.3), the comparison is not any more between the un-mediated exchange and the other options in the hierarchy, if a hierarchy is to exist, but between one form of mediated exchange and another. The focus is on the conversation per se.

The discussion on cues and constraints is also part of a more technological deterministic discussion, in which a lot is said on the deficiencies of the new mediated alternative to match the face-to-face benchmark. Negative as it may seem, the discussion has an optimistic prospect making up for the said deficiencies:

> "[Literature that holds that] the negative social effects of electronic communication are caused by technological characteristics, is an optimistic theory. It suggests the cheerful prospect that the risks will diminish as technology becomes more advanced. The hope is that progress toward the integration of voice, text, and video will soon succeed in personalizing electronic communication, allowing users to relax their guard against outcomes both undesirable and undesired" (Markus, 1994:120).

This discussion, which occurred more than two decades ago, is more relevant now than ever. New media do provide features that combine various media formats and there is no reason for this availability to diminish. Joinson himself highlights that "different types of communications on the Internet have quite different structural characteristics and affordances" (2003:24). In this context, technological developments and the emergent use of the new technology is reducing constraints and providing new ways to convey social cues, rather than filter them out. It is for this reason that in proposing a new model of conversation I choose not to build on constraints and lack of social cues, which the media or the user will overcome.

This leaves the third dimension, that of anonymity. This dimension relates to the users' identity and hence is important when one discusses the protagonists of the conversation. Shared Virtual Environments (SVEs) and older chat applications identified users by means of avatars and user names. They did not convey much of a user's identity. Evidence of this is Rheingold's account of meeting users he had started chatting with online as early as 1986. The meeting happened three months after Rheingold had joined the online chat network.

> I looked around at the room full of strangers when I walked in. It was one of the oddest sensations of my life. I had contended with these people, shot the invisible breeze around the electronic watercooler, shared alliances and formed bonds, fallen off my chair laughing with them, become livid with anger at some of them. But there wasn't a recognizable face in the house. I had never seen them before (Rheingold, 1993:xvi).

The significance of Rheingold's account to the discussion on anonymity is that re-living a similar experience twenty years later is close to impossible. The new media have provided ways for users to go beyond the avatar. In parallel to the path to the smartphone, the social networking world has introduced the notion of the social profile. This profile aggregates as much detail about the individual as possible. With various applications integrating into the social networking profile, details are not limited to activity on the social network of choice. The other activities feed into his social profile. Once users become friends in the social networking sense, the two have access to each other's social profile, a world of information about the users' past and present. Rheingold's discussion hails cyberspace for its level of anonymity:

> "Because we cannot see one another in cyberspace, gender, age, national origin, and physical appearance are not apparent unless a person wants to make such characteristics public. People whose physical handicaps make it difficult to form new friendships find that virtual communities treat them as they always wanted to be treated--as thinkers and transmitters of ideas" (1993:11)

Yet the users' social profile starts with details of age, gender, national origin (or at least current location) and physical appearance. These details become apparent not only if a person wants to make them public. Other users can contribute to your social profile and this could at times result in these details going public without the users' explicit consent.

This shift does change the relevance of anonymity to the discussion. In a way the new social profile and new technological affordances to share images, videos and a stream of information about one's identity, contributes to the convergence of the mediated exchange to the face-to-face encounter. This does not mean that anonymity is not important. However, it seems that the mainstream mode of social interaction is now more than ever based on a sophisticated social identity where anonymity is the exception and not the rule. If mediated conversation is to intertwine with the everyday encounters we conduct face-to-face, and if this mode of conversation is not to be relegated to a place we have so far defined as cyberspace, anonymity is one limitation that has to be overcome. It is for these reasons that I opt not to pursue anonymity as one dimension framing the new conversation.

Before moving on to explore the remaining two dimensions in Joinson's model, I conclude this section by summarizing the rationale behind not pursuing further the first three. The new model of conversation, as formulated in this study, is one that should reflect the characteristics of conversation as it happens in the new media. In this context, the dimensions of cues and constraints have not been pursued further since new technology affordances promise to improve on these limitations. On the other hand, anonymity, even though an integral part of conversation in the early days of the Internet, does not seem to fit in context of the increased focus on the social profile, which elaborates on the user's identity. Synchronicity and exclusivity are the last 2 dimensions in Joinson's framework, which are discussed below.

3.1.2 Synchronicity and Exclusivity

By synchronicity Joinson refers to whether or not a discussion or conversation takes place in 'real time' or is spread over time. He argues that the type of communication enabled by a specific medium, synchronous as the telephone, or asynchronous as letter mail, could be used to categorize media. At the same time, Joinson highlights that this neat division is being blurred by technologies that take on the characteristics of a synchronous mode of conversation due to the speed of reply and networks. In other words, the new technology affordances leave it totally up to the user to choose between replying immediately, almost in 'real time', or whether to answer minutes, hours or days later. In the latter case, more effort could be put in composing the perfect response, something that is not possible in real-time conversations.

The choice of exclusivity in Joinson's 5 dimensions refers to whether or not a medium allows for private conversation to occur, in the sense of exclusivity of access. The author suggests that the lack of privacy in some media leads users to refrain from conducting intimate conversations and reserving these to more private media. He does not exclude the possibility of a conversation leading to more private exchanges, for example a chat room meeting leading to e-mail.

In contrast to the preceding three dimensions, synchronicity and exclusivity have come to be an integral user choice in conversation. Whereas the new technological affordances and the emergent user behaviour seem to be geared up to overcome the lack of cues and constraints in the long-term, the same affordances do not do away with different levels of synchronicity and exclusivity which users have to choose from every time they hold a conversation. This is ever more the case as social media platforms enable varying degrees of synchronicity and exclusivity through the same medium. The table below highlights Joinson's assessment of the two dimensions across Internet media. It highlights different levels of synchronicity and instances of exclusivity. Even though much has changed in the media reviewed by Joinson, the smartphone brings together in the same place their more recent equivalent, leaving the choice to the user. This choice is not only available through the smartphone. New media applications provide sophisticated features for users to chat in real time or delayed time, as they please and when required. They also enable users to share content with hundreds of their friends or limit it to a closed user group.

Internet Media	Private Chat	Group Chat	Usenet	E-mail	MUD / MOO	Video-conference
Synchronicity	High	High	Low	Medium	High	High
Exclusivity	Yes	No	No	Yes	Not Usually	Sometimes

Table 2: Internet Communications & the two dimensions (Joinson, 2003:25)

It is also useful to compare the dimension of anonymity with that of exclusivity, as both relate to privacy in their own way. Whereas anonymity relates to what the user shares and what is kept anonymous, exclusivity refers to who is part of the conversation, directly or indirectly. The new media have enabled large-scale conversations between thousands of people and at the same time provided new ways to conduct conversation with a restricted group. The protagonists themselves choose who is in the conversation. Identity, on the other hand, has become the norm. Whilst anonymous conversations do occur online in smaller social networking apps, the new media have made it easier for users to identify

with whom they are speaking. The use of images, friend information and regular status updates allow users to be up to date with what is happening in the respective lives of other protagonists. In a sense, anonymity does not remain a choice, and staying anonymous would usually imply not engaging in conversation all together.

It is specifically because the user is left to choose on the levels of synchronicity and exclusivity that I pursue the two dimensions. The users' choice is however not independent from the ways the constructs of time and space are being transformed in the new media. The different levels of synchronicity and exclusivity assert these constructs. Time and space are fundamental constructs of society, "the fundamental, material dimensions of human life" (Castells, 1996:407). This justifies further the choice of the two dimensions in the model of conversation, as elaborated in the next section.

3.2 Short-listing the first two dimensions

The new technological affordances have made time very apparent in mediated conversations. Similar to the time stamp on mail or the date in a letter, emails have a date and time, messages are sorted by the more recent and chat provides the time of each message exchanged. Synchronicity is defined by time. The difference between an asynchronous and a synchronous exchange is the time between one turn and another. It is this time variable that defines the speed of reply networks. The user choice brought about by quasi-synchronous media is also time related. The choice can be the negotiation of availability or the preference of the asynchronous mode over the synchronous alternative.

Even though technology enables users to be always on and the speed of reply networks is close to instant, offline, users have commitments and things to do. Response in delayed time could be the result of a situation the user is in, his social availability. For example, in Tokyo, the use of mobile phones for voice calling is not allowed in public spaces such as trains and buses. The act of calling in these public spaces is not encouraged and seen as impolite (Ito, 2005).

Technology has tried to overcome moments of unavailability. Whilst early fixed telephone sets did not allow the user to mute a ringing phone and the user could either answer the call or leave the telephone ringing until the initiator gave up, smartphone devices have all sorts of functionality to put the phone to silent and answer later. HTC, a device manufacturer, has developed gesture-based technology so that the phone automatically goes to silent when the user turns it face down. Specific applications on other devices allow the user to block calls from a group of users in a specific time period, for instance block work-related calls in the evening. These sophisticated features allow the user to negotiate availability better.

In other instances, asynchronous conversation is simply a user preference. When Google demoed a live chat application (Google, 2009) that compressed the time delay by publishing every single character as it was being typed, a number of bloggers raised concerns. One blogger described this type of chatting as if one was talking to an extremely curious mind reader (Manjoo, 2009). Rather than appreciating the attempt to mimic real-time conversation as in the face-to-face case, bloggers thought of the solution as intrusive, broadcasting whatever they were doing at any keystroke in time (Suyata, 2009). This starts to show that the time delay in asynchronous conversation has a purpose that is not the result of technology limitations, and not necessarily of the situation one is in, but of the type of conversation being carried out. In essence, there are conversations that seem more appropriate in delayed time.

Preference of the asynchronous mode could be related to impression management and careful identity construction. Conversation in delayed time allows the user to dedicate more time to compose the message than the exchange per se (Walther, 2006). Text messages, including e-mail, allow the user to arrange face (Goffman, 1959). This affordance of the asynchronous mode has resulted in various studies on impression management in the new media (Quan-Haase, 2008; Jansen, 2010; Utz, 2010).

Delayed conversation by preference is also related to the meaning the delay adds or reduces. Quan-Haase (2008) studies the use of instant messaging among students. She highlights the presence of quasi-synchronicity. She contrasts this to

the in-appropriate use of the chat medium by elders, who write longer messages as if they are using email. This goes to show that in instances, an acceptable level of synchronicity has a purpose. Too much of it feels intrusive, too little implies a slower conversation. The pauses in between message exchanges are part of the chat itself.

However the notion of time, in context of mediated conversation and the user choice in the synchronicity dimension, has deeper roots in the way time is being transformed in society:

> "The culture of real virtuality associated with an electronically integrated multimedia system…contributes to the transformation of time in our society in two different forms: simultaneity and timelessness." (Castells, 1996:461)

By simultaneity Castells refers to the ability of media to broadcast in real time what is happening in another place and the possibility of accessing information instantly in quasi-synchronous time. It also refers to the way new media has reduced to minute instants the delay between one message and another, increasing the speed of reply.

On the other hand, by timelessness Castells refers to the "perturbation in the sequential order of phenomena performed in that context", stemming from the view of Leibniz that time is the order of things. In other words, timelessness occurs when the order of things becomes secondary and subject to the choice of the user. It is also in this context that the asynchronous mode has a purpose in consuming time as we please.

Castells suggests the existence of the two modes, "a culture at the same time of the eternal and the ephemeral" (492), the synchronous and asynchronous. This setting promotes a super-synchronous mode of conversation where multiple conversations are occurring at the same time, simultaneously, yet which are consumed in our own time. Castells states that:

> "Timelessness sails in an ocean surrounded by time-bound shores, from where still can be heard the laments of time-chained creatures. "(467).

It is in this context that the dimension of synchronicity, mapping the shift to a more asynchronous exchange in the new media, is so important to understand the evolution of conversation.

The same line of thinking can be drawn for the dimension of exclusivity. Space is defined to be crystallized time and hence the co-existence of two concepts of time, timelessness and time-bounded, also has to do with the notion of space. The definition of exclusivity focuses on the ability of a medium to carry a private conversation (Joinson, 2003). In other words, the space where conversation occurs, whether virtual or not, is either exclusive to a few protagonists or open for anyone to see.

The notion of privacy in the synchronous mode of conversation implies limited access to the protagonist of the conversation. The access is defined by the place where the conversation occurs. This also holds for the mediated space. Even though two users can hold a private conversation over the phone whilst being physically miles away, they would still require to be in private in their respective places to avoid others from over hearing. In the asynchronous mode of conversation, access to the conversation has to be controlled for much longer and even the message requires an exclusive space where to be stored. Letter mail is sealed in an envelope until read and burnt or shredded thereafter. E-mails are stored in a virtual inboxes, password protected by their respective owners. Castells suggests that:

> "The development of electronic communications and information systems allows for an increasing disassociation between spatial proximity and the performance of everyday life's functions." (1996:394)

The statement is part of a wider discussion on how the networked society is transforming the constructs of place, primarily by separating the simultaneity of the conversation from the physical contiguity of the protagonists. In this sense the global city is not a place but a process, of exchanges, whether of production, of consumption or collaboration. What is relevant to the discussion is that at the heart of it all is the conversational exchange in the new media. The process is known as the space of flows, "the material organization of time-sharing social practices that work through flows"(147).

Castells argues how these flows are changing the meaning of a place and the relevance of spaces. In his terms, "a place is a locale whose form, function and meaning are self-contained within the boundaries of physical contiguity (453)". Yet the new conversation has its own spaces, not bound to the local place and connecting users globally. Protagonists still live in a place, yet their conversations go far beyond their physical location. It is said that they are *alone together,* alone, in private, but simultaneously connected to the world (Turkle, 2011).

Using Castells terminology, the new conversation has this sense of *placelessness* that is also changing the dimension of exclusivity. Whereas Joinson's view of exclusivity is almost dichotomous, in that a medium is either able to carry a private conversation or not, the characteristics of the new media suggest a more sophisticated categorization of what is private and what is made public.

The permanence of the message in email, chat and social networks starts to explain this complexity. Taking Facebook as an example, the social network has transformed the user profile by turning it into what it calls a Timeline. The timeline is a display of the user's online exchanges in the sequence they were posted. Whereas previously users had to scroll down to get to see older posts, making it difficult to access exchanges from the past, friends can now filter posts by date and find posts from as early as when the user joined the network. Even in this case, the technological affordances of new media make what was previously difficult to access, the user's past, easier to get to. This means that two users who met on Facebook in 2013 can go through their respective past posts of years ago, when they would have joined the network, or even earlier if the user wishes to. In the offline space, this is equivalent to walking into a bar and carrying with you at least a decade of baggage. In contrast, offline, individuals narrate their stories to a selected group of people, in a specific context and at a chosen point in time. Not surprising, the users' response to Facebook's Timeline roll out in 2012 (Olmstead, 2012) was similar to that of News Feed six years earlier. Cluley (2012) wrote that "Facebook is encouraging users to enter even more personal details about themselves and their life experiences, and making it simpler for others to view the information". The simplicity of access coupled with the extensive amounts of information provided to the crowded friend lists shift the conversation in public,

making it less exclusive than ever (Figure 10).

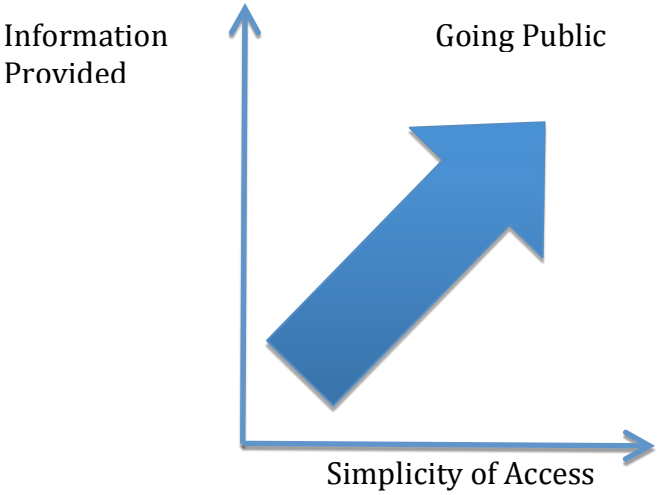

Figure 10: How conversation goes public on Facebook

Even though the timeline, and similar interfaces, provide detailed time information by attaching a time tag to every exchange or utterance, the conversation is time and space free. If one ignores when the conversation happened, he can go back to it anytime. At any point a private conversation in an e-mail inbox, which had been exclusive to its protagonists, can be forwarded to a crowd of friends, seen in a totally different context and changing the dimension of exclusivity. In the offline world, one can still walk out of the room and share a secret with anyone who crosses his path, but the new technology facilitates its mediated equivalent. Authors argue that once users resort to a conversational exchange on a profile where any of their friends can post content and shape their online persona, online communication becomes an inherently negotiable type of communication that cannot be controlled by any single actor (Galegher et al., 1988). Social networks only allow the owner limited control over what appears in association with his person (Langwell et al., 2008).

The dimension of exclusivity has to also consider the user's choice of not opting for exclusivity, making the piece of information public from the start. The new media provide new ways for users to converse in public. Defaulting to the public is sometimes seen as one characteristic of the Internet. In this view, in the online space, "everything that we do not explicitly declare as private is automatically

public", (Krogerus & Tschapper, 2012:88). Sociological experiments have been done to understand better what makes users opt to share their personal conversations in public (Senft, 2008). Re-enforcing the need for research to understand better these shifts in conversation Goffman states that "sociology does not provide a ready framework that can order these data" whilst referring to rules of conduct in public places"(1963:4).

The dimensions of exclusivity and that of synchronicity mark a shift in the way conversation could happen. Whereas this shift has for years been at the mercy of the technology that enabled or limited it, it is now up to the user to choose whether to hold a conversation exclusively in private or shift that to the public domain. The same may be said for the shift from the synchronous mode of conversation to the different levels of asynchronous exchanges. As has been seen in this section, the model of conversation is a result of these shifting dimensions, which apart from widening the users' choice, transform basic constructs of time and space, hence transforming social interaction altogether.

3.3 The third dimension

This section builds on the two dimensions which have been discussed so far. Having outlined the notion of space as crystallized time and the definition of place as presented by Castells, the idea that these two dimensions highlight the affordance of the new media as a third-place (Oldenburg, 1991) is put forward. The discussion will set the scene for the third dimension of the new conversation model.

In 'The Great Good Place', Oldenburg states "third places that render the best and fullest service are those to which one may go alone at almost any time of the day or evening with assurance that acquaintances will be there"(32). He defines a third place as a "public place that hosts the regular, voluntary, informal, and happily anticipated gatherings of individuals beyond the realms of home and work". He goes on to highlight examples of third places that capture informal public life – the pub, the village inn and the old coffee houses amongst others.

Oldenburg highlights the importance of these places for everyday conversation:

> "To have such a place available whenever the demons of loneliness or boredom strike or when the pressures and frustrations of the day call for relaxation amid good company is a powerful resource " (32)

In other words, community life exists when one can go daily to a given location and see many of the people he knows. Going by this statement, the opposite holds as well, in that community life suffers when one cannot resort to meeting the people he knows in an unplanned and informal way. This would be the case unless another alternative exists. Conversation itself started in the farming communities where people had more time to reconvene. Oldenburg argues that new cities are killing this conversation. He references Richard Goodwin (1974:38) who declared that "there is virtually no place where neighbors can anticipate unplanned meetings-no pub or corner store or park". He discusses this in context of the modern suburbs, which he suggests have limited features and facilities to nurture friendships outside the home:

> "What opportunity is there for two men who both enjoy shooting, fishing, or flying to get together and gab if their families are not compatible? Where do people entertain or enjoy one another if, for whatever reason, they are not comfortable in one another's homes? Where do people have a chance to get to know one another casually and without commitment before deciding whether to involve their family members in their relationships?"(Oldenburg, 1991:8).

It is in this context and building on the shift of the conversation from physical places to the space of flows that this study suggests that the new media has an affordance of a third place. If the new media is changing the meaning of place, then third places are not exempt from this transformation. One could even go a step further and synthesize that the demise of the third place is not simply the result of the suburb communities but also a product of the global connected and locally disconnected communities in the network society (Castells, 1996).

On the other hand, it could well be that the new media, the same connected world that supposedly disconnects us from the local community, makes up for the way it has threatened third places in the same community. This line of thought is entertained by research that has revisited the theory of third places as originally

conceived by Oldenburg (Mikunda, 2004; Crick, 2011). Whilst Mikunda tackles the notion of a third place as a commercial proposition which offers "a quick massage of the soul for stressed out customers" (2004:6), Crick (2011) discusses the concept of third places in contemporary culture, both in the developing and the developed worlds. The research builds on Oldenburg's proposed characteristics of a third place which I briefly review below:

It is suggested that third places are places that allow one to escape and find relief from stress by offering a *neutral ground*. In other words these must be places where "people come and go as they please, in which none are required to play host and in which all feel at home and comfortable" (1991:22). At the same time, a third place is also a *leveler*, in that the status of one's life is secondary to "the charm and flavor of one's personality" (1991:23). The latter is what counts.

Useful to highlight that Oldenburg considers a key characteristic of third places to be *conversation*. In his notion of a third place this is the main activity. Citing Sedgwick (1970:225), it is suggested that conversation is a game that "requires two and gains in richness and variety if there are four or five more…it exercises the intelligence and the heart, it calls on memory and the imagination, it has all the interested derived from uncertainty and unexpectedness, it demands self restraint, self-mastery, effort, quickness – in short, all the qualities that make a game exciting." Oldenburg then adds that the third place is this game's home court.

However, third places are also spaces for real games, emphasizing a *playful mood*. The games, which are played in pubs and taverns, serve as conversation currency and further emphasize the place as a leveler and neutral ground. Third places also enable one to come and go as an individual "at almost any time of day or evening with assurance that acquaintances will be there". This is further stressed with the notion of regulars. The author argues that it is *the regulars* that give the place its character and that in itself the place has a *low profile*. Last but not least, third places offer a *home away from home* in that they offer the friendly, "congenial" environment that is neither found at home nor at work.

Social networking applications in the new media space do resemble third places in some of the above characteristics. They do offer users another space where to escape from the daily routine. They also act as a leveler, in that even the more introvert users can compose carefully thought posts to express their personality and charm. Over the past years various were the stories of everyday people who rose to fame as a result of none other but the popularity gained in this space.

Maybe not coincidentally, various games have been plugged in the social media space and are currency for conversation. Whilst today's 'taverns' - discos and nightclubs - do not allow for conversation in this way, the social media world is full of social games that engage a wide network of users.

Surely social networks have their own regulars. The new technological affordances, coupled with the different levels of synchronicity and exclusivity, do enable users to 'visit' the place and expect to 'find' acquaintances at any time of day and evening. The places also carry a low profile in that the social media spaces have managed to do away with the heavy focus on virtual environment, whilst still creating an extensive, constantly habited and immersive space. Social networks are like a cleaner version of the earlier Second Life. Plainness and homeliness are the characteristics of third places further emphasized as part of the low profile characteristic. The social media profiles are as plain as can be, drawing the focus on the users and the conversation that goes on in the space, which as Oldenburg suggests, is the main activity.

Finally, conversation is a key activity in these spaces. Possibly, Sedgwick's romantic view of how conversation should be carried out does not come close to how users engage online, but truly, in Oldenburg's terms, the new media is the home court to the conversation game.

Summarizing this comparison is the definition below:

> The third place virtual community is a place to come into contact with new and old friends. This is a neutral ground where there is no hierarchy between the participants. The communication is democratic and playful in nature. This type of virtual community is always open and there is always the possibility to meet someone that you know. It is a little bit like going to the local pub. (Klang & Olson, 1999:252).

It is really a bit like going to the pub and much more like being there persistently. This would not have been possible had the new technology affordances not enabled the richer and wider conversation to occur. Whilst re-enforcing the inclusion of the synchronous and exclusivity dimensions, the idea of the new media as a third place also highlights the need to consider a third dimension. It is useful to note that as with the other third places, the users' emergent behaviour shapes new media as one. It is user behaviour that re-affirms the characteristics suggested by Oldenburg (1991) in this space. More importantly it is the users' behaviour coupled with ubiquitous access to this space that suggests that conversation is more than ever an exchange made up of effortless interactions that go on all day long contributing to what I wish to define as persistent conversation. The dimensions of synchronicity and exclusivity do not capture fully these features of the connected world we live in. Whilst the different levels of synchronicity allow users to hold a conversation in different dimensions of time, and the levels of exclusivity allow for a wider audience of participants, the affordance of being perpetually in contact enables the user to be 'always on' (Baron, 2002).

Perpetual Contact is the topic of the book by Aakhus and Katz (2002). Extending from the notion of the new media as an alternative space, being perpetually in contact implies being perpetually present. In this context, most relevant to the discussion is the affordance of absent presence that enables the user to be physically absent yet virtually present through perpetual contact. This terminology extends from the face-to-face encounters in a physical place where one is either present, or not, at least physically. To understand better the idea behind absent presence one should note that this is not only related to the new media and can be traced back to media that are not digital. The authors highlight how the print media has rendered an absent conversation present by involving readers in a conversation that otherwise they would not have been part of. The same may be said for media such as TV and the Internet.

In the new technological landscape, being perpetually in contact does not imply being perpetually available. In this way, perpetual contact is not enough to explain the third dimension of conversation and a better understanding of the resultant user behaviour is required.

Licoppe (2004) suggests that our mediated conversations may be categorized in two. As in the example of print media, absent presence refers primarily to mediated interactions which allow one to be virtually present in a conversation that otherwise he would not have been part of. In the world of the telephone and the mobile phone, this assumes that the protagonists are available at the same time. Yet new means to stay in touch have also done away with this restriction. SMS is one example of many.

SMS, and other means, have led to a different type of conversation, making the most of the new affordances to carry out what Licoppe terms as a connected mode of presence. In this mode of relationship management, the interactions become much shorter yet their frequency more regular. The focus is not what is said but that the protagonists feel the sense of being present together. In this way, through a sequence of snippets of interaction, the participants attain a different form of presence. This mode of conversation is different from the mediated interpersonal relationships that come in the form of longer voice conversation, often synonymous with users who are close friends yet live apart.

Licoppe's notion of connected presence builds on the idea of conversation as a continuous exchange. Goffman (1971) suggests that a relationship is represented as a sequence of situated exchanges and mediated interactions. Each of these reactivates, reaffirms and reconfigures the relationship. Eventually the relationship assumes the metaphoric form of a 'continuous conversation', consisting of a multitude of interactions, united in time through the construction of shared expectations, routines and a common world (Berger & Luckmann, 1966).

The study by Ito and Okabe (2005) on visual co-presence strengthens this line of thought. In this study the authors review the way couples share images of their whereabouts and the environment they are in. The photos have little aesthetic value and no captions, but are useful to provide a sequence of continuous updates such that the absent party feels present.

Evidence of this emergent behaviour is the discussion on how users are immersed in this activity and alienated from the real world. Gergen (2001) highlights the

notion of the floating world where talk is not directly related to the happenings of everyday life. He suggests a first order conversation where the language is used to relate directly to the activities in the offline world and contrasts this with the theoretical higher order conversation where talk is separate. He suggests that this is really fuelling absent presence as users learn how to be better in higher order conversation and diminish their capacity to speak in the first order level. This, he suggests, is as if we would be immersed in a floating world.

However, there's more than connected presence in Gergen's floating world. On top of the connected mode of presence is the increasing affordance of new media as a third place, suggesting a persistent mode of conversation. Persistence emphasizes a continued and prolonged existence of the conversation. In fact, online social networks do not simply mediate the conversation, acting as channels for continuous conversation through connected presence, but contain it, acting as a repository of interactions that one can get back to and build on, as if in a floating world.

Roaming around the space involves the consumption of these snippets of activity summarized in a stream. Interacting with other users is also much simpler. In the past the online medium has brought about shared virtual environments (SVEs) that allow users to be co-present in a virtual world. These environments sometimes require considerable effort and complicated equipment to mimic the real world in order to make the experience more immersive. The new social networks have done away with this richness of the virtual environment whilst still allowing users to be immersed in this online space. This simpler experience has made it easier for users to interact wherever they are and through an eco-system of devices. This, coupled with the perpetual connectivity has fueled a shift to a persistent mode of conversation

The shift is also seen in the effortless ways users can interact and express mutual presence. Comments on Facebook are similar to e-mail and SMS in format. A comment can be short or long, and one only needs a device running the Facebook application or connecting the user to the web. However, the Like button is different. The Like button is Facebook's most popular feature. It allows users to

like content and conversations by clicking on the Like button, diffused through Facebook and even beyond, in the Web. In terms of conversation, when clicking like, users do not need to compose any message and do not need to fit all the text into 160 characters – it is simply like nodding in agreement. Like after like, a continuous exchange of 'nods' helps users stay in touch. In Goffman's terms, like after like, users reaffirm their relationship. In Licoppe's definition, like after like, users extend the connected mode of presence. Yet it doesn't stop there. Like after like, user activity feeds into a stream of conversation that is contained in this virtual space for all friends to see.

This type of conversation is seen in other parts of the new media landscape. Twitter launched a six-second video application called Vine, which facilitates the creation and sharing of videos. Vine enables users to record six-second videos and share them via Twitter and Facebook. The videos, which include both visual and audio content, loop persistently (Dredge, 2013). This is what co-founder Dan Hoffman had to say about the service at the launch:

> "Posts on Vine are about abbreviation — the shortened form of something larger," writes Hofmann. "They're little windows into the people, settings, ideas and objects that make up your life. They're quirky, and we think that's part of what makes them so special."

One key difference between Vine and the visual co-presence observed in the study by Ito and Okabe (2005) is this notion of place. Both tools allow users to share details about presence through visual snippets yet through Vine users do not simply return to the picture exchange as in Ito's moblog example but to the Twitter stream, a place inhabited persistently by friends and many others.

The shift to a persistent stream of conversation is the bi-product of the connected mode of presence coupled with the affordance of the media as third place. The shift is not limited to the new media space. The new devices that extend the users' tools to stay connected are "not just added to the older ones, nor [is their use] substituted for a rival use. It is the entire relational economy that is 'reworked' every time the technological landscape changes"(Licoppe, 2004:142). For persistent conversation to be persistent it has to be seen as a cross-media and cross-platform exchange. The simplicity of the new media tools not only enables

this but also highlights that the media's effort to mimic a real world environment is not as relevant as it used to be. The shift to the persistent mode of conversation emphasizes the convergence of the mediated and the un-mediated interactions into one, moving away from relegating the virtual space in a boundary of its own, often referred to as cyberspace. Literature suggests the emergence of the face-to-mobile-to-face conversation, as the mobile aspect becomes an integral part of the face-to-face encounter. Whilst perpetual contact is a technology affordance, persistent conversation is emergent user behaviour, a user choice that extends the notion of connected presence in the virtual third-place.

3.4 Conversation in three-dimensions

Having gone through the literature which led to the three dimensions being put forward, a working definition of these dimensions follows, highlighting the shift from one level to another, and emphasizing the quasi-states in between. Before moving on to the working definition, reference is made to the discussion on conversation in Section 1.4. In this section, conversation was defined as a "few moments dedicated to the conversation per se and cut off from the other tasks"; a "small number of participants"; and finally "the right for the participants to talk and listen in a fixed schedule" (Goffman, 1976:13). The chosen dimensions challenge this definition as conversation shifts:

a) *From a synchronous to an asynchronous mode of conversation*

The dimension of synchronicity highlights a shift in the time of the conversation, from one that is time-bound to a timelessness mode enabled by asynchronous conversation. A synchronous conversation is defined as one that happens in real-time. An asynchronous conversation is one that happens in delayed time. This shift between the two levels is not a dichotomous one as the variants of delayed time add meaning to the conversation. Such variants result in instances of quasi-synchronicity that reside in between the extreme poles of real-time and delayed conversations. More importantly, the technology affordances have made the level of synchronicity a user choice.

b) From an exclusive (and private conversation) to a public exchange

The notion of exclusivity (Joinson, 2003) is also closely tied to the shift from a time-bound to a timeless conversation as defined by Castells (1996). The ability to converse without the limitations of a coordinated exchange has transformed the importance of the place where the conversation happens and where it is stored. In both cases, this has enabled the small number of participants Goffman (1976) speaks about to grow drastically, with social networks including friend lists made of hundreds of contacts.

A private conversation is defined to be one that is inaccessible to spectators. The notion of access is taken to be a perceived one, including instances in exclusivity is simply the result of the other users lack of engagement and not a feature of the exchange per se.

Adopting this idea of access, a public conversation is one that is accessible to others outside of it. In the new media, higher participation draws more attention to a conversation, making it more accessible to others.

c) From a transient to a persistent mode of conversation

The first two dimensions also suggest the affordance of new media as a virtual third-place. This enables users to not simply be perpetually in contact and to carry out a connected mode of conversation, but to contribute to a persistent stream of exchanges contained in the same virtual space. In this context, a transient conversation (or ephemeral) is one that has a beginning and an end. Such conversations are synonymous with intimate interpersonal mediated exchanges that take the form of a longer conversation, as highlighted in Licoppe (2004).

Building on the above definition, a persistent conversation is one made up of continuous frequent exchanges that one can go back to at any time and that form part of a persistent stream of exchanges contained in the network where it happens. The exchanges are brief and effortless in content, not necessarily in the relationship management and self-impression of its participants.

Bringing together these dimensions, and capturing the varied user choice in the ever-changing conversation space, I propose a three–dimensional model of conversation. The model brings together the shift from private to public interaction, the shift from a synchronous to an asynchronous mode of exchange and the shift towards a more persistent thread of conversation, capturing the widened user choice available.

The three axes also capture the quasi-states in what I will refer to as the conversation space. The quasi-states represent the perceived view of the three dimensions as discussed in Chapter 3. Voice calls occurring through the mobile phone could be said to occupy the bottom left corner of the model, assuming that the conversation carried out is private, transient and asynchronous. This marks the starting point of the conversation space. All other points in the model vary by one or more of the three dimensions being discussed.

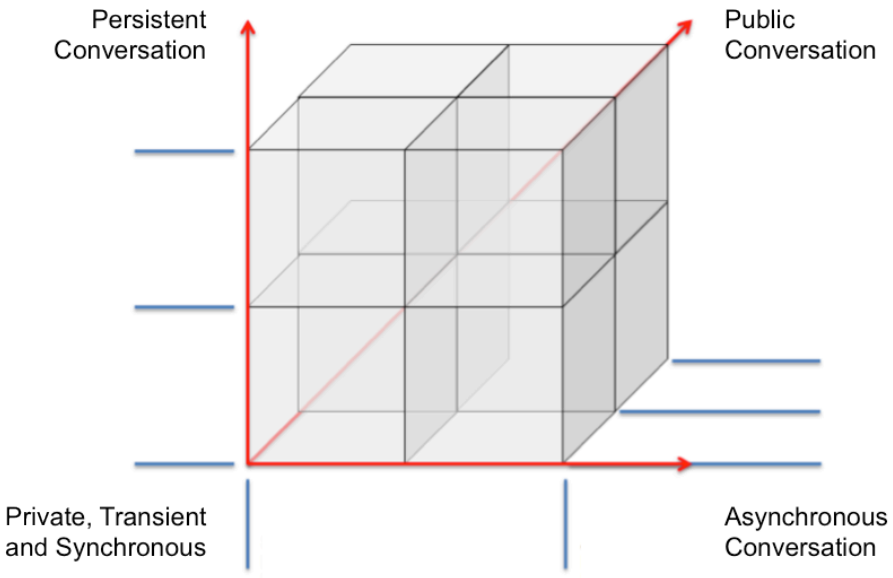

Figure 11: Proposed Three-Dimensional Model

The resultant model stems from the discussion on 5 dimensions (Section 3.1) yet differs in the perspective it adopts. Whilst the model by Joinson (2003) is very much ingrained in the comparison of the mediated exchange with the face-to-face alternative, the proposed three-dimensional model of conversation is more focused on the evolution of the the exchange in the new media space. As a result,

the proposed model does not pursue those aspects in Joinson's model that focus on the limitations in comparison to the face-to-face alternative. The dimensions of cues and constraints are not pursued for this reason. The same may be said for anonymity. Whilst anonymity is a feature of the mediated exchange, old and new, I feel that it is tackled in Joinson as a limitation. The choice of not focusing on the limitations is justified on the basis that the mediated exchange will converge to the un-mediated one by time (Walther, 2002; Utz, 2002). The argument is further re-enforced by the technology deterministic approach, which assumes that technology will eventually be optimized to overcome the limited constraints and cues. Further to this, the ever-growing importance of online identity and the user profile is another reason for not pursuing anonymity in the new model.

On the other hand, the dimension of synchronicity, as highlighted by Joinson (2003), has been left as is and incorporated in the new model. The 5th and final dimension, that of exclusivity, was also incorporated in the model yet approached differently. In the proposed model the focus of shifts along this dimension is the wider participation and the possibility of holding conversation in public. In the original discussion by Joinson, exclusivity is approached as a dichotomous dimension, with its absence limiting privacy.

The proposed model also incorporates the dimension of persistence, which is not captured by Joinson's framework. Apart from primarily being an affordance of the mediated exchange and not of the face-to-face one, the new dimension represents a state of ubiquitous connectivity that might have been difficult to predict in 2003 when Joinson's model was published.

The three-dimensional model also contrasts with other models in the literature. The conversation space maps conversations and not different technologies (Jensen, 1998). Neither does the model map defined conversation categories as in (Bordewijk & Van Kaam, 1986) and subsequent models that followed (McMillan, 2002). This approach brings forth more sophisticated granularity that allows one to tackle different conversations even if these occur through the same medium but vary in mode of synchronicity, level of public exposure and persistence.
The model follows closely the Connected Presence Cube by Schroeder (2004)

where the zero state (0,0,0) state is a face-to-face state and the departure point of the shift. Once again this model is really mapping technologies for SVEs, not conversations, against the dimensions of presence, co-presence and connected presence. In a way, the shift modeled in the Connected Cube is captured and extended beyond connected presence by the persistent dimension, the third dimension of the proposed model.

The existing definition of conversation, such as that by Goffman (1976), makes reference to other aspects of conversation that point towards additional dimensions. Whilst the chosen dimensions in the present study are considered to be core to the activity of conversation, the choice is not exhaustive. In this sense, future research could consider other dimensions Social networking, which relates to Goffman's reference to the number of participants, or the platforms that capture the few moments of conversation as in the definition, could both be tackled as separate dimensions. At the same time, the conversation space captures various aspects of what could be separate dimensions. In this context, one hopes that in tackling new dimensions of conversation, the three-dimensional model becomes the bases for new research to build on.

Throughout the remaining part of the research the notion of three-dimensional conversation is tested by analysis of user behaviour in the mobile and online space. The implications of the findings are then discussed with reference to the evolution of conversation in the future.

3.5. Conclusion

Chapter 3 started off with the question of why developments in the technological landscape are triggering a new kind of conversation. The focus was the relationship between the technology and the users' behaviour. Five dimensions were reviewed in context of other models that aim to map this relationship (Joinson, 2003). Two dimensions, synchronicity and exclusivity have been developed further, making up the first two dimensions of the new conversation view. These dimensions have been discussed in context of the transformation of space and time with reference to the theory of the space of flows (Castells, 1996).

The third dimension is developed on the first two. I discuss the affordance of the new media as a third place (Oldenburg, 1991; Mikunda, 2004; Crick, 2011). This is also a result of how the medium has transformed the notion of place, including that of a third place. I use the literature on perpetual contact (Aakhus & Katz, 2002) to highlight the possibility to be present in the virtual third-place at any time of the day. This is however a technological view, since in everyday life, it is the user that determines the shape and format of the conversation. I present the notion of presence, and the ability for users to be absent present through mediated interaction. Reference is made to the connected mode of presence suggested by Licoppe (2004). This is a different way to keep in touch. I suggest that coupled by the affordance of the virtual third place, conversation is shifting to a persistent stream, contained in the same networks that mediate it. The shift to the persistent mode of conversation makes up the third dimension of the model.

The model is presented towards the end of the chapter. A working definition is provided for each dimension. The three streams of research are brought together to propose a three-dimensional conversation space, which captures the wider choice available to the user.

4. Methodology

This chapter describes the methodology and methods used in the study. The discussion revolves around the basic beliefs that define an inquiry. In the literature, the research inquiry is summarized by responses given to three fundamental questions - the ontological, epistemological and methodological questions (Guba & Lincoln, 1994). The ontological question focuses on what is the form and nature of the reality being studied and hence what there is to know about it. The epistemological question focuses on the relationship to what needs to be known. The methodological question asks how the inquirer can get to the research discovery and follows from the adopted ontological and epistemological stance.

The ontological and epistemological questions are closely related and hence tackled together in the first section. On one hand, ontologically the focus is on the reality that is being studied. At the same time, epistemologically the focus is on how this reality is interacted with for new knowledge to be generated. Responding to these two questions leads to the locking of the theoretical approach of the research. The second section in this Chapter aims to detail the choice of methods used, responding to the methodological question of the inquiry.

Having established the methodological approach, the research design follows. This

is also complemented by a discussion on the research limitations and ethical considerations in the study.

4.1 Theoretical Approach

The ontological and epistemological parts of the inquiry are often said to cater for the aspects of "what" and "who" is in the research. In the present research the reality being researched, hence the "what", is conversation. Yet as has been highlighted in section 1.4, and throughout Chapter 2, the activity of conversation is a dynamic one, evolving in parallel to the technological developments of the past years. In this context, the discussion starts off with a review of the different facets of conversations and then tackles the choice of research paradigm.

4.1.1 Facets of Conversation

Clarity is required on aspects of the reality that form part of the study and those that don't. One facet of conversation is the view of it being an exchange (Bordewijk & Van Kaam, 1986). The notion of conversation as an exchange opens up other facets for research to study. The exchange is a flow of information (Castells, 1996) hence the focus could be the information being exchanged and its format. It could be limited to the spoken word or widened to include other forms of interaction, including the analysis of the textual exchange (Efimova & de Moor, 2005) or visual exchange (Benevenuto et al., 2009).

Flow of information is also seen in the context of the social structure within which the conversation happens - the social network as the social container of the exchange. In this context, the exchange becomes a link between two ends. This approach is mostly present in the area of network analysis where interactions define a social network with the frequency of the conversation indicating the strength of the link (Onnela et al., 2007; Seshadri, 2008). The area of social network theory shifts the focus from the content of the exchange to the participants in the exchange. The focus on social networking theory is also fuelled by the notion that these networks provide a model of the real-life network of relationships that span beyond the medium. As a result, conversation can also be

studied in the context of its relevance to the protagonists' interpersonal relationships (Licoppe, 2004).

In the mediated scenario, conversation can also be studied in the context of the medium in which it happens. The cube of Interactivity (Jensen, 1998) maps media by a set of characteristics of conversation.

These different facets of conversation highlight the options available to the researcher when adopting a stance regarding the research inquiry. The focus of this study is the way conversation is evolving along the dimensions of synchronicity, persistence and shift to the public, as established in Chapter 3. Prominent are facets of conversation that home in on the widened user choice available in the new media stemming from the three dimensions being pursued. The widened choice enables a different kind of conversation altogether and hence its importance in formulating a new model of conversation.

4.1.2 Choice of Research Paradigm

Epistemologically I build on the above discussion to establish the "how" aspect, that is the relationship between the research and the reality being studied. The response to the epistemological question comes in the form of what Creswell terms a knowledge claim:

> "Stating a knowledge claim means that researchers start a project with certain assumptions about how they will learn and what they will learn during their inquiry"(2003:6).

Knowledge claims, also known as paradigms (Guba & Lincoln, 2000); research methodologies (Neuman, 2000); philosophical assumptions, epistemologies, and ontologies (Crotty, 1998); fall in popular schools of thought. The choice of one claim over another is based on key questions, which I pose as part of the process to lock the methodological approach. Primarily, I ask if the view of conversation is an objective or a subjective one.

An objective view of conversation suggests the reduced view, which stems from

the positivist and post-positivist paradigms. The positivist approach to research is the oldest approach. In this paradigm, conversation is a static subject, generic and distinct from context, subject to unchangeable laws over time. This allows for an objective stance which, when adopted by different researchers studying the same subject matter, is expected to generate similar results. In such an approach, the researcher invests in the formulation and careful verification of hypotheses, often involving quantitative methods that confirm or disprove the expected theory.

Post-positivism follows positivism historically and is described as the critical version of it, hence also referred to as Critical Realism. This paradigm assumes that there is an objective view yet takes into consideration the researchers' limitations to fully understand this reality. Lincoln and Guba describe these limitations as "flawed human intellectual mechanisms and the intractable nature of phenomena" (1994:110). The relationship between the researcher and the research subject is less distinct than that assumed in Positivism. Instead of formulating a hypothesis and using analysis to prove it, researchers adopting a Post-Positivist approach take a critical stance and focus more on falsifying hypotheses. Axiologically, in the reduced view, conversation is approached as an activity that can be looked at as if under a microscope in a laboratory. Conversation, seen from the reduced view, is a constant activity, unchanging in essence, even when the technological and social constructs around it change.

In practice, the work by Eagle et al. (2007) may be seen to adopt the reduced view. The work aims to infer social network structure using conversation exchanges on the mobile network. The research hypothesis may be summed up in the ability of the network data to predict relationships. The work focuses on the accuracy of these predictions, generalising the model to wider networks.

However, the view of conversation in the present study does not follow the reduced view. The formulation of a three-dimensional model of conversation is in itself triggered by extensive changes that have happened in the conversation space over the past years. It therefore assumes that the reality under examination is one that is evolving along chosen dimensions. It is in this context that I consider alternative paradigms, which I group under the alternative view of conversation.

The alternative view includes research paradigms that are very different from the positivist and post-positivist approaches. These paradigms vary on the basis of objectivity and relativism in the worldview. In this case the examined subject is "local and specific" to the researcher. In such an approach the researcher recognises his role as a protagonist of the reality he is observing. In this way, he is more aware of his own bias, interpretation and opinion. This researcher is interested in the idiographic aspect of reality, focusing specifically on the subjective reality at that point in time rather than the nomothetic aspect. The work of Horn (1998), Rheingold (2000) and Senft (2008) feature three cases in which the authors are active participants in the reality they are researching. Horn is in fact the founder of the social network Echo[1]. In The Virtual Community, Rheingold relates his experience as an active participant of (the) WELL whilst Senft becomes one of the users she studies.

The alternative view leads to another methodological decision - if it has been decided that the reality is a subjective one, how do we get to it. One particular school of thought, the constructivist one, suggests that the reality is socially constructed. Constructivism holds that there is no one absolute reality and that all research contributes to a construction of this reality. In such a view "realities are apprehendable in the form of multiple, intangible mental constructions" (Guba & Lincoln, 1994:109). Constructivism starts off from the point where the researcher is an integral part of the reality being researched, hence is influenced and subject to bias when drawing conclusions. The axiological stance holds that neither the inquirer nor the inquired are independent. In this view, triggered by the lack of independence between researched and researcher, the epistemological and ontological aspects are not two distinct entities.

Constructivism is not the only paradigm adopting a subjective stance. In fact, along the years some researchers felt that the post-positivist assumptions of the reduced view and the constructivist stance were not enough. The former was seen to have

[1] Echo is a social network founded in 1990. More about Echo may be found at: http://www.echonyc.com/about/ [Accessed 23rd November 2013]

"imposed structural laws and theories that did not fit marginalized individuals or groups", whilst the latter was considered as "not doing enough in advocating an action agenda to help marginalized people" (Creswell, 2003:9). The alternative they present is claiming knowledge through "historical realism" in which a reality is assumed to be real as far as it is shaped over time and bounded by natural laws at that point in time. Creswell suggests that these claims are part of the Advocacy/Participatory paradigm, also referred to by Lincoln and Guba as Critical Theory. The umbrella term groups together alternative paradigms such as neo-Marxism, Feminism, Materialism, Participatory Inquiry and Critical Theory itself.

Both the constructivist and participatory paradigm highlight interesting aspects for the present study yet one final paradigm, the pragmatist approach, is considered to be the most appropriate. Whilst still adopting a subjective view, the pragmatist approach claims knowledge out of "actions, situations, and consequences rather than antecedent conditions"(Creswell, 2003:13). This is in line with the present study in which the inquiry is motivated by the shifting conversation. Shifting conversation is a constant activity, triggered by significant changes exhibited by the interplay between user behaviour and changing technology affordances. The study is interested in emergent user behaviour and therefore adopts a view of conversation that is ontologically dynamic.

For the pragmatist the research is also more forward looking than geared towards explaining a reality in retrospect as in the other paradigms, particularly the positivistic ones. In this way, the focus of the research is specifically the problem under study and all approaches are geared towards solving the problem (Rossman & Wilson, 1985). As a result, reality is claimed by what works at that point in time. The view of conversation in the study is very time specific, with the period of time having been established early in the text, in Section 1.1. The proposed three-dimensional model is geared towards understanding the evolution of the activity.

Building on the wider approach to solve the problem under study, the pragmatist school of thought suggests the mixing of methods. This is also in line with the methodological stance adopted in the present research. In fact, having established the focus of the study on conversation and the epistemological stance being the

pragmatist one, the next section discusses in further detail the choice of the mixed-methods approach, which also locks the methodological stance of the study, the "how" of the research inquiry.

4.2 Methodological Response

Literature responds to the methodological question in different ways:

Part of the literature *extends* knowledge in the area by building on previous literature as the basis of analysis. The review of instant messaging on campus (Quan-Haase, 2008), interaction (Roda, 2003) and sociology of the mobile phone (McGuigan, 2005) are some examples.

Other studies *explain* phenomena in the area. Research in this category includes a concept explication of multi-communication behaviour (Turner et al., 2008), an extensive concept explication of interactivity (Kiousis, 2002), a review of the models of interactivity (Jensen, 1998; Agle, 2006) and a review of mobile social networks (Ziv et al., 2006). Models may be classified in those that are conceptual, such as that by Schroeder (2006) proposing a model of connected presence; and others that are a prototype of how the reality can be shaped. Research adopting this latter includes Vuillemot et al. (2010), who propose Shift-Box, a feature that allows the user to replay the way in which emails are received in an effort to reduce email clutter and make better use of the email time stamp. Hamilton (2009) proposes OurPlace, an online application making use of location data in addition to user-generated content. Erickson et al., (2002) propose a user interface to facilitate social translucence and presence.

A different approach to conversation is found in work that makes use of data mining methods to *predict* network behaviour. This approach is used to analyse data on Youtube (Cha et al., 2007; Benevenuto et al., 2009), Twitter (Huberman et al., 2009), Facebook (Lampe et al., 2006; Viswanath, 2009), LiveJournal (Backstrom, et al., 2006), Hyves (Utz, 2010) and e-mail (Ebel, et al., 2002; Kossinets and Watts, 2006).

In the context of the above examples, the methodological response may be geared towards *extending* the literature, *explaining* phenomena and *predicting* behaviour. These verbs imply alternative methodological responses, which complement the chosen ontological and epistemological stance. In achieving this goal different methods are used. Building on the pragmatist approach, the present research aims to primarily explain the emergent conversation in the new media. In the process it also extends the literature to more recent years and attempts to predict the evolution of conversation in the future. The pragmatist view promotes the mixing of methods to fully respond to the research question, yet before adopting this approach it is useful to highlight what the methods bring to the research process, how they complement each other in the aspects they tackle, the sequence in which they occur and their importance in the methodology.

4.2.1 The contribution of quantitative and qualitative methods

The broad categorization of methods conventionally groups them in the quantitative and qualitative camps. The different methods complement the various paradigms discussed earlier in Section 1 of this chapter.

The quantitative approach relates to quantity and implies a variable (or variables) used to answer the research question. The research question may be complemented by a hypothesis that is tested upon collection of data. Qualitative methods have been used in the analysis of conversation in the mobile space (Licoppe, 2004; Licoppe and Smoreda, 2005; Onnela et al., 2007; Ling et al., 2008; Faloutsos et al., 2008). Eagle et al., (2007) data mines 330,000 hours of usage, generated by 94 subjects. The work is also complemented by self-reported relational data to confirm accuracy of the model. Markman (2009) makes use of chat-based virtual meetings to study mediated conversation. Donner (2007) explores beeping by interviewing business owners and students in Rwanda.

On the other hand, the qualitative approach refers to the quality, aspects or characteristics of a research question that may not necessarily be quantifiable. Such work tackles the topic by providing methodology that is less driven by numbers and a qualitative analysis through the use of ethnographic analysis and

interviewing. Donner and Steenson (2009) interview 39 residents in Bangalore to study their use of the mobile phone. Humphreys (2008) draws a comparison between online social networks and mobile social networks. The study is done by observation and in-depth interviews. Similar approaches are used to analyse popular social networks (Boyd, 2004; Lange, 2007), blogging (Efimova & de Moor, 2005) and visual co-presence (Ito, 2005)

The quantitative and qualitative approaches differ in their respective application in the real world. Literature on the topic of research methods claims that quantitative work surveys the terrain whilst qualitative work mines it (McCracken, 1988). In the quantitative approach the researcher is concerned with the generalizability of findings to a parent population. In such cases effort is put in selecting a representative sample that provides an accurate idea of the wider and bigger population. The qualitative approach is on the other hand concerned with extrapolation of the findings to different cases with the aim of establishing a theoretical link in each case (Brannen, 1992). The contrasting characteristics of the two approaches establish the end goal of the research process and hence condition the full research process – type of data used, its collection, analysis and interpretation.

Quantitative methods are associated with enumerative induction used to extract information from a sample, to answer questions related to quantity on a parent population. In contrast, the analytical type of induction is often associated with qualitative methods. However, this straightforward association of the enumerative with the quantitative approach and the analytical with the qualitative approach is challenged with research that uses both.

Even though the quantitative and qualitative approaches may be seen as mutually exclusive, more recent literature makes use of a mix of methods stemming from both camps. In this work, the combination of these two approaches is varied and purposeful.

4.2.2 The mixed-methods approach

A review of the integration of qualitative and quantitative methods is done in Bryman (2006) using a sample of journal articles that make use of mixed methods, also known as multi-methods (Brannen, 1992), multi-strategy, mixed-methods and mixed-methodology (Tashakkori &Teddlie, 1998; Creswell, 2003; Bryman, 2004). Bryman (2006) highlights how the approach of mixing the quantitative and qualitative methods has grown in popularity such that this approach may be seen as a method on its own. The review draws conclusion on two main points. Primarily, the review highlights the importance of clarity in what both qualitative and quantitative methods answer respectively and how the methods are linked to distinct research questions within the study. Secondly, the review highlights how the application of mixed-methods has presented researchers with unexpected findings that add value to the research aims and objectives.

The research by Bryman (2004) also tackles the researchers' rationale for using mixed-methods. Bryman refers to Green, et al., (1989) and highlights five justifications for using mixed-methods: triangulation, complementarity, development, initiation and expansion.

Triangulation is the adoption of a mixed methods approach to corroborate results. Similarly by *initiation* Greene suggest using more than one method to contrast findings and question further. In each case, the findings from both methods strengthen the result. In the first case the mixing is done to test findings whilst in the other to compare and contrast.

On a different note, in other parts of the literature, the mixing of methods is justified on the basis of *complementarity,* in that one method is used to elaborate further on the results of another. Mixing methods is also justified when it expands the research, widening and broadening the analysis; and when results from one method are used to develop another.

These justifications are rather close in the objectives they try to achieve. At the same time, they point towards different levels of importance of the chosen methods, even determining the sequence, if any, in how they are carried out.

4.2.3 Variants of mixed-methods

As a result, research features instances when the qualitative work facilitates the quantitative method, other instances when the quantitative work facilitates the qualitative one and literature that adopts an equal emphasis approach (Brannen, 1992).

Qualitative work as facilitator of quantitative work

Qualitative work can facilitate quantitative research in various instances. Primarily qualitative methods may be used to draft hypotheses that are later tested quantitatively. Similarly, preceding the quantitative method is the use of qualitative methods to draft and pilot questions in a survey. Yet qualitative work, even if given a secondary role in the research, may not always precede the quantitative method. In such cases a qualitative approach may be taken to interpret the findings and further clarify the quantitative work.

Quantitative work as a facilitator of qualitative work

Quantitative work that is given marginal importance in a research inquiry can support the qualitative method before and after. Quantitative work may be used to provide background data triggering the qualitative method. Alternatively, quantitative analysis could be the basis for the choice of sample that is then analysed qualitatively. In instances where the quantitative method is used after the main method, the secondary method is used to test a hypothesis and strengthen the qualitative outcome.

Equal emphasis of approach

Both methods may be given equal weighting in a study. In such instances the researcher can conduct two separate studies running in parallel or else integrate

the methods at a particular stage of the research.

The choice of combination of the two methods in a mixed-methods approach is influenced by the importance of either of the methods to the research process. However this is not the only factor. As hinted throughout the above paragraphs, sequence is another variable. In fact, the combination of sequence and importance points towards six different strategies, suggested by Creswell (2003) and tabulated below.

Sequence	*Strategy*		
Sequential	*Explanatory*	*Explorative*	*Transformative*
Concurrent	*Triangulation*	*Nested*	*Transformative*

Table 3: Six Different Strategies (Creswell, 2003)

In a sequential explanatory strategy the qualitative method follows the quantitative and is usually the least important, acting as a facilitator. However, in this strategy, the results are combined into one interpretation. The explorative strategy has the quantitative aspect as the facilitator of the qualitative one. The sequential transformative strategy is different from the first two in that the importance of either qualitative or quantitative method is flexible. The strategy is however governed by a theoretical perspective, which guides the mixed-methods approach. A concurrent transformative strategy exists and varies simply by the sequence of the methods. In this case, the methods are carried out concurrently. The strategy is still guided by a theoretical perspective, which could be a conceptual framework, a specific ideology or advocacy. In fact the strategy could adopt the nested or triangulation approach, as long as it satisfies the over arching theoretical framework. As the name suggests, concurrent triangulation carries out a mixed-methods approach simultaneously with the purpose of corroborating findings. On the other hand, the nested alternative has one predominant method, and a secondary method nested within it as a facilitator.

The present study is guided by the three-dimensional model of conversation, which acts as the conceptual framework for the mixed-methods approach. In this way the adopted strategy is a transformative one. This is also in line with the pragmatist paradigm in which all the methods are geared towards addressing the

research problem, in this case that of an evolving conversation. For practical reasons, the quantitative and qualitative aspects of the study have been carried out in sequence, in the order they are mentioned here. The specific choice of methods from the quantitative and qualitative camps will be seen in greater detail in the research design in Section 4.3. However, before moving on to the research design, it is useful to detail one final decision that is required to complete the methodological response – that of the validity framework.

4.2.4 Validity of approach

Validity is defined as the accuracy of the research to represent credible participants' realities part of a social phenomenon (Schwandt, 1997). The above research paradigms suggest a worldview for the inquiry. The aim of any study is also that of providing an accurate worldview. To this extent, an appropriate validation framework is required.

Apart from being influenced by the chosen research paradigm, the chosen validation framework is influenced by the research lens. The lens may be the participants of the research, people external to the research or the researcher himself. Creswell and Miller (2000) cross tabulate the research lens and the research paradigms to propose a two-dimensional validation framework consisting of nine validity procedures. The cross tabulation includes the various paradigms against the choice of lens, be it the researcher, the participants and the lens of people external to the study.

The researcher may verify the work by consulting with the participants of the research, a lens known as the participants' lens. When researchers turn to participants to check the validity of their findings, they assume that if reality is socially constructed, then the participants should assess the validity of the findings. Member checking is a research lens that involves other participants. In this validation approach, the findings are taken back to the participants for a check on whether they represent the participants' reality or not. External people may validate the research. In this case the validation framework would involve a reliable third party to audit the research work and give feedback. To this extent, a

validation technique adopting this lens is the audit trial.

The third lens of the research, and the chosen lens in the present study, is the researcher himself. In this lens the researcher validates the research. In this case the validation process is one where analysts repeatedly return to their data to check constructs, categories, explanations and interpretations (Patton, 1980).

In conclusion, I wish to recap on the key methodological decisions being adopted in this study. Primarily, the study adopts a pragmatist paradigm to the research inquiry. This is also reflected in the mixed methods approach, which is geared towards addressing the research question. The mixing of methods also follows a sequential transformative stance where the three-dimensional model is the guiding theory all throughout. Finally the researcher's lens is used for validation of the research.

4.3 Research Design

The research design in this section reviews the execution of the methodological discussion in section 1 and 2 of this chapter. The design is guided by the three-dimensional model of conversation, which is defined extensively in Chapter 3. In this section I will highlight how the model guides the research design and then move on to explain in further detail the methods used in the research.

4.3.1 Mapping the research design to research objectives

The model suggests a three-dimensional conversation space. By this notion, the model asserts that different instances exhibit different levels of shifting conversation, all captured within this space. Conceptually and as illustrated below this promotes the idea of instances of conversation shifting outwards, exhibiting increased moments of asynchronous conversation made available to a wider public and part of this persistent stream of exchanges.

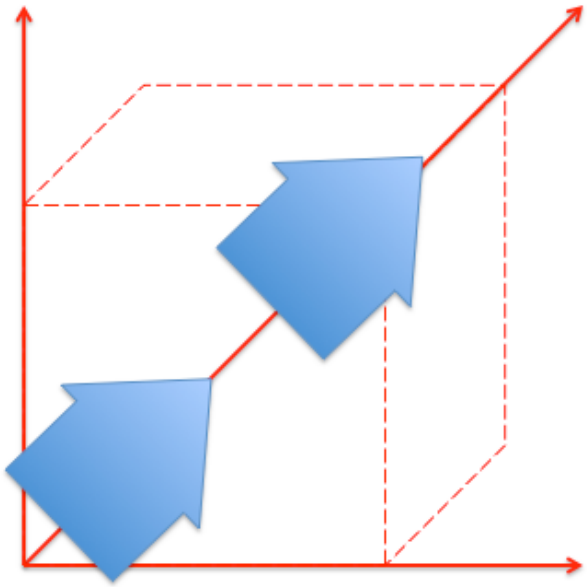

Figure 12: Conceptual Direction of Shift

However, the interplay between new affordances and emergent user behaviour shifts conversation in different ways. Literature suggests that some technologies amplify what people have done before, whilst others transform it. Technologies that amplify make it easier to converse by allowing users to respond in a cheaper, quicker and more accurate way. On the other hand, some technologies are truly transformative in that they lead to a qualitative change in how people think about the world (Kiesler, 1997). This also holds for conversation.

Mapping this idea on the three-dimensional model suggests a two-step shift. In the first step, users simply do what they have done through new applications running on their smartphone. In the second, they exhibit a transformed conversation, carried out through applications that do more than just replicate voice calling or SMS. This distinction is also useful because one cannot exclude cases where a supposedly amplifying technology turned out to be a transformative one. The Internet itself could be said to have passed through the same fate, with early literature suggesting openness to both possibilities (Sherman, 2001) and more recent work confirming its transformative effect.

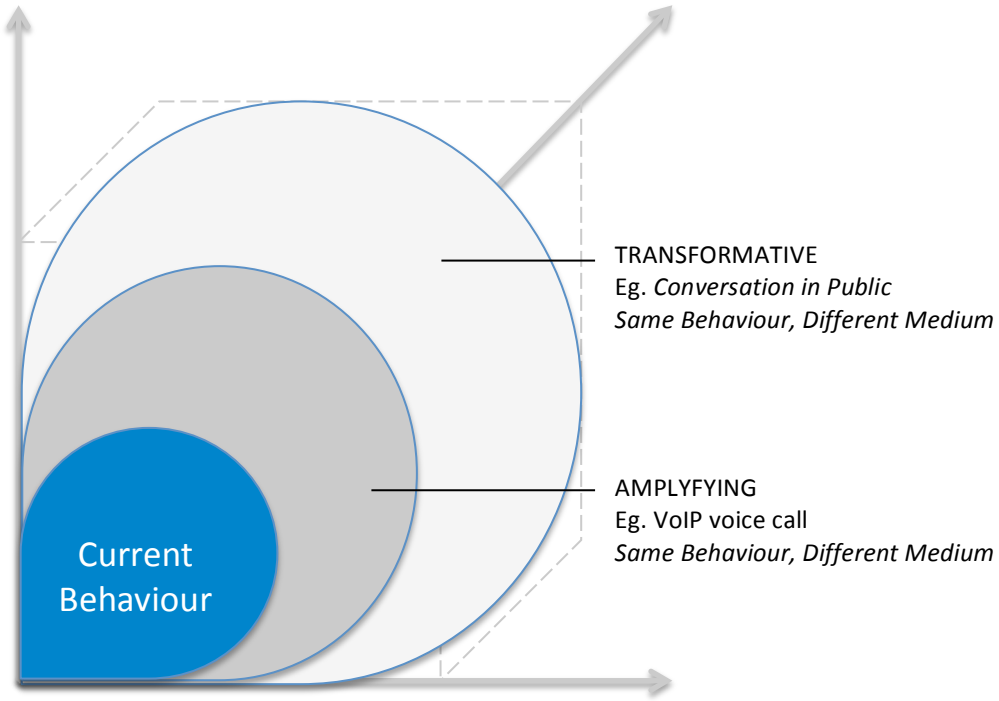

Figure 13: Split of the usage related variables

I map the two-step shift on the three-dimensional space (Figure 12: Conceptual Direction of Shift). The bottom left corner highlights conversations carried out in private, such as voice calls, which are synchronous and transient. The first step shift points to conversations that exhibit some delay, a wider group of users and that contribute, in big or small ways, to a persistent mode of exchange. Hypothetically this could include SMS conversation, group chat and email amongst others. The second part of the shift is much wider. It points towards the world of social media and the never-ending suite of applications that are transforming the way we converse. Put together, the shift along the three dimensions presents the model as a framework for studying the evolution of conversation. This is in line with the second objective of this study (Objective (b) in Section 1.2).

Approaching the evolution of conversation in a staggered manner is also useful in identifying the areas that respond to the research objectives (Figure 14). In the first step the focus is on the adoption of the smartphone, which makes it possible for the amplifying and transformative tools to become part of the users' communication mix. This step focuses more on the take-up of the medium and points towards the shift in usage post smartphone adoption. A second area of focus is what the user does in the new media. An understanding of the tools being made

available in the new media space starts to explain the evolution of conversation. The research design is built around this two-step approach.

Primarily, I analyse the usage patterns of a sample of smartphone users. The analysis is a longitudinal one and compares usage before and after smartphone adoption. I also support this analysis with two secondary experiments that fill the gap of the main quantitative analysis. In the first experiment I study the usage of mobile Internet on specific days during the year. In the second study I code 200 instances of Facebook conversations. This stream of the research responds to the objective of assessing the impact of enhanced and ubiquitous connectivity (Objective (c) in Section 1.2)

Secondly, I provide a review of the new media landscape with a specific focus on key themes. I highlight applications that in the period of analysis have grown in take-up or failed to do so. I use this review as a traversal of the conversation space, which is required to discuss the implications of the three-dimensional view. In the process, I gain a better understanding of the conversation going on in the new media (Objective (d) in Section 1.2).

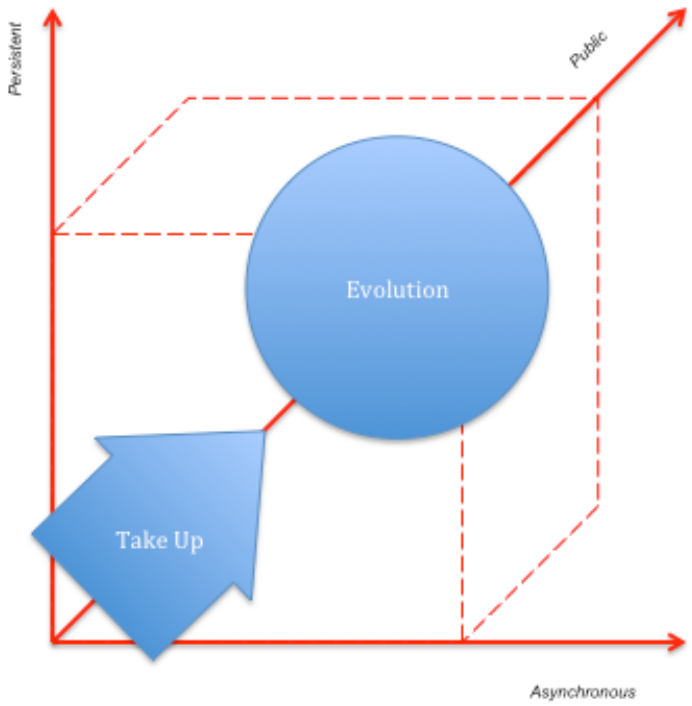

Figure 14: The two streams of analysis

The two sections of the research design complement each other in responding to the main research question. The first part focuses on the take-up of the new media, whilst the second stream goes a step further, understanding the implications of the wider user choice in this space. Together, the streams also tackle supporting questions on the changing rules of social interaction, categorization of conversational instances which shift to the new media and others that do not (Section 1.3). I illustrate this complementarity with the figure above.

The discussion on the future of conversation (Chapter 7) extends the findings of the analysis in both research streams by providing possible scenarios. This is also in response to the 5th and final objective of the study (Section 1.2).

4.3.2 New media take-up through smartphone adoption

Choice of participants

Impact of smartphone adoption on the user behaviour presents a good contemporary opportunity to understand shifting conversation. This is also the case when one considers the way the smartphone enables users to make the most of ubiquitous connectivity. One way to understand better the shifting user behaviour is the analysis of behavioural patterns through usage logs. The analysis makes use of records related to voice calls, SMS usage and Internet access through the mobile device. The records stem from the usage generated on the network and were provided by Vodafone Malta.

The first step in narrowing down the analysis to a sample of smartphone adopters was the choice of adoption period. In the present study this period is taken to be September to October 2012, with the period of analysis being July 2012 to March 2013. Secondly, the study distinguishes adoption by type of smartphone. It follows the hypothesis that a higher-end smartphone facilitates better the take of new media and deduces that its users are more open to new modes of conversation. To this extent, the analysis focuses on three user groups.

The first is a group of 95 users who did not own a smartphone prior to the purchase of the Vodafone Smart 2 device in the same period. Smart 2 is an low-end, entry smartphone commissioned by Vodafone. The device is part of Vodafone's drive to enable its customers to make the switch to the smartphone. In fact, the device follows a similar model, made available a year earlier. Vodafone made the device available in all its markets as part of its headline summer campaign. In some markets the device retailed for as low as 49 euro (£38.79). In Malta, the device launched at 99 euro (£78.36) and was then subsidized as part of seasonal promotions throughout the year. During this time, Vodafone branded the Smart 2 as the most affordable 3G smartphone and its best seller. Considering the population size and the average lifetime of smartphones determining the sales of devices in the market, the sample of almost 100 users is a sizeable one.

A second group of 286 users was chosen, yet this time including users that had upgraded to a more sophisticated smartphone. This comparison group is used to understand better the impact of ease of use and more sophisticated connectivity on shifting conversation. The iPhone 4S was chosen as the device of choice. In the price ladder, the iPhone 4S was one of the most expensive at the time. The phone sold at around 599 euros (£469) and was one of the most popular devices, even though it was soon to be replaced by a new iPhone model by Christmas of that year. After filtering users by set criteria explained further below, the sample size in this case is substantially bigger than that of Smart 2. This also makes sense considering the leading position the device had in smartphone sales worldwide, not least Malta.

A control group of 118 users was also generated. The control group is a sub-set of users that did not switch to a smartphone during the period of analysis. These users were tagged as such before, during and up to a month after the analysis months.

In each case, the user base was limited to customers on a prepaid plan. In Malta, like in other Mediterranean countries, users predominantly choose a prepaid plan. This distinction by mobile tariff excludes users who have unlimited data plans and who are therefore motivated to make use of the new media services over voice and

SMS, which are still charged per unit on such plans. In the prepaid space services are charged on a per unit basis. It is important to note that the usage logs provided by Vodafone track usage on the network and hence exclude access to the Internet through alternative connectivity such as WiFi.

Procedure of Data Collection

To get to the chosen samples, data analysing the users' device category was generated at different stages in time. The report was analysed at the start and end of the adoption period. A third version was also generated at the very end of the analysis period to ensure that the candidate's usage patterns resulted from smartphone use all throughout the month. This check was also required to choose candidates that did not become smartphone users later on in the analysis.

Having identified a list of prospective candidates, usage logs for the months between June 2012 and March 2013 were extracted from the data. Usage logs may be categorized in three levels. The first level of the data relates to the user profile, the second level relates to his usage behaviour on the network and the third level relates to the data that flows in between, the content of the exchange.

In the present study more importance is given to the user profile and usage behaviour in level 1 and 2. The third level, that relating to the content of the conversation, is not analysed. This methodological choice builds on the three-dimensional model, which moves away from the topic of the exchange, categorizing conversation by the length of delay, the number of participants and their contribution to a persistent stream of exchanges.

Data Level 1: User Profile - This level of data captures user details such as demographic data, type of smartphone, user spend and other useful high-level variables. On the mobile network, this data is sourced through business intelligence reports, generated regularly by the operator. The reports carry both manual inputted data and system generated data. Details such as age and gender are either filled in by front-line staff at the time of subscription to the service (or purchase of smartphone device) or inputted by the user when using the operator's

online services (such as topping up or paying the bill). Other details are generated by the system. These details include the model, brand and specific serial number of the device the being used to connect to the network. I focus mainly on the data relating to the type of device (smartphone model or not) and payment mode (prepaid or postpaid contract).

Data Level 2: Usage Pattern - Within the telecoms industry, Call Detail Records (CDRs) are very useful to record events carried out by users. These records are used to study activity on the network. Each transaction is translated in a set of data that includes a specific time stamp of when the activity started and ended together with the originating and terminating mobile numbers (also known as MSISDN). In SMS sessions, the records would include the size of the SMS sent, details of the sender and receiver. In addition, the data would include the volume of calls, the duration of calls in minutes and the list of numbers that the user contacted via voice call or SMS.

In contrast, data sessions do not occur between one mobile number and another. The extraction of records relating to the use of mobile Internet is more complicated and less easily available on the network. Due to data availability, mobile Internet usage logs are limited to the units of use (in megabytes) and the number of data sessions. Even though this does not accurately represent solely the Internet usage related to the emergent shifting behaviour, it is indicative of the take up of new media services. Making use of the existing data sources reviewed in this section, the present study suggests the following variables (Table 4).

Conversation Detail	Variable Name	Variable Description
Voice Usage	Calls	Total number of calls in a month
	Minutes	Total number of minutes of calls in a month
	Average Duration	Average number of minutes per call.
SMS Usage	SMS	Total number of messages sent in a month
Mobile Internet	Data	Total MBs consumed in a month
	Sessions	Total number of data sessions per month.
Other	Mobile Handset	Handset Model used on the day
	Smartphone Tag	Flag identifying smartphone use on the day

Table 4: List of variables in analysis of usage profile

The longitudinal analysis requires a series of snapshots for usage in a chosen month. The logs are generated for the month preceding the purchase and the subsequent months post adoption. More work was done to remove records exhibiting inactivity in the month prior to the analysis period (June 2012) and the month after (March 2013). Inactivity refers to inconsistent usage by customers. On a prepaid plan, a share of subscribers does not use their service regularly, making it difficult to analyse usage longitudinally. This irregularity also makes it difficult to identify customers' commencement and end of service. By setting a month prior to the analysis period and another one just after, it was ensured that such instances are filtered out and the chosen users were customers throughout.

Data Analysis

At the heart of the longitudinal analysis are comparisons of usage by month and between user samples. Prior to introducing statistical tests to assess significant differences, exploratory analysis was done to deduce the most suitable tests. 20 variables were tested for normality. Exploratory analysis highlights that data deviates from normality and hence suggest the adoption of a non-parametric approach (See A2.3 in Appendix).

The second part of the data analysis makes use of a number of non-parametric statistics tests, namely the Friedman test and the Mann-Whitney test (refer to Appendix 3 for further analysis). The Friedman test is used to test the impact of the smartphone adoption condition on the subjects in the study. The Mann-Whitney test on the other hand is used to identify some form of relationship between the usage logs in the data set. In each case, further analysis is done in order to understand how any impact of smartphone adoption developed longitudinally. The Wilcoxon Signed Rank tests and the Kruskall-Wallis tests were used to further the analysis for both in-group and across group analysis respectively (refer to Appendix 3 for further analysis).

Supporting analysis

The smartphone adoption experiment reviewed in this section studies the shift to the new media space, yet with some limitations. Whilst it aims to track patterns stemming from usage logs, it does not explain what this new usage translates into conversation wise. In terms of the above discussion, it does not determine whether the shift in usage is simply the result of the new media amplifying new modes of behaviour, or transforming completely the way conversation is held. I run two experiments that build on the shift to mobile Internet, as it becomes possible post smartphone adoption.

Greetings day experiment

In the first instance I build on the assumption that in specific days, some conversations are more predominant than others. This is only the case on the day. I take holiday greetings as one example. I deduce that on Christmas Eve and day, the greetings conversation is predominant. The same notion could be extended to New Year's Day and the eve, just before the New Year countdown. I synthesize that if increased mobile Internet usage is related to some conversations shifting online, there would be a bigger spike in usage on said days.

To do so I monitor the aggregated usage logs of over 200,000 customers on the Vodafone network in Malta. A snapshot of usage logs was generated for specific days, the chosen days being Christmas Eve, Christmas Day, New Year's Eve and New Year's Day. The usage logs of one year were compared to similar usage logs of the previous year. The period of analysis relates to usage in December of 2009, January of 2010 and December of the same year, and January of 2011.

The analysis compares the growth in voice, messaging and data usage year on year. The percentage deltas are reported side by side to understand further shifts in usage.

A snapshot of real-life exchanges on Facebook

Deducing that increased usage of mobile Internet is the result of specific conversations shifting to the new media space is probably reliable on specific days when the conversation topic is a predominant one yet cannot be extended to everyday conversation in the remaining days. To address this limitation and gain insights on the type of conversations occurring in the new media I take a snapshot of 200 conversations from Facebook.

Facebook is by subscriber numbers the largest online social network. The site started off in 2004 and has in ten years attracted more than a billion users. The site is also accessible through the mobile screens as an app. Facebook suggests there are over 240 thousand user accounts from Malta. This makes its penetration a little bit more than 56% and one of the highest in the European region (Internet World Stats, 2014c).

Choice of Participants

I choose participants from a friend list of over 1000 users from Malta. The friend list is a private list and by no means considered to be representative of the wider population. It is not the scope of the chosen list to generalize findings. At the same time a group of this size in a small country like Malta is highly representative in size when one considers Facebook's penetration and the island's population size (NSO, 2014).

Within the group of 1000 users, participants are chosen at random. An analysis period of 1 week is chosen in May of 2013, and users are chosen on the condition that they feature at the top of the news feed with each refresh. With each refresh, the first post on top is used to select the research candidate. The candidate's profile is visited and the first conversation to fit the criteria of collective conversation, one that features some form of user response, is codified to make up a record in the data set. The two main criteria that were followed focused on the length of time the conversation had been posted and the response to the user post. Records in the data set were limited to posts that were available for at least two

days to give enough time for the post to generate user activity. Priority was also given to exchanges featuring at least one comment. Other exchanges that did not include comment responses or any response where excluded from the full data analysis.

Procedure for data collection and analysis

Utz (2010) splits the data provided by online social networks in three categories – self-generated information, friends-generated information and system-generated information. In a similar way, a series of questions are posed below, leading to the choice of variables captured from the data provided.

On Facebook, each post has an initiator. The initiator starts off the conversation yet there are other protagonists in the exchange. Protagonists may be friends that comment below the post or interact in any way with the content. On the Facebook platform, the Like button allows readers to acknowledge and show approval without the need to comment back. The number of likes and comments are featured with each post. Comments are made available in sequence and users may expand the conversation to read through the full thread. In a similar way, clicking on the number of likes produces the remaining list of users who liked the post. This data may be used to measure the attention the post got from other users on the network.

Users may even direct posts at other users. A post that is directed to a friend features on his profile. To direct posts, both users have to be friends. In hypertext fashion, the user, initiator and protagonists alike can refer to other users, events or pages by preceding the text with an @ sign. This methodology originated on twitter and is slowly becoming common online language for tagging people or pages in the conversation. Some apps, such as the Facebook and Twitter apps, translate this to a hyperlink. Additional features facilitating this type of tagging exist.

Apart from direct protagonists in the conversation, others simply view the conversation. The platform enables different sharing levels. The user may modify

the sharing level to the point of customizing by contact the list of people who may see the post. Facebook communicates the preferred option through a small icon, next to time stamp, at the end of the post. The custom lists of users may also feature at the bottom of the post when the user hovers on the icon.

The size of the users' friend list is a dynamic piece of information which Facebook makes available and which may be relevant to get an idea of how many people could be seeing the post. The latter is an assumption for two reasons: first, if the users do not visit the initiator's profile, the only way to get to the post is through their News Feed or through an activity log in the respective user profiles of the protagonists. Secondly, the level of engagement and historical user interaction is used to prioritize stories on the News Feed. Facebook also states that by default the most recent news feed feature only aggregates posts from the closest 250 friends even though the user can customize this (Facebook, 2013a).

Where does the conversation happen?

Some apps and devices also provide location data, which is then shared with the post. The data is not always accurate, especially in small regions such as Malta. Facebook also provides information about the different functionality being used. If a user comments on a specific event or uses the Birthday app to greet a friend, this is broadcasted with the data surrounding the conversation. The new Facebook functionality also incorporates Facebook Places (Facebook, 2013b) and provides the user with the possibility to search through a list of locations updated through the app.

Location also features when using other apps on the phone. Facebook includes a number of apps that feed back into the News Feed. Photos, Notes, Groups, Events and Marketplace are just a few (Facebook, 2013c). Some applications residing on mobile devices such as smartphones and tablets make use of location data. In the process, the location data is used to broadcast the user location at the time of the exchange.

In some apps, the tag "via Mobile" highlights that the user is posting through a smartphone device. Some dedicated apps also broadcast the type of phone. Posting through a BlackBerry device adds "via Blackberry app" to the post whilst posting through an Apple device adds "via iOS". Additional details and custom post formats are also generated through third party apps.

When does the conversation happen?

The system tags any change by a time stamp. The user time stamp is different than that of subsequent comments. On the day all exchanges are reported in retrospect, such as a "few minutes ago" or "5 hours ago". As the conversation ages the time stamp evolves in format. As the conversation ages over a day, the initiator's post is time stamped by date, eg. "10 January", whilst subsequent comments are time stamped with a day and time to the minute.

What goes in the conversation?

Facebook allows conversations to shape up in any format. A user could start off with a status update and his friends could comment by posting a website address, an image or a video. Likes and commenting on these different pieces of content is also possible, as with the original post. It is interesting to note that when the initiator explicitly posts content in the form of images or video, the system provides viewers with the possibility to share this content and also reports the numbers of shares in the same way it does for likes and comments.

The above discussion is translated in to a list of variables that are extracted from posts on Facebook. The variables aim to capture the details discussed above. The conversation feeds are taken from a sample of Facebook users who all share the researcher as a friend, or friend of friend. The resultant data set consists of 200 records of conversations on Facebook. Records in the data set are anonymous, codified and aggregated (Table 5).

Data analysis is done through an explorative analysis of the data. This generates descriptive statistics on the variables, which are then used to understand better

the type of conversation occurring in some parts of the new media space. Use of cross tabulation and correlation methods is also done.

Conversation Detail	Variable Name	Variable Description
Who sees the conversation?	Friend Size	The number of friends the user has on the social network.
	Share Tag	The sharing filter used, from the wider public to a custom list of users
	Shares	The number of times the conversation was shared by users.
Who are the protagonists?	User ID	An unique code per user
	Commentators	The number of commentators on a post.
	Tags	The number of directed posts or references to other users in the post
Where does the conversation happen?	Via Mobile	A flag which highlights the posting of parts of the exchange via a mobile device
	Location	A flag that highlights whether location data was shared with the post.
How and when does the conversation happen?	Start Time	Time stamp of when conversation started
	End Time	Time stamp of the last comment posted at time of data collection.
	Days Later	Number of days beyond the same day when conversation was active.
	Duration	An estimate of total duration between start time, end time and days later.
What goes in the conversation	Content Type	A code for the different content types used to construct the message.
	ConvClass	A code for categorization of conversations by type of topic
	No. Comments	Number of comments posted at the time of data collections
	No. Likes	Number of likes posted at the time of data collection
	Additional Likes	Additional Likes posted on user comments, excluding the initial post
	User Comments	Number of comments posted by the initiator, excluding the initial post.

Table 5: List of Variables in Conversation Analysis

4.3.3 Review of the New Media Landscape

Earlier on in the research design I suggest that the model of conversation is formulated in two steps, one focusing on the take-up of the new media services, and the other relating more to the evolution of the conversation. The second step is what is tackled in this section of the research design. In this step I discuss key themes of the three-dimensional approach by making close reference to the new affordances that are shaping user behaviour. The review aims to be a traversal of the conversation space, tackling instances of shifting conversation, as seen in the new media landscape.

To do so I focus on several new media applications that are in some way exhibiting the three-dimensional shift in conversation and emphasizing the key research themes. In choosing these applications I aim to cover the period between 2007 and 2013, which relates to the discussion throughout the present study.

Choice of cases

Primarily, I extend the discussion on Facebook. The rationale for choosing this online tool follows that presented in the supporting analysis for the first part of the research design. In the period of analysis, Facebook has grown to be the most popular online social networking site in the world by subscriber numbers whilst Malta exhibits one of the highest penetration rates in the region. More importantly, Facebook has been there throughout the years of analysis. Its growth is also the result of the varied conversation it enables through new features it has rolled out in the same period.

On the same lines, I also include WhatsApp in this review. The application presents users with an alternative to the legacy SMS service that is available across platforms. It enables users to share images and videos in their threads, and hold group chat sessions. The application launched in 2009, and five years later claims to have 500 million active users (Whatsapp, 2014). More significant, is WhatsApp's impact on SMS usage in the countries where it has launched. Following the launch of WhatsApp in the Netherlands, key players reported substantial declines in

usage, blaming the app for the damage (Alekstra, 2013). The trend goes beyond the European region (Phadnis & Sharma, 2014). Maltese users are also exhibiting the decline in SMS. In the second half of 2013, SMS traffic in Malta exhibited a 13.9% decline over the same period in the previous year.

Apart from Facebook and WhatsApp, I also review more recent additions to the new media landscape and focus on those that present a novel way to hold conversation.

Ask.fm is one such example. The site is by definition an online social network. The mode of conversation it promotes is one of questions and answer, hence the name. The interesting aspect of the site is that it enables users to hide their identity. This feature is not new since older chat networks did not have the rich user profiles found on Facebook, yet it is counter to mainstream social networking. The anonymity features of Ask.fm have also been linked to cyber-bullying, which in some instances has even triggered teen suicides. Malta is not an exception, with one such case being linked to cyber-bullying on the site. 34,000 users are reported to have subscribed to the service in Malta (Malta Independent, 2014)

Another example is SnapChat. Even in this case, at face value the app mimics the functionality of messaging apps such as WhatsApp, enabling text, images and video to be exchanged with groups of users. However, in contrast to mainstream apps that store threads, which go back days, if not months, anything exchanged through SnapChat has not more than 10 seconds of life from the moment the viewer opens the message. This type of conversation is totally different to the shift experienced along the years of analysis and prior to SnapChat's launch in 2013.

One other novel way to hold conversation resultant from new affordances that I reviewed in the period of analysis is Vine. Vine is a social network that limits the exchanges to 6 seconds of video. The app launched in 2013, same year as SnapChat. One could see Vine as building on user behaviour seen in Pinterest and Instagram. I review these two apps due to the focus they exert on conversations around images and photos. Both apps launched in 2010 and offer similar functionality. Whilst Pinterest allows users to post images they find online,

Instagram allows the sharing of photos taken by the users themselves. Vine builds on the conversation around visual exchanges, by enabling video snippets.

In contrast to Facebook and WhatsApp, Ask.fm, Vine and SnapChat attract a smaller number of users and younger audience. The significance of their inclusion in the review is the niche behaviour they exhibit. I re-enforce this by making reference to upcoming applications that exhibit a totally new way to interact. I review a game launched in Malta in 2012, which Facebook recognized and awarded Best Social Mobile Web award. Other examples exist, such as the brand new app called Yo, which launched in 2014. The use of both apps is still minimal in Malta, yet the very fact that in a population of 425 thousand people, one finds a small community of users that chooses to converse in this way, re-enforces further the extent of which conversation is shifting along the three-dimensional view.

The novel approach to conversation in these apps is to be seen in context of similar novel approaches which did not manage to become mainstream in the period of analysis. I use Google's Wave project and Vodafone's 360 initiatives to discuss this aspect in one of the themes in the review. Wave was Google's online collaboration tool, which enabled an innovative improvement over the conversation carried out in emails. 360 was Vodafone's way to aggregate messaging going on in various social networks and its own legacy SMS tool. Wave and 360 launched in 2009 and shut down a year later. Their inclusion in the review is significant when one understands the evolution of conversation. Both projects launched and were shut down in the period of analysis. I compare these two projects with MySpace, which also so a drop in popularity and a re-launch halfway through the analysis. In contrast to 360 and Wave, MySpace had managed to get substantial take-up by 2008, just 5 years after its launch, yet this was not maintained in the years that followed.

Below, I map the above-mentioned apps on a time line to highlight their relevance to the period of analysis. I also highlight the periods in between the adverts discussed in the beginning of the study, and marking waves of change in the way conversation is portrayed by Vodafone and other players.

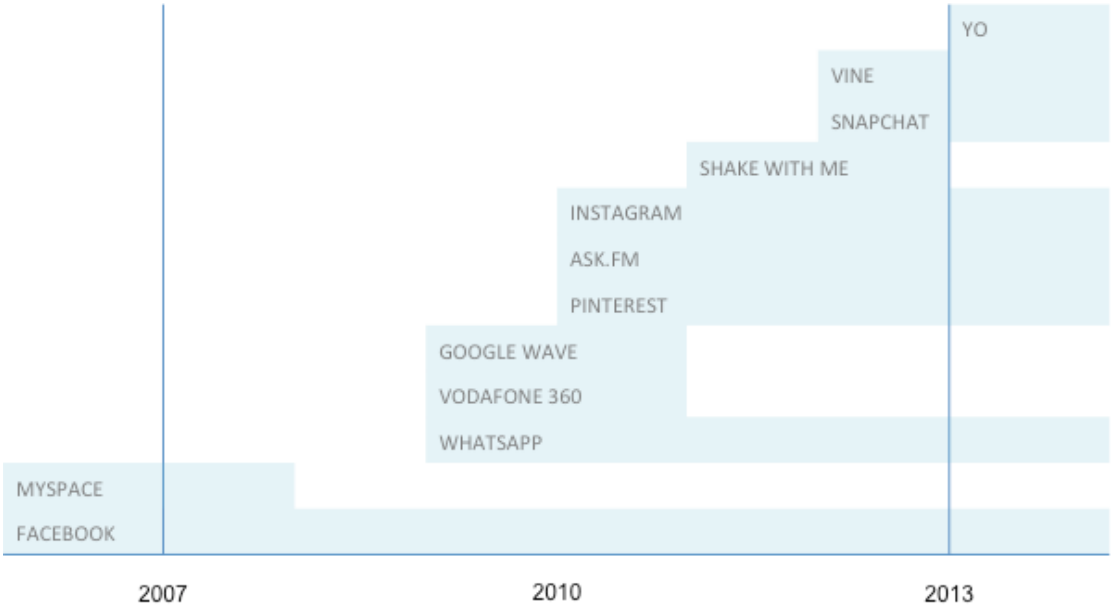

Figure 15: Choice of Cases along period of analysis

The above choice of apps is surely not exhaustive. Various other examples could have been included in the review and have been left out. The main reason for this exclusion has been the research objective of providing a good overview of the new media landscape whilst not diluting the level of detail one could put into the review. The chosen set of apps covers the period of analysis and a wide range of uses, from social networking to messaging, and the fun apps like Pinterest and Instagram that sit in between.

Reviewing Procedure

To analyse the media landscape I focus on four themes and complement these with examples from the above cases. A brief introduction to the four themes is provided below whilst a more detailed discussion is found in Chapter 6.

1. A wider conversation – In this theme, the new affordances in the new media are discussed in context of how they enable a wider form of conversation. This is contrasted with the limitations of legacy SMS and voice calls.

2. A stream of conversation – This theme focuses on the affordances of new media to display long threads of conversation into a seamless stream of exchanges

3. The sophisticated public – The social network has been at the heart of conversation in the new media. The widespread uptake of online social networking is reviewed in terms of its ability to enable users to converse with a wide range of friends in a sophisticated manner.

4. The longitudinal view – Finally, the first three streams are put in context of the longitudinal evolution of conversation. This theme extends the work in the first part of the research, which is related to the uptake of new media. In this context, it makes reference to new affordances that did not generate the expected user behaviour and others that became less popular as users moved on to new modes of conversation.

The review complements the first stream of analysis and builds the context for the discussion on the future of conversation in Chapter 7.

4.3.4 Limitations

Section 4.3.2 and 4.3.3 are a response to the objectives set out in Chapter 1. However, the chosen methods do come with a number of limitations, which I review below:

a) The records used to analyse shifting conversation do not provide demographic details about the participants. This is available in the usage records yet is incomplete for the majority of records and hence is not to be considered as reliable enough to draw any conclusions. Availability of similar records would have allowed for more granular analysis of shifting usage in the chosen samples.

b) The data session records relate to usage on the Vodafone mobile network. In contrast to the voice and SMS records, users can access new media applications to alternative connectivity such as WiFi. In this case, the shifting usage is not captured and possibly much greater than that exhibited on the mobile network.

c) Session data is measured in consumption (Mb) and does not shed light on the applications used. The supporting analysis and the review of the media landscape does aim to fill this gap, yet does not provide the possibility of linking the shifting user behaviour to conversations carried out in the new media by the chosen samples.

d) The holiday greetings experiment is surely representative as it is taken on the entire Vodafone customer base in Malta. This makes up half of the user base in Malta. At the same time, the averages obtained should be broken down further by customer segments, specifically to understand the deviation from the everyday usage and the size of the recorded spikes.

e) The chosen sample list of Facebook conversation is generated by a list of 1000 friends linked to a common user profile. Whilst by size the sample could be considered to be representative of the Maltese Facebook population, a more sophisticated tool to parse conversations generated by a wider and more random sample would have made the results more reliable. A number of options were considered yet none have proven to be successful in generating this sample.

f) The review of the media landscape is one of the most contemporary accounts of shifting conversation. Its strength is specifically in that it does not limit the discussion to one specific new media tool. At the same time, it does not link directly into the smartphone adoption analysis. In a sense, the review is one of various methods in the analysis. This fragmented approach may be seen to complement the pragmatist approach of using any method to understand better the research question. At the same time it may be criticised for coming up with disjointed results.

4.3.5 Ethical Considerations

Since the present study uses a number of data sources, a number of considerations were put in place. Primarily, the University of Hull has approved the necessary ethical requirements. The following is a list of considerations taken in the present study:

The usage logs data set is being chosen on the basis of a pre-determined usage profile. If the subject is a Vodafone mobile subscriber and falls within the research criteria as described in the sections above, the subject's usage records will be included in an aggregated and anonymous way. Analysis of the data is done using samples of aggregate records, which are filtered and analysed against a set of variables. Conversation instances in the second data set are taken from live conversations on Facebook. The conversations are codified and anonymous, storing no information on the user and the content of the conversation.

The research will not involve subscribers that are under eighteen years of age. The data will be stored for a maximum of 13 months in an aggregated manner. Sample data drawn from the mobile network usage logs on the Vodafone Malta network is accessible by the author, the University of Hull and Vodafone Malta. Data related to the online social networking site belongs to the subscribers and is accessible to viewers of their profile at the same time.

The research falls within two legal jurisdictions, that of the UK[2] and Malta[3]. The author also operates in his capacity as an employee of Vodafone Malta, which is an operating company within the standards of Vodafone Group plc, a global telecommunications company with headquarters in London, United Kingdom. In the process of getting ethical clearance from the University of Hull, the company has provided written consent for use of data in line with legal requirements of data protection.

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[2] *UK Data Protection Act 1998.* Chapter 29, Section 33 (London: HMSO)
[3] *Data Protection Act 2001.* Chapter 440 (Valletta: Ministry of Justice)

4.4 Conclusion

In conclusion I summarize the key methodological decisions taken and the streams of work that reflect these decision in the present study. The approach taken in this chapter is made up of three building blocks – the theoretical framework, the methodological response and the research design.

In the first block, the theoretical framework is presented. This discussion leads to two methodological decisions in line with the 'what' and the 'who' question of the discussion. Primarily, the different facets of conversation are reviewed with the present research focusing on the user behaviour related to the choice of conversation mode, which varies along the three dimensions of the proposed model. This marks the first methodological decision in the text. Secondly, this decision feeds into the ontological discussion and is complemented by a review of the reduced and alternative views of the inquiry paradigms. The latter marries the reality under study with who the researcher is and how the two interface together. A pragmatist research stance is adopted in the present study.

In the methodological approach the methods available are reviewed. The discussion is not limited to the quantitative and qualitative categorizations as it delves into the mixed methods approach. The latter is the one adopted in the study with the quantitative research feeding into the qualitative one in a sequential transformative mode. The three-dimensional model is the guiding conceptual framework all along.

Having reviewed the chosen reality, the adopted research stance and the appropriate methodological response, the research design is discussed in the third part of the study. In the research design section, the present study is discussed in the context of two main streams of work, one focusing on the take up of the new media and the other on the evolution of the conversation post take up. The two streams making up the research design are executed in the analysis chapters that follow. Chapter 5 executes on the first stream of the research whilst Chapter 6 reviews the media landscape as specified in the second stream.

5. Smartphone Adoption and New Media take-up

This chapter is aligned to the first stream of the research design, focusing primarily on the take up of new media, taking smartphone adoption as a case study. It is also a response to the research question, which aims to understand the way conversation is evolving as a result of new media take-up (Section 1.3). In fact, the first section focuses on the impact of enhanced connectivity, taking a base of smartphone adopters. An analysis of the usage activity before and after the switch to the new device is carried out. The supporting analysis, reported in section 5.2 and 5.3, builds on the smartphone adoption study and addresses the type of conversation occurring in the new media with reference to additional questions that are part of the research enquiry. The fourth and final section provides a summary of the key findings and a discussion on what the research is saying with respect to the three-dimensional model of conversation.

5.1 Enhanced connectivity- Smartphone Adoption as a case study

Increased connectivity is triggered by the interplay between user behaviour and changing technological affordances. Technological affordances shift as a result of improvements in the technological infrastructure, such as faster data speed on a 4G network or the ubiquity of Internet connectivity in the community. User

behaviour shifts as it embraces the new technology and makes it part of its everyday life. The smartphone is one of the many connected devices that trigger the shifting behaviour. Today's connections to the conversation are tablets, smartphones and computers. As the world moves towards the Internet of things, things will connect to the Internet and will provide an opportunity for a more persistent conversation. To this extent, in response to the research question highlighted in section 1.3, an analysis of the usage behaviour of a sample of users who switched to the smartphone follows.

The analysis in this section focuses on the user behaviour related to the adoption of the smartphone rather than the abrupt switch from one device to another. In other words, the adoption of the smartphone as a device does not necessarily mean that the user's behaviour shifts accordingly and abruptly. Even in the data sets being used, a number of smartphone owners seem to have adopted the smartphone as a device but do not use it any differently from a mobile phone, which is limited to voice calls and SMS. For this reason, smartphone adoption is approached as a longitudinal process in which the user familiarises himself with the new affordances of this technology and puts them to use in his everyday life.

5.1.1 Preliminary Analysis

A preliminary analysis of the data is carried out prior to testing the impact of enhanced connectivity (see Appendix II). The work focuses on testing the data sets for normality. These tests feed into the decision of which methods are more appropriate. The variables have highlighted a deviation from normality, which implies a non-parametric approach to the data. In the two sections that follow, non-parametric tests are used to identify significant changes in the usage profile post smartphone adoption.

In the preliminary analysis, the data set is also tested for significant difference between the three user-groups in the sample. This outcome would highlight that the condition being tested, that of a different device for conversation, impacts the usage profile. The usage is hence compared across groups for each month of analysis. The comparison is done for the three types of usage logs. The first part of

the comparison highlights that overall there is a significant difference (value of metric below 0.05) in all the months when the three groups are taken together (refer to Appendix A2.4 in Appendix II, the outcome of which is summarized in Table 6).

	JULY12	NOV12	DEC12	JAN13	FEB13
SMS	.002	.044	.007	.004	.008
VOICE	.000	.000	.000	.000	.000
DATA	.000	.000	.000	.000	.000

Table 6: Significance tests between usage logs monthly and across groups

A post-analysis is conducted. The aim of this part of the analysis is that of identifying which groups are causing the significant difference. The tests highlight that there is a significant difference between the smartphone user groups and the control group in each case. In other words, SMS, voice and data usage is significantly different for the Smart 2 and iPhone 4S users in comparison to non-smartphone users in the control group (see A2.3 in Appendix II). The result reinforces the notion that enhanced connectivity implies a different usage profile.

Having reviewed the preliminary findings of the smartphone adoption experiment, I move on to review the findings of the main analysis. The analysis starts off by comparing usage before and after. This is then extended to a longitudinal comparison for better understanding of trends of change in the usage pattern.

5.1.2 Smartphone Adoption - Before and After

To start testing the impact of smartphone adoption, as a changing condition for the users half way through the analysis, the usage pattern of the sample of users is categorized into two – usage prior to smartphone adoption and the usage post-adoption. In this way, the number of voice calls, the number of SMS's, and the amount of data used to access the Internet are tested for a significant delta. The Friedman test is used to examine whether there was a significant change before and after smartphone adoption, the variable condition in this analysis (see A2.5 in

Appendix II). The shifts in the usage patterns of the three groups of users introduced in the research design are tabulated below (Table 7). 'S' refers to a significant difference whilst 'NS' highlights a non-significant delta from previous usage. Recording data growth for the control group is not applicable in this case as these users do not have a data capable device and is therefore marked as 'NA'.

	Shifting Voice	**Shifting SMS**	**Data Growth**
Smart 2	S	NS	S
IPhone	S	S	S
Control	S	S	NA

Table 7: Impact of smartphone adoption by model – Before and After

The analysis of voice before and after the smartphone adoption period highlights a significant difference in usage for both smartphone user groups. This implies that post adoption the pattern of voice calls of this user group changed, at least in the snapshot being taken here. This scenario is also present in data usage, marking the users' access to the Internet enabled applications through the device. IPhone and Smart 2 users exhibit significant delta. In the SMS space the two smartphone user groups differ in significance. While iPhone users exhibit a significant difference in between the months of SMS usage, the Smart 2 users do not exhibit such a significant difference. The distinction between delta in usage for iPhone and Smart 2 reinforces the earlier discussion on the impact of the device. The two devices provide the user with a different user experience in user interface and OS. From a market perspective, the users also attract a different type of user demographic.

Another interesting finding is the significance in usage for the control group. In both SMS and voice usage, the control group exhibits a significant difference. This highlights that apart from the change in device, there are other factors significantly impacting the shifts in conversation. Seasonality of offers and a change in usage routine throughout the year could both contribute to shifts in the usage profile. Historical data and an extensive analysis would be required in this case to remove from the equation the impact of these variables. However delving deeper in the analysis, the final wave of tests analyse the shift in conversation month on month. This is useful to understand what the significant variance really means, whether

usage exhibited a decline or an increase in a specific month, or if the shifts are sporadic. The analysis is particularly useful in months in which all three groups, including the control group, exhibit significant variance in usage. A review of the month on month analysis is reported in the longitudinal view below.

.5.1.3 Smartphone Adoption – The Longitudinal View

As highlighted earlier, smartphone adoption is not simply the adoption of a smarter mobile phone with the capability to connect to the Internet. User adoption is a process through which the user familiarises himself with the technology and shifts everyday behaviours accordingly. In fact, the significance or otherwise of the tests conducted in Section 5.1.2 above does not say anything about the direction of the change, whether the usage increases or decreases. To understand further the change in usage, post-hoc analysis is done. The analysis uses the Wilcoxon Signed-Rank test. The test highlights if the significance is based on the negative or positive ranks, which helps to deduce if the usage increased or decreased in the specific months. A better interpretation of the usage trends helps to identify where this variance is coming from and if enhanced connectivity has to do with it.

The test makes use of the monthly usage figures to understand the direction of the shift month on month and in comparison to the month prior to adoption. Both types of comparisons are intended to identify shifting conversation. In Table 8 additional comments are added to the initial analysis to explain the outcome of post-hoc analysis (see Appendix II for the full results). The positive sign highlights a growth in usage whilst the negative sign highlights a decline in the usage post smartphone adoption. In some cases, post-hoc analysis still does not provide enough information on the direction of the change. These instances imply a sporadic shift, which is difficult to explain in terms of direction.

When interpreting these numbers, it is useful to note three points on the analysis of shifting data usage:

Primarily the data usage being tracked is usage occurring through the mobile network and may not represent in full user behaviour. Both the entry Smart 2 and

iPhone allow the user to access the Internet through alternative wireless connectivity. In this case, the usage would not result in the above data records. High-level usage figures may not reflect the user activity in its entirety. Digging deeper in the customer analytics, particularly for prepaid customers, would highlight the possibility of inactivity periods or use of more than one SIM. Whilst the latter is impossible to track, the former would require access to historical data. Nonetheless, a number of checks have been put in place to ensure regular activity in each month.

It is also worth noting that some devices consume more data than others even when the usage is similar. Taking the iPhone as one example, the bigger screen is one cause for higher the data usage; to the contrary, less data is used in the case of smartphones with a smaller screen and a slower operating system.

Thirdly, increasing data usage does not necessarily mean that the users called or messaged any less or more. In the context of declining voice and SMS usage, the increased usage of data could be related to Internet browsing as much as it could be to messaging or calling through alternative web-based applications. Nonetheless, considering the additional technology affordances of these alternative apps, a shift in usage to the new apps is still of value to the exercise of redefining conversation.

		201211-201208	**201212 - 201211**	**201301 - 201212**	**201302 - 201301**
Smart 2	Voice	NS (-)	NS (+)	NS (-)	**S (-)**
	SMS	NS (-)	**S (+)**	NS (-)	NS (-)
	Data	**S (-)**	NS (-)	NS (-)	NS (-)
iPhone	Voice	NS (+)	NS (+)	**S (-)**	NS (+)
	SMS	NS (+)	**S (+)**	**S (-)**	**S (-)**
	Data	**S (+)**	NS (+)	NS (-)	NS (+)
Control	Voice	NS (+)	NS (-)	NS (-)	**S (-)**
	SMS	NS (+)	NS (-)	NS (-)	**S (-)**

Table 8: Impact of smartphone adoption by model – Longitudinal View

Table 8 summarizes the post-hoc results by significance and direction of usage delta. The most interesting part of the analysis is the growth in data usage, yet trends in the SMS and voice usage also contribute to a better understanding of shifting behaviour.

Smart 2 users exhibit a significant variance in voice and data usage. Delving deeper in the monthly deltas, the post-hoc analysis highlights that the first month post smartphone adoption exhibits a significant variance. Interesting to note however that the ranks suggest that data usage declines. Put simply, there are more users that exhibit a decline in usage than others that increase their usage. This result is particular and further analysis shows that there is a significant share of users that do not exhibit any take up of the data service, resulting in no usage before and after smartphone adoption (refer to Table 21 in Appendix II).

Not the same may be said for the users of iPhone. In tests carried out to measure delta before and after adoption, iPhone users exhibited significant shifts in all three types of usage logs. Further analysis in Table 8 highlights a significant and positive increase in data usage in the month post adoption. This result is in line with the hypothesis that enhanced connectivity does impact shifting conversation to the new media. Further analysis of the ranks (Table 22 in Appendix II) highlights the share of users exhibiting growth in data between the two months. These results contrast with the usage exhibited in the Smart 2 scenario.

Shifts in SMS and voice usage were also studied in the longitudinal analysis. Both smartphone groups exhibit a significant increase in messaging in the second month post adoption period. This increase in messaging usage does not feature in the control group. In fact, the latter exhibits a declining usage even though this is not statistically significant. Both Smart 2 and iPhone 4S users exhibit declining usage in voice later on in the post analysis. This time, the control group also exhibits this decline. This similarity highlights that part of the decline is seasonal and not related to the type of device being used. However, a closer look at the iPhone usage highlights that the delta, particularly in messaging, is significantly declining. This is not the case for Smart 2 users. In the iPhone case, one could also attribute this trend to the native messaging application on the device operating

system, which shifts usage through the iPhone network when contacting other iPhone users.

The iPhone scenario highlights a shift that is in line with the shift in conversation being discussed in the present study. In essence, the tests are in line with the hypothesis that post-adoption, users exhibit less usage of the legacy technologies and significantly increase their usage of new applications. This notion of shifting conversation follows on notions of substitution (Karikoski & Luukkainen, 2011). Previous research has tested this notion and has declined the substitution hypothesis, asserting that there is no relationship between mobile Internet use and traditional voice and SMS use. Counter to the notion of substitution is that of complementarity. Boase (2008) tackles use of technology from the perspective of a 'personal communication system' that the users subscribe to. The study suggests that alternative means of communication complement each other so much that the user makes use of a combination of them. The study highlights two categories of users -the heavy users and the light users; it further suggests that there is little variance on the choice of services but more on the frequency of use. In this sense, the increasing usage in messaging post smartphone adoption, exhibited by the Smart 2 and iPhone 4S users, could be in part in line with the notion of complementarity.

It is worth noting that the trends exhibited in the above tables are based on the total sample of users. Following on the theory of complementarity and the suggestion of two segments, the heavy users and light users, it is worth noting the share of users that exhibit a positive delta versus the wider sample. Digging deeper in the data provides the below charts.

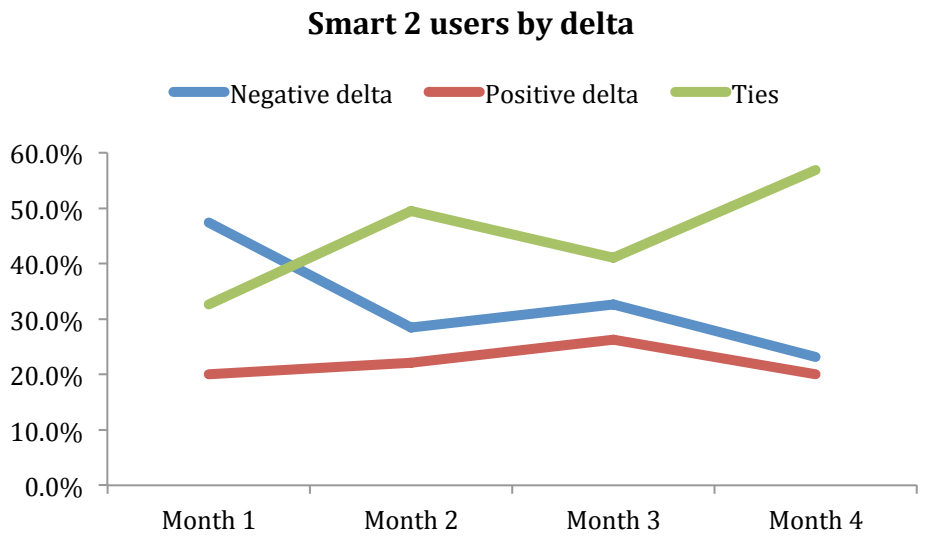


Figure 16: Smart 2 users by delta

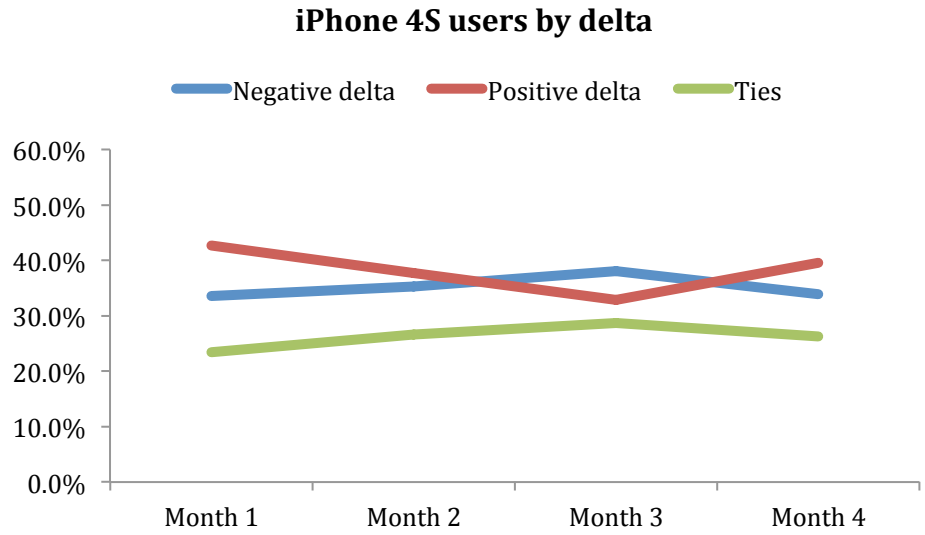


Figure 17: iPhone users by delta

One notes that the Smart 2 users have a higher share of ties, 57% of users did not exhibit a significant shift in usage post smartphone adoption. This contrast with the ties exhibited in the iPhone sample, which are practically half (26%) of the ones in the Smart 2 sample. The share is taken to be that exhibited in fourth month post smart adoption so that enough time is given for the users to shift their usage behaviour. The majority of iPhone users exhibited some form of change in usage, with the more probable being increased data usage, even though cases of declining usage month on month make up one third. It is also worth discussing the first month post adoption. In the iPhone case, 42% of users increased their data usage

whilst only 20% did so for the Smart 2 group. In this context one could deduce that the type of phone could be a predictor of usage, with the iPhone sample attracting the high end users and the entry smartphone being used by low end users of new services, with new media being one of these services.

5.1.4 Relevance to the three-dimensional model

The analysis in 5.1 has focused on the take-up of new media. With relation to the three-dimensional model of conversation, the analysis of take-up relates to the shift from traditional usage occurring in the bottom left corner to a less transient, synchronous and private exchange elsewhere in the conversation space. Whilst the smartphone is one enabler of this shift, it is one that is accessible to users for the longest time in the day, and hence one main contributor to the shift in conversation.

The above research highlights that the shift is not to be taken for granted in that ownership of the device is not a guarantee of shifting conversation. A higher-end device seems to be synonymous with users that are keener to make this shift, as exhibited by the shift in usage patterns. Interesting to note that these users also exhibited some declines in legacy usage, particularly SMS messaging in the iPhone sample. Such trends highlight that enhanced connectivity does not simply widen the conversation space, but also shift some interactions from one part to the other.

Declines in SMS and voice usage do suggest that the increased data is being used for alternative modes of conversation. At the same time, the usage records for data sessions do not provide enough detail to break down units of usage into sessions per application. This also means that higher data usage may relate to general web use rather than increased connectivity, and it is not possible to distinguish between the two with the data records that have been obtained. To make up for these limitations I conduct two experiments, which act as supporting analysis with the aim of elaborating further on what happens post smartphone adoption. The first experiment is strictly related to usage on the mobile network whilst the second adopts a wider view of Facebook usage through multiple platforms. Section 5.2 and 5.3 discuss these experiments respectively.

5.2 Supporting Analysis – Greetings Day Experiment

Having analysed take up of new media through smartphone adoption, the next section synthesizes the idea that if shifting conversation is not simply the shift to a new technological medium. The focus of the research is the shift of conversations. This implies that on specific days, when the overall conversation is dominated by one type of conversational instance or another, the shift in conversation is even more visible. To this extent, I review below the findings of an experiment done around Christmas and New Year. I follow up with a discussion around other similar days.

5.2.1 Analysis

Days around Christmas and New Year's Day are seen to exhibit a spike in data usage and a supposedly sharp decline in traditional usage. A snapshot of usage logs for the total customer base on the Vodafone Malta network was generated for specific days, the chosen days being Christmas Eve, Christmas Day, New Year's Eve and New Year's Day. The usage logs of the current year were compared to similar usage logs of the previous year. The figures below feature the high-level findings:

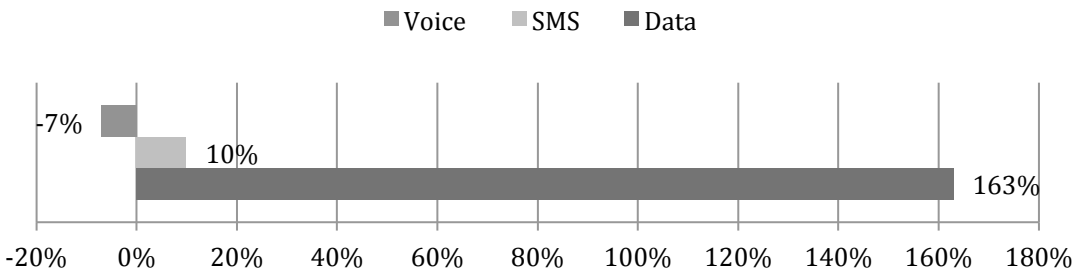


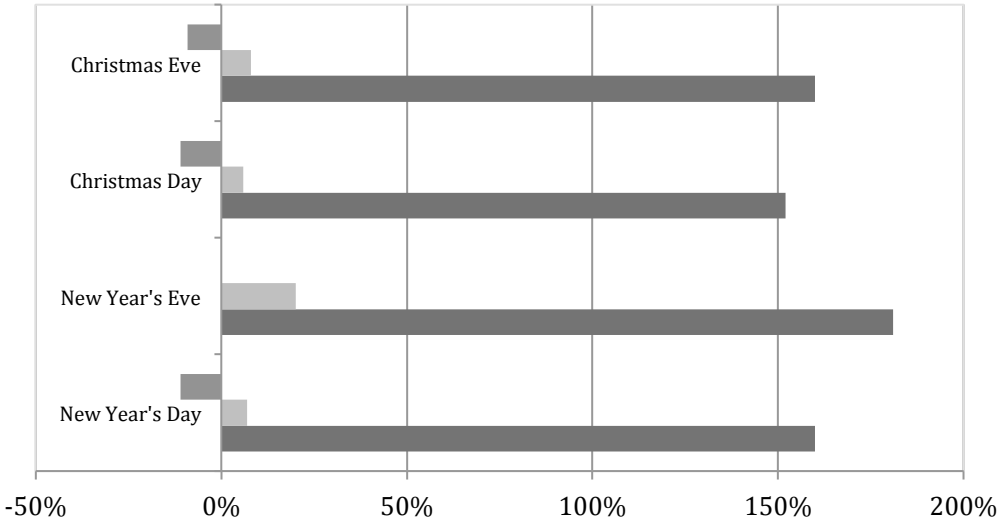
Figure 18: Overall Year-on-Year variance in usage during holidays

The above figure highlights the overall difference in calls made, messages sent and data sessions done by users during Christmas Eve, Christmas Day and New Year's Eve of 2009 and 2010 together with the same activity on New Year's Day 2010 and 2011. The activity relating to Internet access through mobile is denoted by the number of data sessions. In the comparison, Voice and SMS usage is provided in terms of exchanges rather than duration. The use of the number of voice calls

rather than voice minutes fits this specific comparison in line with the use of data sessions rather than data usage. Also central to the analysis is the year-on-year variance. Since the shift in conversation is being studied on the basis of the total population, the comparison is also being made in the context of the impact of increased smartphone adoption.

The average usage made throughout the four holidays indicates a significant year-on-year variance. Data sessions on the days shot up drastically. On the same day, one can note that SMS usage exhibited an increase of 10% whilst the average number of calls made by the customers declined by 7%. The data suggests that on these days, when the most popular conversation content includes holiday greetings, the conversations shift from calls to alternative media accessed by means of Internet connectivity on the users' devices.

The specific variances per day are broken down below. Similar trends are exhibited throughout all four days. New Year's Eve shows a greater variance for both Internet through mobile and SMS with negligible variance in the number of calls made.



	New Year's Day	New Year's Eve	Christmas Day	Christmas Eve
Voice	-11%	0%	-11%	-9%
SMS	7%	20%	6%	8%
Data	160%	181%	152%	160%

Figure 19: Year-on-year variance per holiday

The difference in the shifts in SMS sent and calls made are also worth noting. All throughout the analysis, these two modes of conversation are discussed under the umbrella of conventional or traditional services in the mobile space. The above figures suggest a distinct shift between calls and SMS to the new media.

5.2.2 Extending the greetings day experiment

The significance of the above experiment is that it is not limited to Christmas and New Year. Other specific days could even include one's birthday. In fact, in the past years, alternative modes of greetings have replaced the historic birthday card, ranging from personalised e-cards sent through an electronic mail to SMS greetings. Consequently, the printed card has lost popularity. However, this is only part of the shift in behaviour. The shift in conversation to the new media has also marked a shift in greeting-related conversations to new social media alternatives.

Facebook intervened and facilitated the act of sending a birthday greeting by creating a birthday notification feature that also allows members of the users' friend list to post a birthday message on the user's timeline, directly through their News Feed. The functionality integrates with the users' Facebook calendar, an additional Facebook feature that populates users' calendars with events and notifications on the different devices.

Birthday greetings and related applications are not limited to the Facebook platform. Skype has also enhanced its birthday-greetings features, allowing users to record group video messages, possibly building on usage behaviour, which had been observed prior to developing a fully-fledged application to facilitate it.

The significant aspect of the Facebook birthday-greeting tools is that the messages are posted in public, triggering greetings from anyone who views the messages on the respective News Feed. This feature has shifted further the conversation that originally started in the form of printed birthday cards. The new way of wishing a happy birthday is online, through the social media tools and in public. What was previously a printed card stored away in a safe place to preserve the message, is now a few lines of text recorded on the user's timeline for many more eyes to see.

As in the previous example, the shift of this specific conversation to the new media space is seen in the year-on-year shift. Public data on several profiles suggests that users exhibit much more greetings on a Facebook profile in comparison to the previous year.

With relevance to the three-dimensional view, the findings suggest that particularly on such days, the conversation shifts in the new media for a specific purpose, in this case, public and collective greetings. However, not everyday is a greetings day. In fact, the chosen days may exhibit behaviour that is not present in the other days. To this extent I follow up with observing 200 instances of conversation on Facebook, discussed in the next section.

5.3 Observing everyday conversation in the new media

The new media enables different types of conversation. The Facebook News Feed itself, which I take as the reference case in this discussion, aggregates most of the activity occurring in the different corners of the ever-growing social network and the app ecosystem that plugs into it An understanding of the type of conversations happening in the new media, beyond specific days during the year, requires further categorization of these instances.

In section 1.4 I build on the definition of conversation by Goffman (1976), which emphasized a small number of participants, an idle time cut off or on the side of other activities, and the activities of talking and listening that make up the exchange in its entirety. In other parts of his literature, Goffman also makes the case for conversation being more than the talk per se, and hence focusing on the non-verbal queues that complement it. I extended this idea to the written alternative, where interactions other than the textual exchange makes up the conversation.

In this context, I first distinguish between Monologues, Nodding and Collective Conversations. In this space, exchanges vary by the level of active engagement. Some exchanges carry with them comments that span hours and days. Others reside on their own, as one post of many. Even these are conversations. Only

because users have not shown any feedback, there is high probability they have read the content. Other than the presence or absence of additional comments, Facebook, and other social networking tools, allow users to like the content, share it or tag it. All of these activities enable users to feedback in an effortless manner, as if they are nodding in approval. In the following sections I elaborate on these categories of conversation with relevance to everyday conversation in the new media and hence the three-dimensional view.

5.3.1 Monologues, Nodding and Effortless Conversation

Some of the posts in the new media are like monologues that reside on the users' timelines. They do not generate active participation yet still contribute to the users' social media persona. Such posts reinforce social searching (Lampe et. al, 2006), reviewed in Section 2.2.2. Users consume huge amounts of such monologues in an effort to keep up to date with what is happening in their friends' lives. Monologues are not limited to the text-based status updates. They also include posting of one's photos, music, videos and other content.

The term monologue assumes an audience and the user's effort to deliver the 'speech' appropriately. Such posts should not be confused with the role taken by users in the world of user-generated content. The hype surrounding user-generated content preceded social networking. This type of content is synonymous with the web 2.0 in which users stopped being simply consumers and started to interact more, at times taking the role of the producer. This was the same shift that triggered the popularity of YouTube. Monologues could be seen as stemming from the broadcasting of user-generated content. In fact, whilst user-generated content draws attention to the content, monologues on the News Feed broadcast the self in small frequent chunks.

Other posts generate response in forms other than comments. The Facebook Like button is one form of response to posts and content shared on the News Feed. The Like button has gained so much success that it is frequently plugged in to websites outside the Facebook domain, triggering user interaction on the News Feed.

Likes do not add content to the conversation but cannot be ignored when analysing shifting conversation. The presence of such posts re-affirms the shift to a mode of connected presence (Licoppe, 2004) where the focus is more on the frequent exchanges than on the meaning and content of the exchange itself.

In fact, the meaning of the act of liking content on the News Feed is not always clear. Liking content seems really appropriate when someone posts content that friends identify with, be it photos, videos, music or even links to projects they are working on. However the possibility of liking is widely available, to an extent that it's meaning has become less obvious, particularly when used in specific circumstances. Conversations on the News Feed exhibit liking even when users post bad news such as the death of a friend or the break up of a relationship. Surely so, liking in these instances is not interpreted as actually liking what has happened. Supposedly, in these instances liking is interpreted as a sign of support, replacing what in the offline space could be a hug or a pat on the back.

In other very different instances, liking is equivalent to tagging, by which one may collect content in order to refer to it later on. Some of the content shared by users is very generic and the user posting it seeks no actual acknowledgement. In such instances, viewers might want to record the post in their activity log, enabling them to return to it. In this case, liking becomes public bookmarking.

Liking is just one response which does not extend the conversation but interacts with the initiator's exchange. On the News Feed, similar user response comes in the form of tags and shares. Tagging is a feature that allows you to link a piece of content to an online user profile or page. The feature was conceived as an additional function of Facebook photos, enabling users to tag the person in the picture and linking faces to online user profiles. On the other hand, sharing is similar to a forward button in an e-mail, only that the share implies the re-posting of the conversation on the user's own profile. The act of tagging and sharing may also lack clear meaning at times.

Tagging adds meaning to photos. Tags identify the person in the picture, the location where the photo was taken and the event or occasion during which the

photo was taken. However, it is also a form of attracting attention. When tagging photos, users direct attention to the persons who were featured in the picture. When tagging a post, users direct attention to those people who have been tagged.

In some instances, users share content, as if they are passing on the message. When a friend shares content, that content also features on that friend's profile page. Consequently, a share widens the initiator's reach by opening up the content to friends of friends. In other instances, sharing is simply identifying with a piece of content, like supporting a cause or sharing an opinion piece.

Delving deeper into online conversational norms, it becomes less clear when to like, tag or share. This is not much different from offline social norms when people smile, wink or nod in acknowledgement. Even in such cases, the actual activity is to be understood in the context of the relationship between the participants and the moment the discussion is being held. In contrast, liking and tagging do not carry a time stamp. This implies that conversations involving this type of response are timeless, not only because they are permanently featured on the user's timeline, but because they can be liked and tagged whenever. Liking, tagging and sharing follow the constant stream of shorter status updates shared from wherever. They reinforce an effortless way of approving, acknowledging or simply staying connected.

5.3.2 Collective Conversations

The third category of conversations includes those posts that are accompanied by commenting and liking. These exchanges extend the initiator's posts in a turn-taking thread of subsequent posts. These posts are referred to as collective conversations, since the user and his friends are collectively and actively shaping a conversation that is widely accessible. Conversations of this type are the closest to offline conversation where all parties have their say. Such exchanges may also be seen as the public equivalent of conversations carried out over email or messaging.

I refer to the snapshot of Facebook conversations to observe the different types of conversation that occur on the News Feed. The snapshot is not to be taken as an

accurate representation of what happens in the wider population, yet as evidence of the variety of conversations that flow in this space.

a) Different levels of synchronicity

The categorization of conversations by length, making use of the time data provided, is one measure of the level of synchronicity. The approach is very similar to the analysis of length of call duration, undertaken in the mobile space to understand usage behaviour. Measuring the shift to a more asynchronous mode requires a measure of conversation in delayed time, drawing the focus not simply to the length of the conversation but the length of delay between one turn and another in the same exchange. Conversation on the News Feed provides this level of detail in turn taking. The present study makes use of this granularity as seen below (Figure 20).

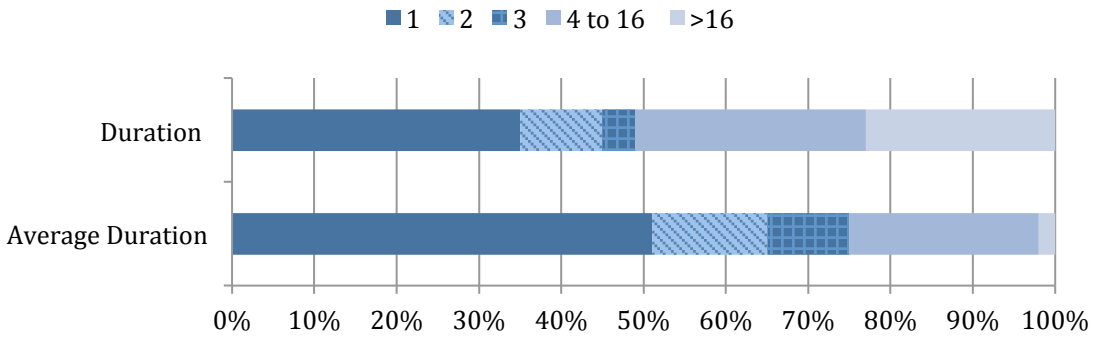


Figure 20: Conversation split by duration and average duration (hours)

I focus on the total length of the conversation, that is the time between the first and last time stamp, and the average delay between commenting time stamps in the exchange. The findings point towards a majority of light users and a small share of heavy users. In fact, a bit more than one third of the exchanges start and finish in the first hour, half of them do not span for longer than three hours, but one fourth go beyond 16 hours. Since the length of the conversation is the sum of the delays between different comments, this trend is also exhibited in the average duration of the delays between the exchanges that make up the conversation.

b) Different levels of participation

Several variables shed light on the participants of the conversation and the size of the audience of the exchange. Commenting and Liking activity suggest that there are two types of exchanges, those that feature few responses and fewer participants, and those that feature substantially higher participation. In the chosen snapshot, 80% of instances do not go beyond 7 comments and 95% have even less commentators. At the same time, other instances feature up to 38 responses in one thread and more participants. One could deduce that the presence of these two extremes of conversation is in line with the heavy and light users captured in the smartphone adoption experiment.

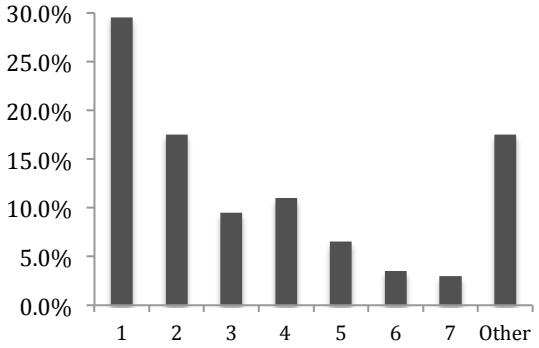


Figure 21: Comments per conversation

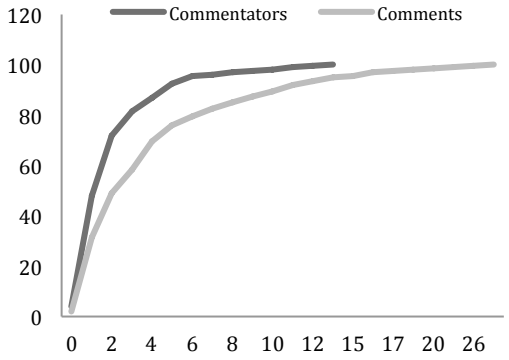


Figure 22: Commentators per comments

Data on the number of likes also seems to point at a substantial set of collective conversations exhibiting very limited interaction and a small but significant share exhibiting much higher participation. One particular conversation featured 129 likes. The same analysis can be done for tagging and sharing as a measure of the level of participation. In the data set, almost one third of the conversations

featured some form of tagging whilst users shared slightly more than 12% of conversations.

Apart from direct participation, a shift to conversation in pubic should also shed light on the public, the number of users that have access to the conversation. To do so, the size of the initiator's friend network at the time of exchange and the sharing level of the post may be used to dimension the public. An analysis of the data set of conversations explains the distribution of conversation by the level of sharing, whether it is shared with everyone, with friends, with friends of friends or restricted to a custom list of contacts. The latter is often a set list prior to the posting of the exchange; however users may build custom lists for every exchange. The data suggests that collective conversations are set to public and made accessible to everyone in one of every four cases. These exchanges also include customizations of the users' profile, such as the profile picture or the cover photo, which are by default public. Cover photos and profile pictures collected in the data set are the most curated content, often featuring images of the users and friends. Not the same may be said for conversation that is shared with a custom list of friends. In the data set, these conversations make up a small share of the conversation space, 5% of the cases. Other sharing options fall in between. The most popular form of sharing level is the friend level, possibly due to it being the default sharing level on the Facebook platform. The least popular level is the sharing content with the friends of friends (FoF) network consisting of an aggregation of all respective friends' lists of the initiator's friends. The FoF level of sharing is even less popular than custom lists.

Related to the discussion of user choice of sharing level is the user's friend network. The size of the friend network influences the distinction between public and private conversation on Facebook. The distinction between a conversation with friends and one with the wider public becomes even less clear when the users' friend lists go into thousands of users. This is not a one off case. The number of friends in one's network also determines how big is the extended friend-of-friend network is and if or when the user needs to limit the conversation to a custom list.

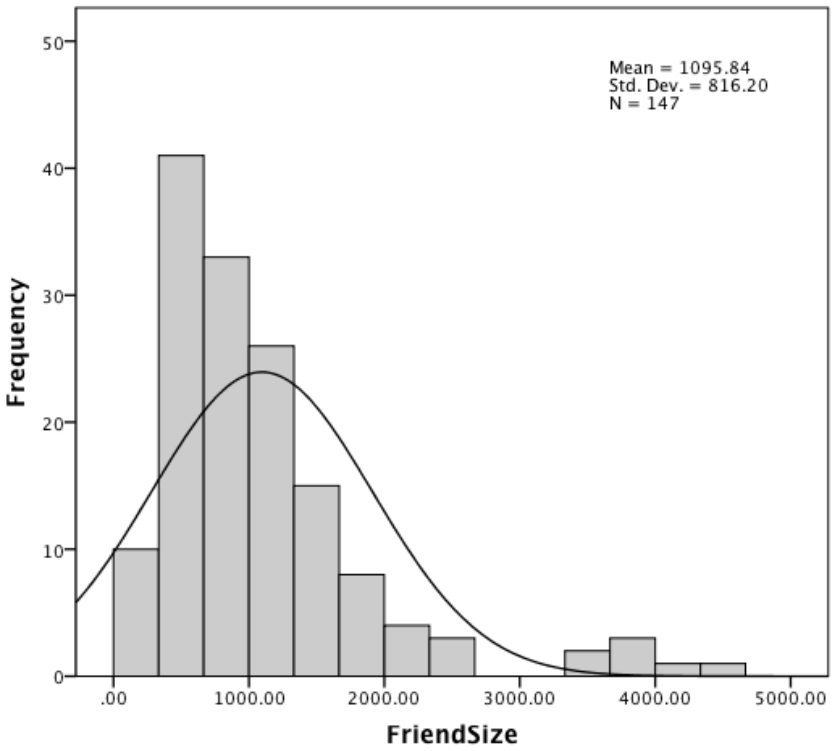


Figure 23: Size of the friend network

Figure 23 plots the size of the friend lists for users in the data set. At a glance it is clear to note that some users have friend lists that run into hundreds and thousands of contacts. Excluding users that have not shared this information, at least half have a friend list that falls between 200 and 1000 friends in size. The majority of users in this bracket fall in the second and third interval with an average friend size of around 500 and 800 respectively. The rest of the users have a friend list that falls between 1000 to 2000 friends. A small share of the users go beyond the 2000 friends and up to 5000 users, the Facebook limit for number of friends per user profile.

These figures highlight a big audience, which in an equivalent offline scenario would make up a crowd of individuals. Friend lists of this size demonstrate that even though the users are distinguishing between the public and their friends, the conversation is accessible to a wide number of users. It is also useful to contrast the affordances of the online social network with those of the traditional mobile network or the offline equivalent. It is very difficult for any user to converse with such a wide group of people at once without the means of a virtual online gathering of friends.

In this context, it is even more worth noting that users do distinguish between a conversation with friends, and one that is restricted to a much smaller closed group of friends. Even though the users have a friend network that runs into the hundreds and thousands, they still distinguish between conversations that are available to the set of contacts they consented to be on their list and exchanges that are available to everyone else.

c) Different formats

The News Feed allows users to attach content such as images, links and video. This is similar to the way users converse elsewhere. Both online and offline photos are social currency and conversation starters. This categorization may at times be less defined as users incorporate different media in their exchanges. Images feature text incorporated in them as in the popular meme images. Articles are also posted as a screen grab with a link away to the main article.

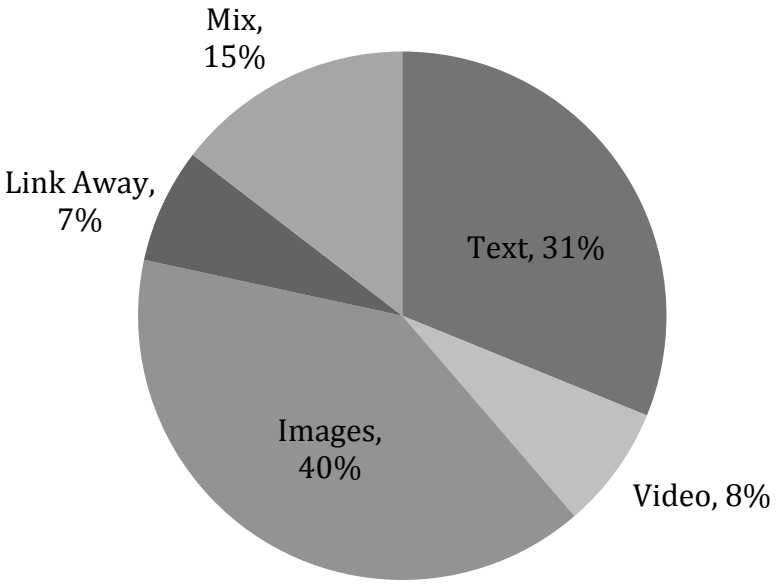


Figure 24: Split of conversation by type of content

Figure 24 underlines that in the new media, there is much more than the shift to text-based conversation. In fact, text-based exchanges make up around one third of all the posts in the data set. Images make up the largest category in the chart. This figure further reinforces the success of photo-based apps such as Instagram, Pinterest and SnapChat, reviewed in Chapter 6.

5.3.3 Discussion

The observation of conversation on the Facebook News Feed highlights a wide conversation space with instances that vary by synchronicity and participation amongst other variables. The discussion on Monologues, Nodding and Collective Conversations is a first attempt at understanding the conversations that flow in this space. Further observation suggests categorization by the duration of the conversation, the format of the exchange, the number of likes and comments, the sharing level and the size of the friend network. Drawing conclusions from these observations, the presence of at least two conversation clusters is identified:

One of these two clusters of conversation happens in a quasi-synchronous manner, with a big share of posts lasting not more than a few hours and involving a limited number of users, resulting in little participation in the form of commenting and liking, amongst other interaction alternatives. These interactions could be seen in the incremental investment the user makes to his online persona. The various conversations persistently carve out the users' image online, adding more detail about preferences, interests and activities. The public, made up of hundreds, and in some cases thousands, of friends consumes these instances passively.

Whilst this cluster seems to make up the largest share of the conversation, other instances spanning over a longer period of time were also observed. These instances include more comments, commentators, likes, tags and shares. In the observed sample of conversations, such instances were related to the uploading of new profile pictures or cover photos. In these instances the users choose the best shots and the most valued images they identify with. The result is increased participation spanning over a longer period of time. Increased participation fuels the popularity of these instances triggering further participation.

It is important to note that these clusters are not exhaustive. However the simple occurrence of these conversations highlights the wide conversation occurring in the new media. It could also suggest that different users approach the medium in a different way.

5.4 Summary of findings and observations

In conclusion, the key findings and observations are summarized below:

The central work of this chapter is the analysis of smartphone adoption and its impact on the users' behaviour. The analysis shows that a segment of the users in the sample did exhibit shifting behaviour, with increased data usage in the first month post adoption in parallel to flat voice usage and declining SMS sent. This trend was observed mostly by the sample of iPhone users, the higher end smartphone in the comparison. The trend also highlights a longitudinal aspect that is very hard to capture due to other factors which impact usage, such as seasonality and pricing.

In comparison, users of the Smart 2, an entry smartphone by price range and features, did not exhibit a significant shift in behaviour. Further observation of these trends highlights that in both samples only a share of the users exhibited increased data uptake. In the Smart 2 sample this share is half that of the iPhone group. As a result, in the Smart 2 sample, the other users dilute any significant change by those that shifted their behaviour.

The findings in the smartphone adoption analysis starts to explain the shift occurring at the bottom left corner of the three-dimensional conversation space, but does not link this with usage behaviour in the new media. The supporting experiments aim to make up for this limitation. In the first experiment, shifting behaviour is observed on specific days where the conversation is predominantly known and similar for the majority of users. The year on year trends for Vodafone's customer base highlight a substantial increase in data usage and a decline in voice minutes. Even though this trend could be extended to other specific days, it does not necessarily reflect everyday conversation.

The observation of conversation on Facebook extends the analysis to the everyday setting. The variety of conversations occurring in the new media is evidence of how complex and varied is the three-dimensional conversation space. This snapshot of exchanges in the new media highlights the presence of at least two

clusters of conversation, both of which exhibit aspects of shifting conversation along the three dimensions.

From the start, the idea of three-dimensional conversation has been discussed in context of the interplay between emergent user behaviour and new technology affordances. Whilst the above text has focused on the user behaviour, the next chapter frames this discussion in context of a review of the new media landscape, and key themes relating to the evolution of conversation.

6 Traversing the conversation space

The second stream of the research focuses on the evolution of conversation in the new media. The review of the new media landscape provided in this chapter is used to tackle key themes relating to the model of conversation.

The period between 2007 and 2013 has exhibited significant changes in the communications landscape. These changes start from the products and services that were launched in the past years. The changes become more important when one sees how users have responded, the applications they have endorsed and made their own, and others they have shelved or moved away from. Of relevance to the study is the shifting conversation exhibited through these applications, re-enforcing the idea of three-dimensional conversation, of which the model is the outcome.

I traverse the conversation space by making reference to the conventional use of the mobile phone and contrast this with user behaviour on Facebook and WhatsApp. Whilst the former extends the discussion in 5.3, the latter follows on from the use of legacy SMS. WhatsApp and Facebook are not the only apps I make reference to. Similar apps providing novel features such as SnapChat and Ask.fm are also included in the review. These are accompanied by apps such as Vine and Yo, both of which are recent additions to the app ecosystem. A discussion on the

choice of apps being discussed is provided in section 4.3.3 of the research design.

Four sections in the chapter tackle each one of the four chosen themes – the wider conversation, conversation as a stream, the sophisticated public and the longitudinal view of conversation.

A final section is also provided. This section extends the discussion on the longitudinal view of conversation by making reference to initiatives that failed to get the necessary traction or did not manage to keep up with three-dimensional shift in conversation. I make reference to three initiatives – Google Wave, Vodafone 360 and Myspace.

6.1 A wider conversation

The significant changes that have occurred in the new media landscape have brought about new affordances. Conversations vary by the speed of reply, the user response, the format and the way they contribute to a persistent exchange. These affordances, coupled by the enhanced connectivity brought about by smartphones and other devices, enables the user to carry out a wider conversation.

Approaching the theme of a wider conversation requires one to go beyond the technology specific debate often occurring in the communications industry. In such instances the shift in technology is discussed in terms of the shift from fixed to mobile, or from mobile to the smartphone. Such discussions are useful to determine the future of a revenue stream business-wise but may oversee the emergent behaviour triggering three-dimensional conversation.

In this context I tackle conversation occurring in the new media by considering the wider definition discussed in previous chapters, making reference to the wider range of formats and the resultant wider meaning.

6.1.1 A wider definition

The telecoms business model is very much ingrained in the unit approach to conversation. In the telecoms space, operators sell a minute of a call at its cost plus mark up. The same approach is also found in the messaging part of the offering where users are charged for every message sent. Since the competition is very harsh, variations of this offering exist and come in the form of bundles of units at a better price than the per-unit cost. The bundles often come with a monthly, weekly or daily time window.

One contributor to the unit approach to conversation is the network, or rather networks, of users. The operators' business model is built on earlier networks of communication such as the postal service. In fact a similar charging mechanism exists in the two networks. When a letter is sent from one country to another, one postal operator pays the other for carrying the letter all the way to the end receiver. In the mobile space, networks have put in place termination rates. A network operator pays a termination fee if the call starts on one network and ends in another. Rates vary according to countries and regions.

Also synonymous with the postal service is the pair of originating and terminating numbers. In this space, these dyads define the network and the activity that goes on it. This is also the case with SMS. In this context, the business model includes pricing strategies for network members (also known as on-net messaging), non-network members (off-net messaging) and members who are not in the region.

Unsurprisingly, telecom operators have approached Internet over mobile in units of length of sessions. Session length is measured in megabytes. Prior to the launch of the iPhone in 2007 various attempts had been done to make the Internet mobile friendly. However, these attempts contrast with the application approach. Whereas operators were providing dressed down versions of the online world to be consumed through the phone, phone manufacturers built a suite of applications which bring out the key features one would need when on the go, making these much easier to use and doing away with the rest of the online space. Even though one still needs data sessions to run these applications, the latter approach

challenges the concept of unitisation. The conversation occurring in these apps is not a session measured by length. It encompasses a wider definition. Exchanges can occur in the shape of traditional voice and text, but also in the sharing of an image, a web link or a simple notification triggered by one user and notifying various others. They are also not limited by the sending and receiving numbers of the mobile network. In fact, some applications enable a group conversation and public posts that go across platforms and devices.

6.1.2 A wider format of the exchange

The suite of applications, which has grown exponentially in the period of analysis, are often considered to disrupt the telecoms business model since they challenge the unitisation of conversation, which is so much ingrained in the telecoms space. However, the popularity of these apps should not simply be attributed to the cheaper cost of holding a conversation. Several apps provide additional features that enable their users to converse in a richer way than the legacy alternative.

The popularity of WhatsApp is evidence of this. WhatsApp users, which run into hundreds of millions, generate 20 billion messages per day (Paczkowski, 2013). The messaging application is available on the most popular smartphone platforms as an add-on app with a small annual subscription fee. The application is limited to the mobile space and competes with bigger social networks, that come with a desktop presence, as well as with other native apps. The success of WhatsApp in the sharing of images, videos and other media also contrasts with the low take-up of earlier multi-media message service (MMS), an enhanced version of SMS running on third generation mobile networks.

The same may be said for applications such as Instagram and Pinterest, both of which revolve around a different form of interaction using images and photos. As an app, Instagram does what any other camera app can do, yet in addition it offers increased functionality. The key functionality is the possibility of sharing these images with the Instagram community and other social networks that the app feeds into. In numbers, Instagram users made up 100 million active monthly users and uploaded 40 million photos a day by the end of the analysis period in 2013 (Instagram, 2013). Pinterest on the other hand offers users the possibility to create

boards, collections of images that are 'pinned' to the users' profile. Pins added by the user feed into the home screen of the user's followers. Instagram and Pinterest cater for the conversation of the creators and curators respectively (PEW, 2012). The creators are those who take pictures and share them with the rest of the online community. The curators are those who collect pictures and exhibit them online.

Pinning, snapping images on Instagram and 'whatsapping' are just three examples of a wider format of the exchange. All formats points towards a departure from text exchanged in a message or voice conversation through calls. This reality highlights the different meaning such exchanges carry with them.

6.1.3 A wider meaning of the interaction

A wider definition of what makes up conversation, aided by the new formats of the exchange, brings about a wider meaning. In section 5.3 I consider Nodding to be part of posts that include user response in the form of Likes, tags or shares. In other words, this user response is more passive and does not extend the conversation directly. Applications such as Pinterest, Instagram and Facebook allow users to pin, love or like content respectively. This type of response occurs when viewers of the content click the Pin Button on Pinterest or the Like button on Facebook. In contrast to voice calls, the senders and receivers do not need to respond to such exchanges in real-time and do not have to elaborate and explain what they mean.

Pinning and liking are not the only examples of effortless conversation. Games that require very little thought and a high dose of spontaneous interactivity are also part of the wider conversation in the three-dimensional view. As an example, the 'Shake With Me' game was awarded the Best Social Mobile App Award at the London Facebook Hack 2012 (Webit, 2012). The app enables users to simply shake their device and play with other users, the faster the shake, the higher the score. More recently in 2014 the Yo app was launched. As the name suggests, the app enables users to send a "Yo" to another user. Interactions on Yo come in the form of notifications, similar to Facebook's poke. The simplicity of the app re-enforces

the notion of effortless conversation. In both the shaking and the Yo apps there is limited use of text and no voice exchanges.

Nodding is also accompanied by Monologues. Even these were discussed in 5.3 and point towards the absence of any form of explicit user response, be it commenting or effortless conversation. Some of the images posted on Instagram and Pinterest do not generate any response. This does not make these exchanges less of a conversation when compared to more interactive posts. In fact, these Monologues populate the user profile and provide the other participants with a constant stream of updates. Even these exchanges are signs of a wider meaning. Such instances shape the user's persona, providing context and social currency for future conversation. The full extent of the meaning such instances carry with them is to be seen incrementally, as one stream of conversation, and not separate exchanges.

6.2 A stream of conversation

Having discussed the way the new media widens the definition, the format and meaning of conversation, I wish to tackle a second theme, that of conversation as a stream. In this theme I see the sequence of exchanges side by side and discuss the implications of the way new media presents and stores these conversations.

In this context, the Facebook timeline and the Pinterest Pin boards are not to be seen as a choice of user interface but as streams of conversation. The same may be said for the thread-like interface in Facebook's messenger, Gmail and most messaging apps. This is not simply a sophisticated aggregation of messages but an approach to conversation as a stream. The like button, the Pin It button and Google's plus button are not simply effortless conversation, they are effortless contributions to a stream of conversation. All of these are not separate streams but one persistent sequence of snippets of conversation. The shift to a persistent mode of conversation indicates that the conversation space is made up of distinct and unrelated conversation clusters. Conversations, spanning across the wide array of applications and platforms, contribute to a persistent stream of exchanges. The

Pins and Likes are vague and often meaningless on their own, but in their frequency and sequence they keep the users persistently connected.

The conversation stream is also not limited to the applications that were created to enable it. As happens offline, we do not limit our conversation to places or activities. Shifting conversation is enabled by applications that come from the social networking and messaging space, but not only. Apple's 2009 commercial boasts that there is an app for "just about anything" (CommercialKid, 2009). This has given rise to wide categories of applications under the umbrella of productivity, health, sports, music and others, as highlighted earlier. The stream of conversation flows in these applications too as they feed back into the social networking framework, further extending the persistent exchange.

In the next two sections I discuss the notion of the stream from the perspective of frequency of the exchanges and the way these frequent exchanges are made available to the user, facilitating further conversation.

6.2.1 Frequent snippets of conversation

The proposed working definition of the persistent dimension in section 3.4 drew attention to the frequency of the exchanges, to the effortless snippets of conversation that make up the persistent stream. These snippets of conversation become clearer when one observes the brevity of the exchanges. The observations in section 5.3 confirm the presence of a significant share of the conversations that are very brief in duration.

The duration and simplicity of these snippets of conversation contrast with efforts by the communication industry to compete with faster Internet speeds, bigger smartphone screens and high definition video that do not necessarily enable the shift to a persistent conversation. This mode of conversation, highlighted by Licoppe (2004), translates 'always on' (Baron, 2008) - ubiquitous connectivity to 'always present' – ubiquitous (or rather persistent) conversation. In this mode of conversation the separate sessions lose some of the meaning as the wider meaning of the exchange is captured by one continuous thread.

In this context, Vine, an application that allows video sharing through the phone, stands out. The application offers an alternative and an easier way to effortlessly 'speak the video language'. Whilst mobile manufacturers focus on providing end users with bigger storage on the phone and as much more space in the cloud to enable the sharing of better quality and lengthier exchanges, Vine makes the camera social by limiting video length to six seconds. Videos taken through the app are instantly uploaded on the Vine mobile social network and fed into conversation streams on Twitter and Facebook.

Even though compiling a video requires much more effort than hitting the like button on Facebook, Vine makes it much easier to do so with as much effort.

> *"Posts on Vine are about abbreviation — the shortened form of something larger. They're little windows into the people, settings, ideas and objects that make up your life."(Hoffman, 2013)*

As photos present a social currency, so does the video medium. Users did not start recording videos on their phone when Vine came around, but the app is surely amplifying this activity. Vine's video format is one tool that enables users to have a different kind of conversation. It is not about the length and detail of the content but about the way users integrate Vine in their conversation with what they share.

Snippets of conversation are also amplified on Ask.fm, which one could describe as a dressed down version of a contemporary social networking site. The stream of conversation on this site takes the shape of questions and answers. Questions are limited to 300 characters whilst answers are not, with the possibility of featuring additional content. When answering questions, users can record a video or attach an image to the post. Any questions posted by the user from his profile reside in the stream waiting for anyone to answer. Answered questions make it to the user's profile.

The stream is a very active page, enabling anyone on the site to respond, even anonymously. Staying on the page for just a few minutes generated more than 700 new answers waiting to be read. Taken on their own, the questions and answers are almost meaningless small talk. Consumed as a stream, conversation on Ask.fm

carries meaning, to the point of having been the cause of serious cyber-bullying, leading to cases of teenage suicides, as reviewed in Section 4.3.3.

An alternative view of conversation as a stream is the one brought about by SnapChat. Conversation on SnapChat takes the shape of visual exchanges in the form of videos and photos, also referred to as picture chat. The application has made it to the top ten App Store downloads (Top App Charts, 2013). Until 2011, Facebook was one of the applications which exhibited significant growth in picture uploads and sharing. In late 2011, SnapChat came into the picture and became an interesting alternative to Facebook's success. SnapChat stands out due to its inherent feature, which self-destructs exchanges after a maximum of ten seconds from the time they are sent. The deletion happens on both the sending and the receiving end in a very strict manner. The sender chooses how long the exchange is to be made available to the receiving user before it is deleted, as long as this does not exceed the set time limit of ten seconds. SnapChat even notifies the sender if the other user records the exchange by taking a screen shot of the picture or part of the video.

The deletion feature has several implications on the type of conversation that is carried out. The focus of the exchange is on sharing the moment rather than framing a memory. Whilst the asynchronous exchanges on Facebook are aided by the possibility to edit the post even after it has been published, SnapChat is about the snap at that point in time.

The transient nature of snaps is very different from the permanence exhibited on other social networking apps, such as the Facebook timeline. However, even though the shared content is not available at length, snap after snap, a stream of exchanges occurs. The increased focus on the quick exchange makes it easier for users to stay in touch and hold subsequent conversation. The keywords in the previous sentence are "staying in touch" as there is less focus on the exchange and much more on the quick interaction. Even though the picture chats per se do not last for long, the idea behind SnapChat is for users to be constantly in touch.

6.2.2 Grid-like representation of the stream**.**

The stream of conversation is also seen in the way interactions are presented to the user. Various applications point towards a representation of conversation in a stream-like manner. The representation of conversation as a stream, as a burst of interaction, further reinforces the notion of the conversation space as a container of frequent, brief and related exchanges.

Facebook adopts the timeline approach beyond the Timeline itself. The News Feed has been the focus of this study. The News Feed and the Facebook Timeline are related as one aggregates the activity happening on respective user timelines. The aggregation includes all sorts of posts. Both applications allow the user to go back to previous exchanges and consume the exchange as a stream of content. Both applications changed the way Facebook users consume content and have in the process led to user criticism related in particular to how they facilitate access to 'private' information in public and possibly out of context.

The stream approach is also seen to go beyond the Timeline in Facebook's Messenger app. Facebook switches between quasi-synchronous chat and asynchronous messaging seamlessly, depending on when the users are accessing the app. If both users are online, Facebook enables them to chat. If either of the two is not actively using the app, then the app shifts to the messenger's functionality. This shift to quasi-synchronous conversation is also aided by Facebook's new Chat Heads functionality. The innovative messenger notifications do not simply come up at the top of the screen when the app is being used but feature a small widget that displays as an icon on top of any other app. In this way, the exchange is not limited to instances when both users are using the messaging app. As a result there is only one thread between two users. Exchanges between two users feed into a continuous thread, gradually building what could eventually become a life-long thread of exchanges between groups of users.

Much like the Facebook Timeline, the Pinterest profile features the most recent Pins in a grid-like format (refer to A3.1 in Appendix). As on the Facebook Timeline, followers can scroll down and go through all the Pins the user would have shared.

The focus of the pinboard is on the persistent stream of pinned content and not the specific social activity surrounding it. Clicking on the Pins will then enable the users to view likes, comment and go through related boards by other users. The grid-like design, which is carried on the site, is a reflection of the shift in conversation. The layout makes it easy for followers to get a quick idea of the user by reviewing a grid of pinned images. This type of layout is in line with the stream of posts in News Feed and the stream of questions on Ask.fm.

One could hypothesize that as more apps join the conversation, the grid-like interface promises a way to dashboard the various streams of activity triggered by both users and machines, to feed into a persistent mode of conversation. In fact, the grid-like layout has been around for some time. It is also found in layouts catering for widgets such as the concept of the customizable interface in iGoogle and Netvibes. Pinterest takes this concept further. Whereas widgets offered a glimpse of the full app, Pinterest goes to the very edge of the conversation, the pinned images, and displays them in the grid-like dashboard.

The grid-like layout that emphasizes the stream of exchanges has recently made its way into photo apps on the Apple and Windows operating systems. These apps group photos by moments. Moments represent common dates or places where the photo was taken. Moments also integrate own photos with those taken by friends in one stream.

The acts of pinning and liking, together with the grid-like layout making its way into applications, demonstrate that the shift in conversation is one where being persistently connected overrides the need to compose sophisticated messages. Moreover, this approach to the representation of the stream makes it easier for an audience to consume conversational exchanges. In this case the audience varies in size. It could include a large friend list on Facebook or a more exclusive group chat on SnapChat. The different audiences hint at a third theme implied by the three-dimensional view, that of a sophisticated public.

6.3 The sophisticated public

Online social networking sites enable a new mode of conversation. In this setup, users are able to share conversation with hundreds and thousands of users making up the users' friend lists. The popularity of this choice is seen in the choice of the friends sharing level in section 5.3. This affordance suggests the needs to define which content is public and more importantly, who is the public.

Primarily, user conversation spans physical networks and technological boundaries. Secondly, this network is not defined by the length of friend lists or subscriber numbers, but by user relationships. Finally, this includes instances where size does matter, in that a segment of the conversation is directed towards the wider definition of the public.

6.3.1 Beyond the network

In the mobile space, the unique mobile number, associated with a SIM card and a physical device, defines a user. Here the public is a list of mobile numbers as much as the network of SIM cards connected to base stations. This definition of the public is synonymous with the telecoms space, but not only. Telecoms operators are not alone in adopting such a view of the network.

Hardware manufacturers often limit their messaging apps to their ecosystem of products. In their view, the network is one made up of devices carrying the same brand or operating system. Apple's iMessage is only available on the Apple operating system across Apple devices. The app seamlessly integrates with the smartphone messaging application, routing both messages to the iMessage community and others to the rest of the user's network. In 2013, Apple did not allow the Facebook Home application to be made available to its users on the iOS platform. The app takes over the smartphone such that the home screen and user interface revolve around the Facebook functionality. Apple did not run the app in its App Store, claiming it wanted to own the user experience on its own devices.

This idea of restricted public is seen in several other places. Social networks limit features to subscribers of the network. However, the online view of the network is very different. The online space is not owned by anyone but its users. The e-mail channel, which has been around far more than smartphones and applications, spans countries, regions and providers. The three-dimensional model adopts this notion of the public. This is a more user-centric view of conversation than that limited by physical or technological constraints.

Facebook does adopt this view of the public even though it still operates within the constraints of its business plans. The network was originally conceived in the online space before the iPhone, the Android operating system and the App Store. The site adds on another layer to conversation by adding the social profile to every contact, bringing along with it the friend activity, friend network and presence on the network. In this way Facebook transforms the address book, a list of mobile numbers, to a network of friends. The take-up of the service has also enabled other apps to plug into the social network that Facebook carries. In this way, even these apps feed into the social network.

The shift from a physical to a more social network is also bringing down the virtual boundaries that exist elsewhere in the communications landscape. Blackberry had limited its popular Blackberry Messenger (BBM) app to the Blackberry Device ecosystem since its inception. In 2013 the vendor started making available a multi-platform version of BBM. Such a move might be interpreted in the market as Blackberry's last attempt to stay relevant and hold on to its user base. However, from a user perspective, Blackberry's stance is a move in line with the shift in conversation. Apple, which is known for its strong belief in being vertically integrated and limiting the software it designs to the ecosystem of devices it manufactures, has in the same year made available its suite of iWork products through any web browser via the iCloud.com site. Microsoft has in turn made available the Office suite of products as apps on iPad.

Such moves in the communication industry are fuelled by harsh competition and business strategy. At the same time, such an approach contrasts with the users' demands, which go beyond device, app, platform or provider to communicate in

public. This is also re-enforced in the ever-growing friend lists on Facebook and in parallel, the move to more contained group chat on WhatsApp.

6.3.2 Friends in public

The findings of the categorization in section 5.3 demonstrate that the size of the friend lists run into the hundreds and thousands. The analysis also indicates that sharing content with everyone or limiting it to the list of friends are the two most popular options. At the same time, user response shows that most of the conversations feature few comments and fewer commentators.

The shift to a social network that resembles a public network rather than a physical network implies that its users would perceive the network equivalent to an offline crowd. In this context, the size of the crowd does not dictate who the user's friends are. Related to this is the users' choice to shift their conversation from a public medium such as Facebook to a closed group.

Towards the middle of 2013 Facebook confirmed that it was experiencing declining activity coming from the younger segments of its user base. At the time media analysts suggested that this was coupled with a shift of conversation to other apps such as WhatsApp. Later in 2014, Facebook bought WhatsApp whilst still running its messaging service as a separate app.

The popularity of Facebook could be causing this shift to a more restricted circle of friends. Earlier in the research, social networking sites were discussed in terms of them being a third place. By definition, a third place is neither home nor work. This might imply that users seek alternative gatherings as relatives and work colleagues subscribe to the same network. WhatsApp is one of these gatherings.

WhatsApp and similar apps reside in between the legacy voice calling and the public conversation that is synonymous with the News Feed. The app builds on the notion of a closed conversation. Even though group chat can include a large number of users, the conversation is still exclusive to the group and not available to the public. WhatsApp is useful for a group of friends to be constantly up to date

with what is going on. A continuous thread of exchanges in the form of a group chat allows these friends to comment on their daily life without the need to be in the same place. This form of persistent conversation is not as easy to maintain through SMS, especially because group SMS is not fit for a continuous thread of exchanges.

WhatsApp cross platform availability enables the shift to a more sophisticated public in a wide manner, but has its own limitations too. The app is limited to the smartphone. Other OTT apps, such as Skype, bring the functionality conceived in their desktop versions to a wide array of devices, not least the smartphone. The availability of the app on both desktop and mobile platforms enables a more flexible way to conduct conversation with friends, even when these are not subscribers of the app or communicating on the same platform.

If there is a more sophisticated choice of friends, which goes beyond physical, technological and virtual networks, then there has to be a definition of the public, in the generic sense. There are instances where the exchange is directed to a public, an audience of users. The conversational instances analysed in the previous chapter also suggest that there exists a cluster of conversation that triggers higher user response and a lengthier exchange.

Significant is the popularity of Ask.fm in the context of its functionality enabling users to post anonymously. Of all the networks reviewed so far, the network is the most open and the less concerned about the participants' identity in the exchange. Users do not need to show their identity and do not have to be connected to the other user to be able to direct a question at them. This anonymity extends the concept of the public. In fact, conversation on Ask.fm is open to anyone on the site. As a result the concept of public in this space is widened. One could even argue that Ask.fm embodies the virtual Saturday night out where what matters is that you are in the 'in' crowd and not who you are and whom you know. To a certain extent, it is as if Ask.fm is the new Second Life, in that the site becomes a third place for users to make some noise.

Outside Ask.Fm, the public is embodied by the wide conversations that users carry out through social networks and discussion boards. It is the Internet in its original state as a network of users, enabling exchanges with friends in public.

6.4 The longitudinal view

The proposed conversation space assumes a three-dimensional shift. As highlighted in section 5.1, the shift is a longitudinal one. Smartphone adoption is seen as a gradual path through which the user adapts and shifts behaviour. The evolution of new modes of conversation could in time also diminish the importance of traditional means of communication in the conversation space. Assuming that the older modes of conversation are the least persistent, public and asynchronous whilst the newer modes expand this type of conversation in a number of directions, the diagram below (Figure 25) suggests an evolution of conversation after smartphone adoption.

The diagram assumes declining conversational instances in the more conservative mapping area and the increased importance of the other outer parts of the conversation space. The graphical representation also suggests that the conversation space is split in two parts. From a technology perspective, amplified behaviour is exhibited in new technologies that substitute the older technology by offering the same features in a possibly better, cheaper and easier way. From a user perspective and on the diagram, this behaviour is the closest to the traditional forms of conversation. The outer part of the conversation space includes user behaviour that is significantly different from voice calling and messaging. In the technology space, these media exhibit emergent user behaviour.

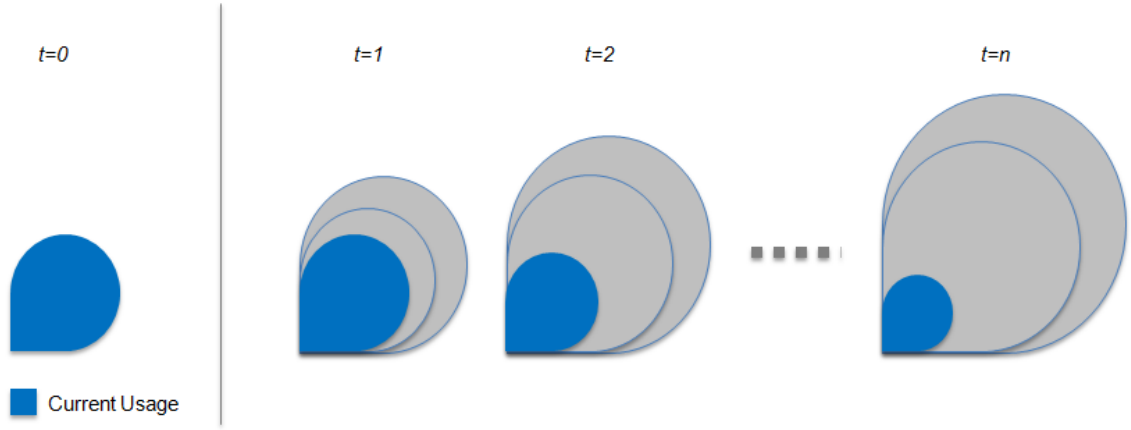


Figure 25: Evolution of user profile in the new media

The longitudinal view is primarily an outcome of enhanced connectivity and the growing affordances of the technology. It would be restrictive to assume that the evolution path in the conversation space is simply the result of a cost-conscious user. In other discussions these apps are referred to as disruptive technology. However, what these apps really disrupt is the business model that the industry players operate with. From a user perspective these applications cater for a segment of the conversation that occurs at different parts of the conversation space, suggesting that users opt to shift their conversation in order to find a more appropriate means through which they express themselves. Research often misses out on a significant shift, that in which the user exhibits emergent ways of staying in touch.

Taking WhatsApp as an example, its cost structure is an annual subscription in contrast to the per-message charging in standard mobile tariffs. Once the user can connect to the Internet, all activity in the application is free except for the cost of mobile data used to carry the messages. However there's more to shifting conversation than the cheaper annual subscription. WhatsApp moves away from unitising conversation, enabling the user to share images, voice messages and videos in the thread. WhatsApp also follows on similar applications and does away with the inbox and outbox. The app also facilitates group conversation and users need not be limited to the same type of device or operating system. The user experience provided by the application has enabled it to become the messaging application of choice on devices such as the iPhone, which come with similar native apps for messaging.

In acknowledging the longitudinal view it is also worth exploring emergent user behaviour that could pre-empt a more mainstream mode of conversation in the future. The type of conversation on Ask.fm seems to attract a younger audience in comparison to the wider user base. The app states that half of its users are under 18 years of age. The inclusion of Ask.fm in the discussion on shifting conversation is not only relevant because of the mode of conversation exhibited by the users but also because of the site's younger audience. This conversation on Ask.fm could be synonymous with users who are discovering socializing on the Internet without having lived in a past reality. The new mode of conversation on the network could also hint at where conversation will go when these users would represent a wider part of the Internet subscriber base.

The implications of the longitudinal view are not limited to legacy services. In the new app space shifting user behaviour will trigger the transition to newer and more appropriate modes of conversation. Adopting a longitudinal view of conversation implies taking into consideration that what today defines the boundaries of the conversation space might not be sufficient for the evolving user tomorrow. The three-dimensional model of conversation also captures the quasi-states in between the extreme points that define the boundaries of the conversation space. The states feature in between the extreme points on the axes of the public, asynchronous and persistent dimensions. Quasi-states capture the perceived view. Apart from evincing that the user perception of shifting conversation is more sophisticated than a dichotomous choice in a technology, these states also show an element of unpredictability. Unpredictability should not be discounted in the extension of these implications into the future. Unpredictability becomes more important when one reviews past attempts to shift the conversation. This element of unpredictability reinforces the role of the user in influencing new ways of communication.

6.5 A look back at previous attempts

The new affordances brought about by the convergence of the phone and access to the Internet make it difficult to predict user behaviour which in various cases emerges to be different than the intended use of the technology. Service providers,

who need to adapt to the new communication setting also experience this challenge. A similar challenge has been experienced by the industry as it tried and tried to sell the idea of the smartphone. However, this time, it seems that the user is bought into the idea and the industry is the one trying to make the link between the new behaviour and the enhanced technology affordances.

Hypothesizing that the emergent behaviour exhibited by the user is part of the shift to a more public, persistent and asynchronous conversation, can one come to the conclusion that applications that are not around any more have failed to enable this shift in conversation? Even more significantly, have applications that tried to get the necessary traction to change user behaviour failed to do so because they did not shift the conversation along the chosen dimensions of the conversation space? Thirdly is there an element of unpredictability in emergent user behaviour, which is hard to predict when discussing the future of conversation?

I review three examples – Myspace, Google Wave and Vodafone 360. The three projects are reviewed in the context of the four implications of the three-dimensional view, discussed throughout this chapter.

6.5.1 Vodafone 360

The lifetime of 360 was a very short one. The project was announced in late October 2009 and showed signs of trouble as early as April of the 2010 when Vodafone closed down WayFinder Systems, one of the three start-ups in the 360 project (Vodafone, 2010). Less than a year after the launch Vodafone also ceased work on the H2, the third bespoke Vodafone 360 handset. Just 2 years later, Vodafone announced that it would be discontinuing the service.

The significance of Vodafone 360 to the traversal of the conversation space is its attempt to widen the conversation. The service provided users with a new tool to manage conversation through three pillars – an innovative address book, a content store and location-based features. The big statement with which 360 started off was that the social network is at the centre of conversation. By this 360 referred to the network of contacts with which we interact, through both legacy services synonymous with telecom operators and the new media alternatives. Even content

and location data were presented around the user's social network.

The service acknowledged that the conversation is wider in scope than the platform over which it happens, or the network through which it stems. 360 attempted to capture conversation that was occurring outside the mobile space through its desktop version. Vodafone made use of Zyb, an enhanced phone back-up service it had acquired, re-branding it to 360. The backup service allowed for integration between the mobile view of 360 and its desktop version. With the online back-up functionality, 360 even integrated traditional messaging, backing it up in the online space. The service also integrated interactions from other social networks.

The interface also featured the concept of a timeline with interactions featuring in the sequence they occurred, providing users with an innovative way to display the stream or interactions. Messages were also grouped by contact rather than by the type of app. This functionality facilitated access to alternative means of staying in touch, shifting the conversation in the new media. The grouping also added to the persistent dimension of conversation. Suddenly, a continuous thread of interactions with that user could be accessed in one place. A similar feature is available on the Windows Phone 8 operating system, which was launched years later. In a similar fashion, the messaging app aggregates messages from different social networks. In both cases the conversation is not limited to one network or format. The conversation can flow from one app to another in one continuous thread.

The innovative address book provided users with a sophisticated tool to manage their network. The new functionality came with the People app, which aggregated contacts and interactions from different social networks. In this way, rather than going through a menu of applications and then getting to the specific interaction, on 360, users accessed their phone book first and everything else followed. This was one phone book, the aggregation of the user's social networks on different apps. Vodafone's approach to an aggregated address book makes it clear that the user's public is not limited to the technical social networks to which he or she

subscribed. This approach reinforced the notion of a conversation space that is made up of various types of interactions.

Beyond aggregating sub-groups of contacts and circles of friends, the Vodafone service approached the notion of the public in a sophisticated way. Tags grouped users, denoting family, friends and other user-defined tags. This was before Google came up with Circles on Google Plus and Facebook introduced lists. Even the way the network was displayed was innovative. The user interface also came with some new features on how to display the user's social network of contacts. These included the notion of groups of contacts and a three-dimensional view of the address book, with the closest contacts featuring on the front and the others behind, distinguishing between close contacts and weaker ties (refer to A3.3 in Appendix).

Conceptually, Vodafone's project seems to have touched upon the three key dimensions of shifting conversation. The project is also in line with the themes being discussed in this review. The service did enable a wider type of conversation; it did embrace conversation as a stream of interactions and did provide a sophisticated way to manage one's network of contacts.

Ironically, the 360 service did little to enhance the voice call experience per se, even though at its centre was the *phone* book. It facilitated access to the asynchronous mode of conversation. On top of this, 360 added location. The Wayfinder application added context to the conversations occurring through 360. This type of location meta-data is very common now, four years later, yet was as popular at the time. The third angle of the 360 store was content. In 360, content stemmed from Vodafone's previous revenue streams in the days of Vodafone Live. The new content store promised to be an easier way to get to new music and games in the 360 environment but it did not necessarily make it easier for users to consume and share it.

However, the Vodafone 360 solution also had some limitations that could have impacted its success. Primarily, adopting a longitudinal view of how users evolve in their communication, 360 could have been launched too early to gain the

desired momentum. Vodafone 360 was conceived at the time when the iPhone was barely 2 years old and the Android platform had just been launched. Facebook on mobile was not an obvious add-on to the smartphone and social networking on mobile was still at its initial stages. At launch the 360 service did not integrate with Twitter and Hyves (Shiny, 2009). In this scenario the mobile Internet user experience was still taking shape.

In taking an active role in shaping up the mobile web experience, Vodafone built a new platform based on the Linux Mobile operating system (LiMo) and made it available for developers to build a suite of new apps users could access through the phone book. As part of the Joint Innovation Lab (JIL), Vodafone claimed its applications would run in the hands of billions of users. The network combined the users of the big operators making up JIL even though the proposition never reached as many people. Vodafone promised 700 applications at launch, which was acceptable when compared to the 800 apps with which the iPhone had been launched two years earlier. It was still far away from the 35,000 apps on the App Store at the time of the 360 launch (Costello, 2014).

There were a number of barriers one had to go through to start using the service. To get the full 360 experience, users had to use one of two devices, designed by Samsung specifically for Vodafone 360 and carrying the 360 functionality on their software. The devices were known as Vodafone 360 H1 (GSM Arena, 2010a) and Vodafone 360 M1 (GSM Arena, 2010b). The wider user base that did not own an M1 or H1 device was left with one of three options:

First, if the user had one of a selected range of devices, limited 360-functionality came as part of a software release that could be installed on the user's device. The software release included elements of 360. If users did not own such devices, they could also download the three 360 apps on their respective phone, when this was possible. As a third option, users who did not own a device which either supported the software release or could download 360 as an app version, could use 360 as an online tool to manage their aggregated phone book and back up their phone. With every option, the user got a different flavour of 360.

Finally, one could criticize 360 as being inherently an aggregation of software rather than a conversation tool. In fact, the service could be seen as an umbrella for all of the users' mediated interactions, making the smartphone really the window to conversation of all sorts. The criticism is re-enforced when one considers other vendors such as HTC and Facebook that have in the same period offered alternatives to 360.

HTC aims to own the user experience on the smartphone. HTC dresses up the Android operating system with its HTC Sense interface, which in some cases offers functionality similar to 360. Facebook attempted to dress up the operating system in a Facebook cover, becoming the default home screen. In 2013, Facebook launched Facebook Home. Like 360 Home also came with its own hero device, which was designed by HTC and known as HTC First. In a similar approach to that of 360, apart from the HTC First, the Home experience was also limited to a select number of other hero devices, limited to the Android operating system and was rolled out gradually geographically. Home aims to make the social network the window to every other app on the phone. The Facebook cover becomes the default home screen whilst Facebook's user experience takes over the phone. To this extent, Home may be criticised for not really being a new way for conversation but a tool to facilitate this further. The take up of Home is nowhere near the network's success in previous endeavours. Following its launch, Facebook is now breaking down the new features that came with Home and introducing them in the already popular apps.

It is also useful to note that subsequent products did feature some of the ideas that were showcased in 360. The idea of the expanding widgets may be described as a precursor to the tiles concept in the Windows Phone 8 interface. The same may be said of the notion of unified messaging, including social networking messaging tools and traditional services side by side. Both timeline and sub-groups are popular in the layouts and functionality of Facebook and Google Plus respectively.

In conclusion, Vodafone 360 provided users with a tool that enabled them to capture a wider share of the conversation, including services that had been seen as disruptive by the same industry. The project also presented users with a new way

of accessing the stream of interactions. The innovative approach brought about by the People app was also a sophisticated way of approaching the network of contacts. On the other hand Vodafone's proposition to facilitate shifting conversation may be seen as fragmented and not focused. In addition, the user experience was restricted to the limited devices and platforms on which the service was made available.

6.5.2. Google Wave

At the launch of Google Wave, the keynote presentation positioned the Wave Project as a redesign of email, allowing users more collaboration and an aggregation of the different tools Google was already popular for. The new service was announced in May 2009, opened to the public the year after and declared as an end-of-life project less than three months later. In January 2012 Google Wave went into read-only mode and closed down in April of the same year. Today, Google Wave is in an open source project that is in incubation stage (Apache Incubator, 2014).

It is useful to look at the overall concept of the wave. The concept of the Wave touches upon the dimensions of three-dimensional conversation and the themes discussed in this traversal. Google's project provided users with a sophisticated aggregation of content carried by Google's ecosystem of products in the same thread. This facilitated the inclusion of videos, photo albums, documents, polls and other widgets in the conversation carried over an email-like exchange. The aggregation of these different types of content approached conversation with a wider definition and was one of the features most popular with beta testers and early adopters (Cheang, 2009).

At the same time, the notion of the wave re-enforced the notion of conversation as a stream. In fact the idea of the wave is inline with threads found in the new messaging apps such as WhatsApp, Facebook messenger and Google's Gmail. The notion of a continuous exchange, which incorporates messages and content in such a sophisticated stream, should be seen as an enabler of persistent conversation. Google's approach of aggregating the different conversations in its ecosystem to

enable a more sophisticated conversation, builds on the notion of persistent conversation in that it can aggregate multiple conversations going on between the same users (refer to A3.2 in Appendix).

The possibility of contributing to the thread at any point meant that unread messages could be found at any part of the wave. Together with new subgroups of users being added halfway through an exchange, the stream of conversation in the wave was less straightforward to read through. This contrasts with the simpler grid-like layout of exchanges on Pinterest and other apps. To address this more complex sequence of messages and users, Wave included a new feature, that of being able to playback the conversation as it developed. The concept of playback is similar to the one found in the literature discussing the Shift-Box prototype (Vuillemot et al., 2010). This feature made the most of both synchronous and asynchronous modes of conversation as the latter could be made to mimic the former with playback.

Even though Wave did not come with a public profile, the service still had a public dimension. Google Wave occurred with the scope of collaboration, of working on something together. It enabled users to join a public conversation by starting or joining a public wave, one that was open to all subscribers. These waves could be filtered in a user's inbox in the same way e-mail is searched through. Joining the conversation meant opening the wave in e-mail fashion. Every time users added more content to the public wave, users were notified in the same way they are when someone responds to an e-mail thread. At any point, users could also mute public waves. This would stop the notifications when a new exchange was added to the specific wave.

In the mode of collaboration as suggested by Google one possible criticism is that content, and not communication, was king. Taking on e-mail, Waves were centred on a subject and not a set of users. Users rated highly the collaboration tool that Wave promised to be and the functionality to aggregate various communication tools in one place that came with it. This is very different to the persistent conversation that Licoppe (2004) proposed – the notion of a connected presence where the content is secondary and what matters is staying in touch. The

aggregation which was at the heart of Google's new service, aggregated content from the various parts of Google's ecosystem and most often this did not involve the kind of effortless connectedness which is seen in liking and pinning content.

This obviously does not imply that waves did not carry user interactions. In various product tutorials, the wave alternative was seen as a cleaner way to hold group conversation. Complicated e-mail threads including groups of users were contrasted with the more sophisticated Wave alternative. In Wave users could edit the wave at different points and not be limited by the sequence in which comments were posted. New users were easily added to the conversation without the need to forward the e-mail and start a separate thread. Sub-groups within the wider group could have separate conversations at different parts of the wave.

A particular feature triggering user debate was real-time chat. By real-time chat Google redefined quasi-synchronicity. Instead of waiting for the other user to type the next chat message and then reading the message, the service enabled users to view in real-time every character the user keyed in. This feature removed the brief intervals present in other chat services where the user is presented with a discrete notification message saying, "user is typing a message". Real-time chat made the most of speed of reply but at the same time side lined the shift to a more asynchronous mode of conversation in which delay of the response adds meaning.

Google Wave made the most of both synchronous and asynchronous exchanges. A similar functionality was later made available through Facebook messenger. The app became a chat client when both users are online, and turned itself into a messaging inbox when anyone of the users was offline. This approach to messaging is also in line with the notion of conversation as a stream of exchanges. Incidentally in Wave the approach was slightly more complicated as multiple conversations could be going on with the same users at the same time, whilst they were involved in other waves.

The distinguishing factor between Google Wave and Facebook is Wave's departure point – e-mail. Whilst the e-mail medium is very much synonymous with the asynchronous mode of conversation, and chat is synonymous with the quasi-

synchronous type, Google Wave provided the two modes of conversation in their extreme states. The Wave's playback feature facilitated asynchronous conversations at any part of the thread, whilst the real-time chat feature exposed quasi-synchronicity in its extreme.

Since Wave focussed on collaboration as a key characteristic, interaction on Wave assumed user feedback and hence the service did not cater for user monologues, posts equivalent to the Facebook status with no response. Reinforcing this further, Wave users did not have a public profile as in the other social networks.

In the context of the shift to public conversation, Wave did not have the sophisticated social framework available in other apps. The product lacked a friend-list feature that would have allowed a subset of contacts to represent the user's audience. Building on the initial findings of the present study, a large part of interactions are shared with the friend list, which is neither the wider public nor a custom list of contacts. The latter two make up a smaller part of the conversation on the Facebook News Feed. It seems that the users are comfortable with publishing content online to a controlled public, for which Wave did not cater. In the case of Wave, it was either the custom list or really all the users. Wave's approach to public conversation attempted to turn e-mail into an online social networking site, but lacked information on the user's public identity and the relational aspect of social networking. In this public setting, users had to give away their e-mail address to start interacting.

Google's approach to the social network highlights a limitation in that the Wave network was more tied to the physical e-mail network than the social user network. Primarily Google made available a limited number of invites. Until a year after its announcement, the Wave service was not integrated in the Google ecosystem so that users had to have an invite to be able to join in. This meant that the early adopters of the new technology, the ones Google relied on to make the new functionality more mainstream, had no guarantee that their friends, possibly early adopters like them, were on Wave. This could have hindered Google's attempt to re-invent e-mail and switch the users' e-mail activity to Wave. Users did confirm that the lack of user accounts available within their circle of friends

topped the list of issues.

Google Wave's functionality was limited to Gmail users. This meant that the user public in Wave did not include users from popular e-mail providers such as Yahoo or Hotmail, not to mention other e-mail services. This might be acceptable in the social networking world in which different social networks such as Facebook and Twitter offer different functionality, but surely not useful in a forty-year-old technology such as email. A Facebook conversation cannot happen with users on the Twitter network. Yet this is possible in e-mail. Gmail users email Yahoo Mail users and the thread can continue nonetheless. Once the service is dressed up as an enhanced e-mail service, it would be difficult to limit the conversation to contacts on the Gmail network only.

Wave's lifetime was a very short one. The company set out to clean up the fragmentation of exchanges occurring across its ecosystem of products. It is as if Google attempted to aggregate most of the exchanges happening throughout this shifting conversation space. Such a shift in behaviour possibly requires more time to generate substantial take-up. It could be that Google did not give the necessary space for users to respond.

In conclusion, Wave embraced the notion of conversation as a stream. The view that the various exchanges we're part of make up one long and complicated wave is possibly closer to the offline reality than any other alternative tool. Wave also embraced the wider definition of conversation. Google Wave also challenged the notion of synchronicity through its real-time chat and the Wave playback function. Both features are not around anymore. Wave also switched between synchronous chat client and asynchronous messaging, a feature that was later taken up by Facebook.

However the focus of the project was collaboration and hence aggregation of substantial content and not the effortless conversation snippets most conversation streams are made of. Wave might have been one of the most sophisticated collaboration tools at the time however not all conversation on e-mail is a long discussion on a project at work. Back to the snapshot of real life conversations in

Chapter 5, work-related conversations are possibly the least popular in the social media.

Even though Wave pushed the boundaries on a number of fronts, it seemed to lack focus on which conversation to capture. The mode of conversation was asynchronous as in email but at the same time quasi-synchronous thanks to the real-time live chat feature. The conversation was a group conversation but limited to the lucky few who had an invite. This made an e-mail network aspire to be a social network and in the process excluded other e-mail users from joining the conversation, simply because they resided on a different e-mail networks.

6.5.3. Myspace

Myspace started as a social network for artists and bands, which could set up their own page and interact with fans through the site. The site launched in 2003 and gained popularity thereafter. The site's popularity could be seen in the usage it generated, at times exceeding search queries on Google (Cashmore, 2006). However, by the end of 2008, Facebook kept increasing its users whilst the Myspace user base remained fixed at around 100 million users (Schonfeld, 2008). In fact, the site's users declined from just above 100 million in 2008 to around 30 million in 2013. In the same period, Facebook's social network exceeded one billion users. Unlike Wave and 360, Myspace is still around and has been revamped with an aspiration to become a social network for artists and art. The new Myspace is dressed up as a showcasing website, with big imagery and a strong focus on music and the artists. In 2008, Myspace tried to dress itself up as a social network when in truth it was more of an online and interactive showcase of artists. The re-launch highlights the strength of Myspace, which is that of publishing artists; both signed and unsigned, on the same platform.

Myspace is significant to the discussion because it did manage to widen the conversation substantially. In contrast to new technologies such as Wave and 360, discussed later on in this chapter, Myspace triggered new user behaviour that was not short-lived. By 2008, the site had captured a significant cluster of the users' conversation space. Facebook and other networks followed Myspace' success and

whilst at its peak, managed to overtake it in popularity.

The new Myspace comes with refined features for artists to showcase their music and broadcast themselves. This functionality does enable a stream of interactions relating to the users' music broadcast. The streams of music on the new Myspace are similar to the grid-like interfaces on applications such as Pinterest, which provide the user with an endless stream of content. At the same time, exchanges on Myspace differ from the effortless conversations occurring on other social networks. In fact, the network's ability to generate a conversational interaction is still to be seen.

The story of Myspace re-enforces the importance of the sophisticated public. Even though the network managed to attract a wide audience, users did shift their conversation the moment a new service satisfied their conversational needs better. User numbers relating to service take-up and attrition are evidence of this. Other apps that seem to be shifting the conversation significantly at present could in the near future be replaced with tools that aid users to manage their public in a more sophisticated manner, in line with the longitudinal view of conversation.

Finally, Myspace highlights that there is a business side to conversation, which impinges on how users are enabled to connect. One theory suggests that the commercialization of the site may have made it become less focused on facilitating the conversation. Co-founders have spoken in the press about the pressure of monetizing the product at the expense of constant innovation to keep up with the users' conversational needs. This commercial aspect of new media services is one aspect that influences the evolution of a service. Even though this aspect of the longitudinal view is out of scope in the present study, it is worth making reference to Myspace as a case in point. However, as also seen in the story of Myspace, emergent usage takes over and dismisses the old to the new.

6.6 Conclusion

In conclusion I wish to recap on the key themes, as discussed in terms of the chosen cases from the new media landscape, both present and past.

I. Primarily, the three-dimensional model of conversation is one that assumes a wider view of conversation, in definition, format and meaning. The new conversation is moving away from the unit approach synonymous with operators' business models and is aided by the wider formats of the exchange. The possibility for users to be part of the exchange in an effortless manner through acts of liking and pinning adds meaning to the conversation.

II. Conversation is also evolving into a stream. This is seen in the frequency of snippets of conversation. In this view the meaning of the conversation is less on the specific exchanges and more on the aggregated sequence of interactions. This evolution is further re-enforced by new ways for displaying the streams of conversation, with the grid-like layout used by Pinterest as one example of how conversation is being mapped in the new media.

III. Thirdly, the fragmented stream of exchanges also implies a more sophisticated public, implying a careful definition of who is a friend, and who is a friend in public. Both definitions go beyond the virtual network determined by Facebook or any other technological social network.

IV. The final theme is the longitudinal evolution of conversations, which emphasizes an unpredictable conversation space with exceptions and complexity depending on how its users engage in it. This aspect of the conversation is also seen in the first three themes. The emergent user behaviour that leads to an element of unpredictability is seen in practice in the current new media landscape, as reviewed all throughout the chapter, and previous attempts that were tackled in Section 6.5.

7. The future of conversation

The central question of this study relates to the evolution of conversation in the new media. In the preceding two chapters the impact of enhanced connectivity and the key themes shaping the new conversation have been analysed. However, the evolution of the conversation in the present circumstances leads to the question of how the conversation will evolve post the analysis period and beyond. The question is also in line with an important objective of the research, which is that of extending the findings into the future. To this extent, I propose two scenarios for the three-dimensional conversation space.

The first scenario extends the conversation space, in that it caters for a user who converses in a more public, asynchronous and persistent manner. This scenario points to emergent behaviour, which is hard to predict, yet which supposedly extends the chosen dimensions to extreme ends. Alternatively, the second scenario redefines conversation such that the conversation space is repositioned, or clustered. In this scenario the user is more selective and more educated on how to make the most of new affordance in the new media. The conversation in the second scenario is focused on identifying the more selective user and the choice of medium for specific types of conversations. In this case the conversation space exhibits more defined clustering of similar types of conversation.

The two scenarios are not mutually exclusive in framing the future of conversation, and the interplay between the two is also discussed in the last part of the chapter.

Both scenarios are to be seen in relation to prospective types of users, such as the new generation of Internet users and the wave of future users who are still not connected to the Internet. Both user groups bring with them new conversation behaviour. In parallel, the longitudinal view suggests that the existing user becomes more educated about the tools at hand and fuels the evolution of conversation within the proposed scenarios.

Before moving on to develop the scenarios I also make reference to alternative approaches for framing the future. Different approaches determine how the findings are extended into the future.

7.1 Framing the future

The proposed conversation space is in itself a space in which conversation shifts along the public, asynchronous and persistent dimension. It has been highlighted in Chapter 5 that the model is different from other models in the literature, in that the space focuses on the conversational instance rather than the medium or tool that enables it. However, the evolution of this space is also the result of the interplay between user behaviour, that which is cultural, and the technology affordances that enable the conversation, those that are driven by the tools and an industry within a market of competing services.

I consider three approaches, homing in on the third approach as the one being used. The first approach is very user specific and extends the findings by aligning these along possible changes in the culture of conversation. This approach focuses on the user and the emergent behaviour as the user reacts to the new affordances. The second approach is very technology specific. Here the future can be seen in context of the launches of competing players in a market that offers different communication services, which in the process shape conversation. In this approach the evolution of conversation may also be seen to follow the evolution of an enabling technology, a general-purpose technology that grows into other sectors of the industry. The third and the chosen approach is the ecosystem view of the evolution of conversation. This view follows the thought process that has

been adopted throughout the study as it focuses on the interplay between industry players, the technologies they launch, and the users that adopt them.

These perspectives are not mutually exclusive, particularly when one considers that one view shapes another. A summary of these perspectives follows.

7.1.1 The cultural view

User behaviour is influenced by culture. The diverse uses of the phone have been reviewed in section 2.1. Some of these uses are the result of norms that are specific to the society in which they occur and the stage in time the society is in. The meaning of constructs in society and the values of the same group of people shape these norms.

Earlier in Chapter 3 I have made reference to the research by Castells (1989) and the discussion on the meaning of space and time. The cultural context of a society does impact the meaning of these constructs, which re-dimension conversation, as discussed throughout the work. More recent work has in fact explored these constructs in the respective culture of the time (Wellman, 2002; Ling, 2004, 2008; Jenkins, 2006; Campbell & Ling, 2009). The construct of place is another cultural aspect to be considered. The way users experience place changes over time (Humphreys, 2008). This also impacts the view of the new media space as a virtual third place, which I also make reference to in Chapter 3 to define the shift to a public mode of conversation

Seen within the longitudinal view, the cultural evolution of conversation promises a transformational shift. Morten Hjerde (2011) discusses the phone paradigm shift. In his discussion, he argues that in the future, users are less likely to be speaking over the phone and will be making use of the mobile device as a different kind of tool. This is further justified by literature discussing emergent behaviours such as multi-communication (Cameron, 2007; Turner et al., 2008) and the ever more networked public (Ito, 2007).

The cultural approach is very time specific. Younger age groups are exhibiting emergent behaviour that is different from that of the mainstream users. This new

behaviour is also the result of a type of user who was born into a connected culture and is triggered by the widespread diffusion of technology. In this context, I consider the second view, which is more technology determined.

7.1.2 The technological view

The interplay between user behaviour and technology points towards the need to understand the future of the technologies enabling conversation. Technology development occurs within an industry. The future activities of this industry shape the future of technology.

Research suggests that the present stage is an inflection point where the old strategic picture gives way to the new (Grove, 1996). Cowhey and Aronson (2012) discuss the inflection point between the communications and the Information Technology infrastructure. They suggest that software and hardware are in a new stage of modularity, which, coupled with cheaper equipment, fuels the development of a powerful infrastructure not yet seen. This industry-driven scenario also influences the strategies companies adopt to provide communication services and products.

The market perspective is also the basis of the notion of the General Purpose Technology (GPT) approach, where the focus becomes the tools that enable conversation. Helpman and Trajtenberg (1998) introduce the concept of a GPT. In their contribution they distinguish between the study of the diffusion of a GPT and the analysis of the diffusion of a specific innovation. In contrast to the latter, they consider the diffusion of a "macro" innovation to have economy-wide implications in the form of a General Purpose Technology. The authors highlight four parameters assessing the diffusion of a GPT. The first parameter is related to the productivity advantage brought about by the new technology. The second parameter is that which relates to the old GPT and the existing stock (number of components) developed for the old technology. The last two parameters in the model tackle the demand of the new technology in each segment, and hence, the spend share of the segment related to the new GPT; and in a similar way, the R&D parameter, which studies how expensive it is to develop new, complementary

components. The contribution goes into great mathematical detail to determine the process by which different building blocks contribute to the diffusion of a GPT.

Approaching the future in this way requires one to understand the technological eras. A more recent contribution is that by Jovanovic and Rousseau (2005). In their contribution the authors review the Electrification Era and the IT Era in the context of the diffusion characteristics of a GPT. The diffusion of semi-conductors is often reviewed in these works as well. The model captures the resistance, or rather, the cost to switch to the new GPT in the first two parameters above. According to the authors, "the flip side of the potential of great benefits is the potential for extensive disruption" (Helpman & Trajtenberg, 1998:116).

Framing the future by observing disruptive trends requires one to distinguish between technologies that bring about real disruption that revolutionizes people's lives, and incremental technologies that offer better ways to do the same thing from one generation to another. One view of the future is that of a world of information appliances that act as one system and not a fragmentation of isolated devices. Norman (1999:259) states "The goal is to provide solutions for the consumer, not just electronic gadgets." The author's to make the computer "invisible" is fuelled by his vision to "move to the third generation of personal technologies, the generation where the technology disappears into the tool, serving valuable functions, but keeping out of the way. The generation where the computer disappears into tools specific to tasks. The generation of the invisible computer." The author suggests that devices have only taken the first step, are still isolated from one another and rarely communicate. Ten years down the line the devices are ever more connected through the net, yet fragmentation still shapes the current landscape. Understanding how this will change in the future could help to frame the evolution of the conversation space, which is also enabled by these devices and limited by the inherent fragmentation observed by Norman.

Another view on the future of conversation is that by Carr (2008). Here the author suggests that the future promises the evolution of conversation as a utility. This idea of the future is mirrored on the past. Carr observes how companies stopped generating their own power with steam engines and plugged into an electricity

grid. He suggests that a similar revolution is happening today. Many businesses and homes have plugged into the Internet's global computing grid.

Conversation is enabled by these technologies and hence in extending the proposed three-dimensional view, the evolution of the technology and the industry behind it are important parts of the puzzle. However there is more than technology making up the puzzle. I consider the ecosystem view as one more way to frame the future.

7.1.3 The ecosystem view

I have all along the text considered the interplay of the technological affordances and user behaviour. The third approach places these aspects, and players influencing their evolution, in an ecosystem. Such an approach is justified by the characteristics of the media landscape, which contrast with that of an economy. Whilst economics is the study of the allocation of scarcity focussing on what is happening in a market place, the new media landscape is abundant with shifts happening outside the marketplace. Approaching the current landscape as an ecosystem may be more useful to understand what is still to come. Adopting the ecosystem approach means that the media landscape is seen as an ecosystem made up of "a community of organisations, publishers, authors, end users and audiences, along with their environment, functioning together as a unit" (Naughton, 2012:115). Within this ecosystem, the Internet, as an entity, is a disruptor 'by nature', fuelled by the inexistence of a central control, and not being optimised for any specific application.

The interesting aspect of such an approach is its attempt to be exhaustive on the different players shaping the future. The overview of the Institutional Ecology is evidence of this (Benkler, 2006). In this framework different levels of the ecology are highlighted. Levels include the physical layer made up of the technological network that connects users and objects, and the different devices that connect to it. Another layer is the logical layer, which covers the transmission protocols and software. The common software infrastructure is related to this layer. It carries applications on it and is embedded in the devices and the software itself, including

the different web services that come in the form of mobile applications, online websites and other software. Related to services is the data space, which is becoming all the more relevant to the discussion due to the phenomenon of big data and its implications in the future. Also related is the network topology connecting users and objects in the context of the Internet of Things. Thirdly, the institutional ecology makes reference to the content layer. This layer is the one most synonymous with the mass media space but also related to the area of user-generated content. Layer after layer, Benkler touches upon both technological and user determined aspects of this ecology.

It is in this context that the ecosystem view is seen to be the most complete, as the user interfacing with other parts of the ecosystem at the different levels of the institutional ecology. In fact, envisioning the future as the growth of an ecosystem also includes the industry and the cultural perspective of the future. In this approach neither the user nor the technology has a free reign to evolve separately. Within each category the technological, cultural and business perspectives are considered as the forces of change. These forces of change relate to the approaches discussed earlier. For this reason, I frame the future of the conversation space by approaching it as an ecosystem that shapes the chosen dimensions.

7.2 Scenarios of conversation in the future

The preceding chapters of this study are at the basis of the scenario discussion that follows. In Chapter 3 the chosen dimensions were discussed in great detail. In the analysis chapter the shift from the bottom left corner of the model to the wider conversation space was studied using smartphone adoption as an example of enhanced connectivity. The findings highlight that sophisticated connected devices do shift the usage pattern. Chapter 5 also highlights that at least two clusters of conversation are shifting in the new media. Last but not least, chapter 6 highlights how the chosen themes are being re-enforced by new media applications that relate to the period of analysis.

Building on this, the scenario discussion explores how the dimensions will evolve and change in context of the findings in Chapter 5 and the chosen themes in

Chapter 6. I consider two possible scenarios. In the first scenario the three chosen dimensions extend into the future. In other words, the extended conversation space promises much more of what I have observed, yet goes beyond the set boundaries of the analysis period. I explore a more focused future for conversation in the repositioned conversation space, the second scenario. In this scenario, different levels of synchronicity, public participation and shift to a persistent mode of exchange are linked to particular types of conversation.

The diagram below provides a conceptual explication of the scenarios (Figure 26).

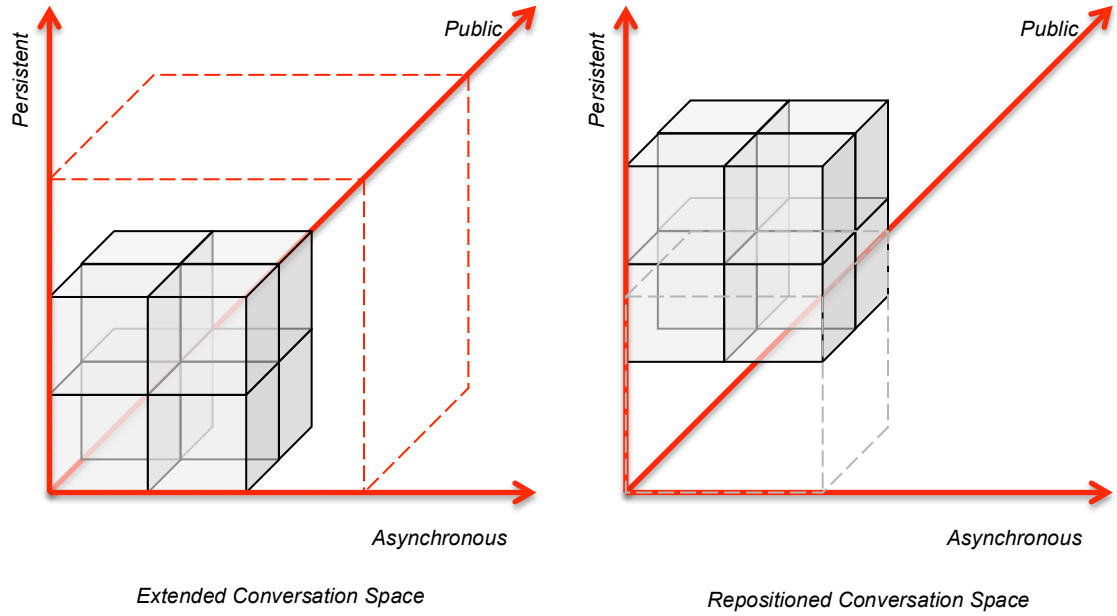


Figure 26: The future of conversation

7.2.1 The Extension of the Conversation Space

The extension of the conversation space refers to a scenario where there is more of the shift that is being exhibited today, an extended shift to public, asynchronous and persistent conversation. The behaviour of the younger Internet users on a social network such as Ask.fm is a clear example of a shift in behaviour, which is taken to an extreme, pushing the boundaries in at least one of the three dimensions. This is not the only way in which the conversation space might be extended. Two trends are worth mentioning to reinforce the prediction of an extended conversation space:

I. *The increase of connected devices:* 2008 was the year in which the number of connected devices exceeded the number of connected users. The trend did not stop there. It is expected that there will be 50 billion connected devices by 2020 (Cisco, 2011). Building on the analysis in section 5.1, which focuses on the impact of enhanced connectivity through smartphone adoption, the shifting usage exhibited by iPhone users is just a small part of the puzzle. This is further re-enforced when one considers the idea of the Internet of Things as a wave of enhanced connectivity in places where connectivity is not possible yet.

II. *The increase of the Internet user base:* Behind connected devices there is connectivity per se. Global Internet penetration highlights that the Internet user base is still a minority even though parts of the world are exhibiting significant subscription numbers (Internet World Stats, 2014d). The younger age group using apps like Snapchat and Ask.fm exhibits a behaviour that is very different from the rest of the online population. The behaviour is also the result of the users' social background. These users were born into a highly connected society from the start. This is not the same anywhere else. The low Internet penetration in parts of the world, and the steep increase that it promises every day, suggest that a new breed of Internet users is yet to come. These users will be introduced to an evolved Internet and will also bring with them their social background and their cultural norms.

Increasing connectivity, both in terms of users and machines, promises increased conversation overall. This could result in two shifts, the shift to the new media and the shift in the new media. The two shifts are in line to the analysis in Chapter 5 where the shift to the new media is tackled through smartphone adoption; and the evolution of conversation in the new media is the discussion that follows in the second and third section of the same chapter.

The shift to the new media implies that the shift in conversation exhibited by the existing Internet population will continue as new users adopt devices, such as the smartphone, which enhance their connectivity. The low Internet penetration is to be seen in parallel with the lower smartphone penetration. As these two grow, more and more people will be able to shift their conversation within the three-dimensional conversation space.

In analysing the evolution of conversation in the new media, the dimensions of public, asynchronous and persistent conversation take on a wider meaning. This means that what today happens in a certain public, asynchronous and persistent mode of conversation will in the future shift further along these dimensions. It also means that the constructs of the three dimensions, discussed in Chapter 3, will evolve as time goes by. The review of new media in Chapter 6 relates to this part of shifting conversation.

Both these shifts promise increasing conversation, which demands a media ecosystem facilitating the choice of varying synchronicity, enabling a better public conversation and part of a persistent exchange. I explore what this could mean in the future.

The extension of the asynchronous dimension

The shift to an asynchronous mode of conversation is the one most synonymous with the new media because it has enabled the use of varying media formats to exchange messages over a wide range of communication networks. Users might shift their conversation further along the asynchronous dimension by being able to

use it in instances that are not so popular today and in a more intensive manner. I suggest two examples, both of which may be extensions to present developments in the media landscape.

The first example relates to the wider use of voice in a delayed mode of exchange. Whilst the shift to an asynchronous mode of conversation has been possible due to the use of text, images and other media, it is less popular to communicate in this mode of conversation using voice. Facebook and WhatsApp already provide limited features for delayed voice exchanges. The recorded messages become part of the messaging thread. This trend promises to become more popular as the WebRTC initiative gains traction (WebRTC, 2012). In this initiative, a number of players, including telecom operators, have joined forces to incorporate voice in sophisticated applications that make the most of higher network speeds. Such applications enable the voice exchange to be part of messaging and hence occur in delayed time. In the process, the shift complements the theme of a wider conversation being carried out in the new media.

A second possible development that could extend the asynchronous dimension is the widespread storage of exchanges, not least those occurring over voice, for retrieval later. In the period of analysis, applications such as Pinterest and Instagram already enable users to store exchanges in a sophisticated manner. The exchanges make up a persistent stream, to which users can go back. The exchanges are still captured within the application, meaning that access to the thread is fragmented. I build on the idea of the grid-like interfaces that enable the idea of conversation as one stream. The extension of the asynchronous mode could be facilitated by a more elegant way for the storage of exchanges and the delayed conversation they trigger. Whereas today users need to go through different applications to add to the past exchanges, the future might really incorporate these in one personal stream, with each snippet being accessible in one place.

Such a discussion is not independent from the way the public dimension is extended, since competing social networks and multiple user profiles trigger much of the fragmentation.

The extension of the public dimension

The Facebook News Feed allows users to post content in public. For users the public could mean one of three groups – the wider public which includes every Internet user, subscribed or not subscribed to Facebook; the Facebook public which in 2013 includes more than a billion Facebook subscribers; or the friend list, which for some is made up of a few hundreds of contacts, whilst for others runs over a thousand. Variations to the friend list exist depending on the privacy setting of the particular post, the user profile and the other participants in the conversation. The segmentation of the public in this way is not limited to Facebook. For any social network one has the possibility to post content which can be seen by anyone, including people outside the network; content which is limited to the whole social network and other content that is limited to a smaller circle of friends. Understanding the extension of the public dimension requires a discussion on the possible future of these three groups.

Primarily, the wider Internet public promises to grow as more people go online. Worldwide, only just above one third of the population is online. In Africa, the region exhibiting the fastest growth in new Internet users, only 15.7% of the population is online (Internet World Stats, 2014e). Secondly, a social network could grow or diminish in size. Such shifts are not necessarily reflective of the activity on the same network since users could be happy to get the benefits of being on the platform but converse elsewhere. In response, social networks could also launch new features and services to counter this, widening further the definition of conversation. The third and more restricted group is the users' friend list. New service will enable users to manage their personal social network. Their conversations will evolve their social network accordingly.

Amidst the three groups of users are constructs of privacy and identity that will also impact the shift in conversation. Hints of this are seen in the present media landscape. Ask.fm, reviewed earlier, brings back to the social networking space the use of anonymity. The Ask.fm stream is not only open but also anonymous. Lack of identity allows for a more open conversation. Anonymous exchanges could occur in the form of stage names, a hidden identity represented by a virtual identity, or simply anonymous exchanges. Anonymity is appropriate in a specific context.

Similar exchanges are seen in online polls, user ratings, crowd-sourced projects and feedback panels.

In the context of better ways of processing data, and a more connected space, similar conversations could be very important to get a better service, beyond targeted advertising. There is value in sharing the data when this improves the service being given, but that does not necessarily mean that the user wants to be associated with that data. As an example, there is value in sharing your spending patterns with the bank if the bank can recommend ways to budget better, but that is something which one would share neither with his close friends, nor with the wider public. The discussion of anonymity will also extend to the amount of knowledge providers are obtaining through their users. The fear of a 'big brother' world will fuel new concerns and privacy requirements.

At the same time, not all conversation can be anonymous. Today the online public is a fragmented one. Fragmentation comes in the shape of multiple user profiles for the different web services and social networks. Fragmentation also comes in the form of multiple log-ins when accessing the same services from different devices. Vodafone 360 attempted to aggregate multiple identities under the 360 umbrella. Vodafone is not alone and other big players such as Google and Facebook want to own the online user identity. From a business perspective this gives additional data that can be used to increased targeting in advertising and service provision. However, from a user perspective, a less fragmented identity aggregates multiple exchanges occurring online. A move in this direction extends the public conversation in a sophisticated manner and contributes to the perspective of conversation as a stream.

The extension of the persistent dimension

The dimension of persistent conversation also complements the public dimension. The multitude of devices that will connect to the Internet will enable a more persistent conversation. A more persistent exchange does not only depend on more devices being connected to the Internet, it also implies an easier way to converse. Facebook announced the concept of frictionless sharing. By frictionless

sharing, Facebook implies seamless sharing. Today most sharing happens as a result of the users actively posting an article or photo. In the future, more and more sharing will happen as a result of users doing other things without actively sharing this content.

An increasingly connected world also implies additional meaning that is not present today. Photos have become social currency through which users relate memories and experiences. The ubiquitous connectivity of devices, and therefore the photo galleries stored on them, resulted in these conversations shifting to the online space faster. Their popularity is even seen in the snapshot of conversation analysed in Chapter 5. Photography is one to record these experiences. When more things are connected to the Internet, it will be easier to share these stories with the wider social network. When clothes, gadgets, furniture and other things are online, their online presence will become social currency too with little intervention from the user. .

A more persistent exchange can also hint at a more sophisticated stream of conversation. Vodafone's effort to aggregate conversation from different social networks in 360 was hindered by the complexity of different platforms, different devices and charging mechanisms. These platforms will converge further, bringing about simplicity. Voice calling and text messages will not be limited to a PC, tablet or phone. The grid-like layout discussed in 6.2 already hints at a more sophisticated approach to
streams of conversation. As social networks extend their services to the multitude of connected devices and screens, when and if a screen is needed, the conversation will become even more persistent.

Summary

To recap, the extension of the conversation space is the extension of the chosen dimensions in new areas of interaction. It is hard to predict the extent of the wider conversation space, yet it is easy to highlight signs of this shift. The emergent user behaviour that comes as a result of unpredictability, as discussed in the

longitudinal view, provides food for thought on the incremental and more predictable steps in the direction of an extended conversation space.

7.2.1 The Repositioning of the Conversation Space

Introducing someone new to a vast and unchartered space could lead the person to roam around out of curiosity. However, after some familiarisation with the surroundings, the person would become selective of which spaces to occupy and when, if at all. The same may be said of the notion of the conversation space resultant from the significant changes that have brought about new technology affordances and unexpected emergent user behaviour. Users have been exposed to different ways to keep in touch with anyone who is online. This has triggered user behaviour that at times felt inappropriate, unintended, out of place and unpredictable. The repositioning scenario suggests that in the future, users will become more familiar with the possibilities of the conversation space and will do less roaming around out of curiosity. The online behaviours that we are still shaping today might tomorrow become cultural norms taught to pupils on school benches.

This alternative perspective of shifting conversation in the future is one that takes in consideration a more educated ecosystem overall. In this scenario, the fragmentation of the ecosystem is used to the benefit of conversation. The conversation space is categorized and clustered. Rather than expanding the conversation space, the shift in conversation revolves around the consolidation of the current shifts. Different applications focus on servicing different conversations. Once again, I discuss what it means to reposition the chosen dimensions, and the three-dimensional conversation space.

The repositioning of the asynchronous dimension

"You have the right to remain silent, anything you say or do may be used against you". This text is taken from the Miranda warning, which is read out when someone is to be arrested in some parts of the world. Users who have posted content on their timeline that was later used against them might feel this way

about the shift to an asynchronous mode of conversation. As a result users are now more aware of this risk and supposedly will be more selective of what to say in the future. The repositioning of the conversation space could occur on two levels in terms of the asynchronous mode of conversation.

Primarily, the future will present more tools that do away with the choice of conversation in delayed time. This does not mean that the asynchronous mode will not be possible. It points at a scenario in which the automatic switching between synchronous chat and asynchronous messaging becomes the norm. This feature is presently available through Facebook's messenger app yet the functionality could extend to other apps, not least the voice calling application. Today, a voice call is by default transient. Whilst Skype stores a history of messages exchanged by users, it does not make available a recording of the conversations held. Even though this feature could create serious privacy concerns, it could be an extremely useful tool when users need to go back to the conversation. In a work scenario, the recording could be transcribed into meeting notes. Out of the office the tool could feed into the conversation stream, as is the case with voice messages through WhatsApp and similar apps.

Secondly, the repositioning of the conversation space in terms of the asynchronous dimension could imply a stricter distinction between the two modes of conversation. The strictly transient property of conversation on Snapchat is a clear example of this. Users of the app are aware that the content is at most 10 seconds long and reserve specific conversations for this mode of exchange. There are various other exchanges where transience is desirable, particularly when traces of the activity could cause a security issue or divulge information that is of a personal nature. Medical records and billing transactions are just two examples of this.

Switching seamlessly between real-time and delayed conversation, or making the distinction a more defined one, are both in line with a more intelligent and a more selective way to conduct conversations. The choice is also useful in terms of a repositioned public dimension, tackled next.

The repositioning of the public dimension

An extended public is a bigger one. A repositioned public is not really concerned with how big and inclusive the public is. In fact, even though users in the new media space might initially be keen on connecting with anyone who is online, the more familiar users become with the online space, the more selective of whom to speak to and how that happens. With so many users online and so many reasons to connect, the repositioned public implies focussed interaction. In terms of the themes discussed in Chapter 6, focussed interaction will be achieved through an even more sophisticated public, one that is closer to the real world than to the virtual network.

To this extent, the dichotomous decision of friending and not, or following and not, will be refined. Applications that automatically friend, follow and connect to users and machines will be part of the decision. Some initial work has already been done. Google refers to these subgroups as Circles whilst Facebook as Lists. The new ecosystem could integrate such groups into mainstream social networking.

The wider public space still has a role to play. Conversation in public, which is often more of a public broadcast, will be reserved to conversations that are richer in the wider group, such as the media broadcasts or collaboration tools. Authentic relationships will be built in smaller subgroups where discussion has a context and that context adds meaning.

The repositioning of the persistent dimension

The notion of conversation as a stream is based on small interaction snippets that may not be meaningful on their own but add meaning once seen as part of a frequent sequence of exchanges. Extending this further might hint at the inclusion of many more of such snippets. Here is where the grid-like layout discussed in Section 6.3 comes useful. On the other hand, the repositioned alternative promises a more selective user determining what is added or not. A more selective user could be liking less content of one type and investing more time in pinning content which today is not yet available.

The repositioned persistent dimension will also be facilitated by technology affordances. The scenario promises sophisticated feeding into the stream. Whereas today all likes become part of the users' activity feed and all pins feature on the pin board, more sophisticated apps will automatically filter content in parts of the persistent stream of conversation. Such features are already emerging. Gmail automatically prioritizes the user's inbox whilst the streams of content on the Facebook Timeline, the Pinterest pinboards and YouTube's recommendations are custom lists of content, tailored around the users online activity.

In context of a conversation that is not expected to slow down, not only will the future technology affordances enable sophisticated liking and pinning but they will also display the content more intelligently. The grid-like layout on Pinterest, which features bursts of activity, could in the future aggregate activity in a more meaningful manner. In this way the clusters of conversation become more defined. While today we use asynchronous modes of conversation in a quasi-synchronous way and share in a persistent manner details we should not, a future repositioned conversation space promises a more sophisticated use of the right levels of synchronicity and persistence as required.

Summary

In summary, the repositioned conversation space is a refinement of what the past years have brought about. It is a realization that conversation in the new media is part of our everyday communications. There are fewer surprises in this scenario and a more educated way to juggle between the many options in the three-dimensional conversation space.

7.3 Conclusion

The aim of this chapter was that of extending the findings of the present study into the future. The discussion is not a scientific one, even though it is based on findings from real world case studies. The chosen framing approach is also in line with the work done in the previous chapter, as it marries the user behaviour and the technological developments observed between 2007 and 2013. The chosen

scenarios and the discussion conducted throughout this chapter builds on the findings.

Primarily, both the extended and the repositioning of the conversation space relate to the uptake and adoption of enhanced connectivity. They build on the analysis done in Chapter 5, highlighting a change in usage behaviour when the right connectivity is adopted. In the extended scenario the new behaviour is an extension of what has been exhibited so far whilst the repositioned alternative is a refined sub-set of this.

The analysis chapter also referred to clusters of conversation relating to specific days and those observed in the snapshot of everyday conversation. The repositioning of the conversation space builds on this notion of clusters of conversation and tackles these by repositioning the interactions as appropriate. The extension of the conversation space suggests that there could be new clusters, some of which being the evolution of less mainstream modes of conversations that are exhibited today by niche groups of users.

The two scenarios also capture the themes discussed extensively in chapter 6. The idea of a wider conversation, the notion of conversation as a stream and the idea of a sophisticated public all relate to both the extension and the repositioning of conversation. The wider perspective of conversation is mostly linked to the extension of the three-dimensional space. The stream of conversation relates to both scenarios. In the extended scenario the stream is seen to be more inclusive of exchanges that are not captured today, whilst in the repositioning scenario the choice of what is added to the stream becomes a more sophisticated one. The same may be said for the public dimension, in one instance it is a wider public, in the other it is a more focussed one.

The scenarios are inherently reflective of the longitudinal view of conversation. In discussing both the extension and the repositioning of the conversation space, I re-affirm the idea of a changing conversation and an evolving user. In the first scenario the user exhibits a stronger shift to a public, asynchronous and persistent mode of exchange whilst in the second scenario the user is more focussed in his

approach and consolidates the emerging conversation clusters. The two scenarios are not mutually exclusive and the interplay between the two is a most interesting combination for the future of conversation. The combination highlights the complexity in predicting the future of conversation, in line with the failed attempts discussed in Chapter 6.

The extension of the findings of the present research also relate to the island of Malta. Historically, usage trends in the area followed those of more advanced countries. As a result of enhanced connectivity and greater exposure to the wider world, beyond the shores of the island of Malta the time to take up new modes of conversation is becoming much shorter. Evidence of this is the new media take-up in comparison to the other countries. In this context, the discussion on the future of conversation, as presented by the two scenarios, is one window into the future of conversation, not least that happening in Malta.

8. Conclusion

The present research sets out to define a new model of conversation in the context of the significant changes that occurred in the new media landscape between 2007 and 2013. The central research question queries the evolution of conversation as a result of the take up of new media in Malta. Five objectives are set out in the introductory chapter and tackled throughout the text – (i) to extend the literature in the area; (ii) to provide a model for the study of conversation in the new media; (iii) to assess the impact of enhanced and ubiquitous connectivity; (iv) to gain a better understanding of the conversation going on in the new media; and (v) to extend these findings into the future.

The study also sets out to answer the research question, outlined in Section 1.3, being "How is conversation evolving as a result of take up of new media in Malta?" The response to the research question is tackled on two levels. Primarily, the study analyses the take up of the new media. Smartphone adoption is analysed as a case study of enhanced connectivity in which the user is presented with a choice between continuing to converse through the conventional means of voice calling and SMS, or shifting to newer forms of conversation. Take-up of the medium is one side of the story. Another side is the evolution of conversation once the take-up

occurs. This is the second part of the analysis, followed by a review of the new media landscape.

In response to the main research question, secondary questions are also put forward. The study queries which conversations are shifting to the new media and which are those that aren't. It also queries the implication of increased connectivity and the rules of social interaction that change as a result. Finally, the research is also interested in studying these findings in a future context.

8.1 Contribution

The main contribution to research is the new model of conversation that is defined and studied in the text. The starting point of the research is the older definition of conversation (Goffman, 1976). The new model is defined by means of three dimensions, highlighting the evolution of such an activity. The chosen dimensions extend previous work in the area. The synchronous and public dimensions are a subset of those presented by Joinson (2003). On the other hand, the persistent dimension is not found in the literature but is built around the constructs of a third place (Oldenburg, 1991) in new media and the notion of perpetual contact (Aakhus & Katz, 2002). The three dimensions make up the conceptual model of conversation.

Two strands of analysis corroborate the model. In the first analysis, the focus is the enhanced connectivity. Two groups of smartphone users evince the usage behaviour of recent adopters of a basic smartphone and those who switched to a more sophisticated device. The two groups are studied on the basis of shifts in their voice, SMS and data usage profile. A control group also complements the analysis. An important finding in this part of the analysis is the shift in usage exhibited by the iPhone users. IPhone users exhibited an increase in data usage coupled with a decline in the legacy services. These shifts in the user profile complement the notion of a shift in conversation.

The supporting analysis complements the study of enhanced connectivity. The year on year comparison of usage on specific days of the year suggests a shift of the

predominant conversation on the day. Widening the analysis to everyday conversation through a snapshot of conversation on Facebook suggests that conversation is sometimes unaccompanied by any form of explicit response, thus resembling a monologue. When the conversation is not a monologue, user response is, in some conversations, limited to activity that takes the form of liking, sharing and tagging. The former is the most popular of the three. This type of effortless response is in line with the shift to a more persistent mode of conversation, in which the frequency of the exchange is more important than its content. A share of conversations includes user response in the form of commenting, and in some cases, this is complemented by other modes of user participation.

The snapshot of conversation suggests the presence of conversation clusters. User participation is either very limited to a few comments and commentators, or extremely participative for a smaller share of conversations. These two categories of participation are also seen in the analysis of likes per conversation. Two significant categories emerge when exchanges are sorted by duration. A share of conversations occurs within an hour or less, and another share occurs within a long period of at least 16 hours. Conversation on Facebook is also colourful in terms of format and includes different media. Conversations that are only text-based are not the majority. The use of images and mixed media is highly popular

The new model of conversation is also contextualized. The context of the research is tackled in three separate chapters. Chapter 2 provides an overview of the path to the smartphone, chapter 6 reviews the media landscape in the analysis period, and Chapter 7 extends the findings into the future. Together the three chapters provide the past, present and future context.

Throughout Chapter 2 the trajectory to the smartphone is mapped out. The path to the smartphone is useful to the study as it highlights the significant change that led to the state of being persistently connected to the wider user public. In this review, the convergence of the mobile and the online space is discussed. It is interesting to note that this, in itself, also marks a shift in conversation.

The contextualization of the research is also achieved in Chapter 6. The chapter is a response to the second stream of the research design and shifts the focus to the present media landscape. The chosen dimensions and the analysis in the preceding chapter are discussed in terms of a review of the media landscape. Four themes are developed. The first tackles the wider definition of conversation proposed by the three-dimensional conversation space. The second concerns the perspective of conversation as a persistent stream of exchanges. This is seen in practice in user interfaces and online tools that make it easier to consume a stream of activity. A third implication is the sophisticated approach to the public, or rather the network of connections that the user interacts with. The final implication is the longitudinal view of conversation that the model puts forward.

In chapter 7 two future scenarios are developed. Both scenarios build on the three-dimensional conversation space. In the first scenario, the conversation space is extended; meaning users would exhibit a stronger shift to the public, asynchronous and persistent mode. The younger population of users often exhibits aspects of this emergent behaviour. However this scenario caters for a wider, more varied online population and further enhanced connectivity as a result of the Internet of Things. The second scenario envisages more educated users who consolidate the behaviour being exhibited in the present. In this scenario the user is more familiar with the conversation space and selectively chooses where, how and with whom to hold a conversation. In this sense, it is as if the current conversation space is repositioned. The two scenarios are not exclusive and they complement each other. On the one hand, the conversation space will feel more like home for these users, while on the other hand they will exhibit new behaviours in a highly connected and popular space.

8.2 Limitations

The research is not without limitations. I provide an extensive list of limitations relating to the adopted methodology in section 4.3.4. I sum up the list in two main points below:

Primarily the research could be criticized for the quality of data used in the analysis. Usage records lack demographic data that could help in understanding better which users are more prone to shift the conversation in the new media. The data is also limited to activity recorded on the Vodafone network. Smartphone devices may connect to the Internet through alternative networks such as Wi-Fi. As a result, the recorded data usage is not representative of the real extent of the shift. On a positive note, it suggests that any recorded shift can only be amplified further had this usage been recorded. Related to this, the shift to the new media is deduced from increasing data usage. This does not give visibility of the applications used by users as they shift the conversation.

The supporting analysis does try to make up for these limitations but even here the quality of the data can be challenged. Whilst the greetings' day experiment is highly representative of the population, since it is generated from the total Vodafone user base in the region, it may require further granularity to identify the subset of users causing this shift. Worth nothing though that such granularity may highlight a bigger shift than the one deduced. The snapshot of conversation on Facebook on the other hand is robust in the chosen variables and highly granular, yet may not be a representation of the wider population.

The discussion on representativeness leads to the second point relating to research limitations. I did not manage to find a similar review of the new media landscape to the one provided in Chapter 6. Whereas various works adopt one application as a case study, the chosen approach reviews a number of applications that were launched or developed in the period of analysis. Whilst this in itself is a valid contribution to the research, it brings about the debate on the generalization of the findings versus their particularity to the chosen cases. In this context, it is worth nothing that it was never the scope of the analysis to prove mainstream behaviour. The intention, rather, is to highlight trends that hint at what future behaviour could exhibit in a stronger manner.

8.3 Future Research

Having reviewed the main contributions of the research and the limitations of the adopted approach, I move on to suggest ways in which future research can build on the three-dimensional model of conversation. I would like to propose the following building blocks for future research to explore:

To counter the criticism on the quality of the data, a constant stream of data is to be sought. Established variables, stemming from variables explored in the analysis and supporting analysis would capture this data. The data sources could be defined as part of a longer and more established relationship with a third party such as Vodafone. The emergent area of big data should also be explored to add further detail to the analysis. Even though the area of big data is still in its early stages, and the more connected devices, the more the possibilities with big data, new levels of data sources may be established. One could not only get information about the conversation exchange per se but go into the detail of what the users were up to when the conversation happened, if they were idle and it was a way to kill time, or on the go, and juggling between one thing and another. To get to this type of data, and other sources that might be available in a big data source, one would require partnering with big data aggregators.

After establishing a refined stream of data, I propose that the three-dimensional model is turned into a visual model, mapping conversation instances in three-dimensional space and visualizing conversation clusters. It would be beneficial to be able to continuously feed data records to the model for the visualization to become optimal and more accurate.

Using the visual model the research should then propose further analysis to understand how conversation will continue evolving. This research might not be as data intensive as the first two building blocks but should capture emergent uses and behaviours, not least those related to conversation in the Internet of Things.

My hope is that future research not only considers these ideas but also finds in this thesis a starting point. The shift in conversation will not stop with the advent of the

smartphone and will go beyond the connected devices shaping our lives today. At the same time, the evolution of this mundane activity is at the heart of the interplay between new affordances and the user that is captured by the three-dimensional model of conversation, as presented in this thesis.

Appendix I: Profile of the environment

Malta provides a good sample population for the present study. This island state of around 400,000 people[4] has over the past years experienced significant changes in its communication landscape. Malta's dense population at 1307 people per km squared, its active presence on social networking sites together with the expected growth in broadband and smartphone penetration in the future, make it an interesting case study of shifting behaviours, in particular those related to interpersonal conversations.

Facebook and Internet use in the area:

In the European region Malta had the third highest Facebook penetration at 53% as at December 2012, an increase of 11 percentage points from 2010. Malta's penetration follows Denmark and Sweden at 54.8% and 54.4% respectively. The island also ranks in the 24th place when it comes to Internet Penetration in Europe, standing at 69%[5].

Mobile use in the area:

Malta's mobile penetration stood at 131% at the end of June 2013, up by some 40% since the beginning of 2009. In the same years the island has seen the introduction of a third mobile network operator[6] and a number of mobile virtual

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[4] NSO, 2013. *Economic and Financial Data For Malta* [online] Available at: http://nso.gov.mt/docs/sdds.html#REAL_SECTOR [Accessed 27th November 2013]

[5] IWS, 2013. *Usage and Population Statistics for the European Union* [online] Available at: http://www.internetworldstats.com/europa.htm [Accessed 27th November 2013]

[6] Melita, 2009. *Melita launches mobile telephony and announces lower tariffs.* [press release], 31 January 2009. Available at: http://www.timesofmalta.com/articles/view/20090131/local/melita-launches-mobile-telephony-and-announces-lower-tariffs.242990#.UphphpRxsVk [Accessed 27th November 2013]

networks targeting niche segments. Smartphone penetration within this region is still low. The Blackberry range of smartphone was only introduced in the market in 2008, a month apart from the launch of the iPhone 3G in the same market (Vodafone, 2010), The Blackberry App World was only made available to Maltese subscribers at the beginning of 2011. Similarly, the Android suite of products was launched in the market by Vodafone in 2009[7] while paid applications on the dedicated Android Market where made available to local subscribers in 2011[8].

[7] Vodafone, 2009. *Vodafone Malta launches the Vodafone HTC Magic with Google.* [press release], 22 September 2009. Available at: http://gozonews.com/10689/vodafone-malta-launches-the-vodafone-htc-magic-with-google/ [Accessed 20th November 2012]

[8] Debattista, M., 2011. Paid apps in Android market now available to Malta. *Times of Malta* [online] (Last updated 00:00 on 9th June 2011). Available at: http://www.timesofmalta.com/articles/view/20110609/technology/Paid-apps-in-Android-market-now-available-to-Malta.369769 [Accessed on 20th November 2012]

Appendix II: Further Analysis

A2.3 Choice of Method – Normality Analysis & Descriptive

As a first step, the variables were tested for normality. The tests were done on usage records for SMS, Voice and data in the different months of the analysis, a total of 21 variables. Both tests highlight that the data deviates from normality (Table 9). This implies the need to approach the analysis in a non-parametric way

	Kolmogorov-Smirnov[a9]			Shapiro-Wilk[10]		
	Statistic	df	Sig.	Statistic	df	Sig.
DATA201207	.402	280	.000	.389	280	.000
DATA201208	.380	280	.000	.332	280	.000
DATA201211	.408	280	.000	.233	280	.000
DATA201212	.399	280	.000	.353	280	.000
DATA201301	.409	280	.000	.237	280	.000
DATA201302	.403	280	.000	.256	280	.000
DATA201303	.396	280	.000	.283	280	.000
VOICE201207	.408	280	.000	.163	280	.000
VOICE201208	.416	280	.000	.149	280	.000
VOICE201211	.418	280	.000	.147	280	.000
VOICE201212	.412	280	.000	.174	280	.000
VOICE201301	.410	280	.000	.179	280	.000
VOICE201302	.417	280	.000	.148	280	.000
VOICE201303	.419	280	.000	.145	280	.000
SMS201207	.390	280	.000	.217	280	.000
SMS201208	.376	280	.000	.268	280	.000
SMS201211	.338	280	.000	.422	280	.000
SMS201212	.343	280	.000	.390	280	.000
SMS201301	.357	280	.000	.357	280	.000
SMS201302	.340	280	.000	.429	280	.000
SMS201303	.361	280	.000	.347	280	.000

[9] ,[89] The Kolmogorov-Smirnov test and the Shapiro-Wilk are statistical tests, which is used to identify if the numbers in the sample follow a normal distribution. The outcome of the test determines the choice of subsequent test which are applicable on both normal and non-normal variables.

a. Lilliefors Significance Correction

Table 9: Test for Normality

A2.4 Smartphone Adoption – Before and After

The first set of analysis compares the three user groups in each month using the Kruskal Wallis Test (Kruskal and Wallis, 1952 cited in Field, 2005). The test aims to identify significant differences between the three groups in relation to the different device used, which is the independent variable in the analysis.

Test Statistics[a,b]

	SMS201208	SMS201211	SMS201212	SMS201301	SMS201302
Chi-Square	12.852	6.249	9.855	11.276	9.604
df	2	2	2	2	2
Asymp. Sig.	.002	.044	.007	.004	.008

a. Kruskal Wallis Test

b. Grouping Variable: MODEL

Table 10: Analysis of Smartphone Effect Across Groups (SMS)

Test Statistics[a,b]

	VOICE201208	VOICE201211	VOICE201212	VOICE201301	VOICE201302
Chi-Square	49.719	53.421	39.004	39.888	39.655
df	2	2	2	2	2
Asymp. Sig.	.000	.000	.000	.000	.000

a. Kruskal Wallis Test

b. Grouping Variable: MODEL

Table 11: Analysis of Smartphone Effect Across Groups (VOICE)

Test Statistics[a,b]

	DATA201208	DATA201211	DATA201212	DATA201301	DATA201302
Chi-Square	97.367	85.002	89.591	82.199	92.713
df	2	2	2	2	2
Asymp. Sig.	.000	.000	.000	.000	.000

a. Kruskal Wallis Test

b. Grouping Variable: MODEL

Table 12: Analysis of Smartphone Effect Across Groups (DATA)

The above tests highlight significant variance between the three groups of users, which implies that the choice of device does impact in some way the usage profile in that specific month. However, post-hoc analysis is required to understand

where the variance is coming from, considering that there are more than two group of users in the sample. The Mann Whitney test (Mann and Whitney, 1947 cited in Field, 2005) is used to analyse the variance between the pairs of user groups. In the first wave of analysis the smartphone user groups, both iPhone and Smart 2 users, are contrasted to the control group on the data usage variable. In both cases (Table 13, Table 14) there is a significant variance between these groups, highlighting a significantly different user profile on data in the months of analysis. This variance is not to be taken for granted. Even though the users in the control group are not equipped with a smartphone device, and hence cannot exhibit data usage as the other users, owning the smartphone is no guarantee of its usage as a smartphone. As highlighted earlier in the discussion in Chapter 2, the smartphone is as smart as the users make it to be and therefore, the significant variance between the users starts to explain the impact of enhanced connectivity.

	DATA201208	DATA201211	DATA201212	DATA201301	DATA201302
Mann-Whitney U	2242.000	2966.000	2774.500	3046.500	3218.000
Wilcoxon W	9263.000	9987.000	9795.500	10067.500	10239.000
Z	-9.653	-7.945	-8.340	-8.018	-7.685
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000

a. Grouping Variable: MODEL

b. Based on 10000 sampled tables with starting seed 205597102.

Table 13: Variance in data usage – Control Group Users vs. Smart 2 Users

	DATA201208	DATA201211	DATA201212	DATA201301	DATA201302
Mann-Whitney U	1770.000	1652.500	1637.500	1785.000	1488.500
Wilcoxon W	8791.000	8673.500	8658.500	8806.000	8509.500
Z	-8.927	-8.879	-8.937	-8.773	-9.512
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000

Table 14: Variance in data usage – Control Group Users vs. Smart 2 Users

A2.5 Smartphone Adoption – The Longitudinal View

In the previous section the analysis has been done across user groups. However, the longitudinal view of conversation suggests that the shift in behaviour is evolutionary and grows month after month. The analysis is done for the three groups in the sample. Initially the Friedman test (Friedman, 1937 cited in Field, 2005) is used to estimate the variance before and after smartphone adoption. The test is run for several months after adoption phase.

However, identifying a significant change in usage is not enough to understand the direction of this change, and hence the evolution in behaviour. The direction of the shift is captured with the post-hoc analysis in which the Wilcoxon Signed-Rank test is used (Wilcoxon, 1945 cited in Field, 2005). As in the previous wave of analysis, the post-hoc analysis looks into the delta in between the pairs of months, and goes beyond highlighting some form of variance between groups on a period of months.

The full analysis is reported in the tables below. A discussion of these results is provided in Section 5.3.

iPhone user group

VOICE	
N	286
Chi-Square	12.382
df	4
Asymp. Sig.	0.015

SMS	
N	286
Chi-Square	45.314
df	4
Asymp. Sig.	0

DATA	
N	286
Chi-Square	12.778
df	4
Asymp. Sig.	0.12

Table 15: Friedman Test analysis for the iPhone user group

	VOICE201211 - VOICE201208	VOICE201212 - VOICE201211	VOICE201301 - VOICE201212	VOICE201302 - VOICE201301	SMS201211 - SMS201208	SMS201212 - SMS201211	SMS201301 - SMS201212	SMS201302 - SMS201301	DATA201211 - DATA201208	DATA201212 - DATA201211	DATA201301 - DATA201212	DATA201302 - DATA201301
Z	-1.39b	-.851b	-2.56c	-.668b	-.205b	-2.480b	-3.48c	-4.31c	-2.83b	-1.12b	-.202c	-.242b
Asymp. Sig. (2-tailed)	0.165	0.395	0.01	0.504	0.837	0.013	0	0	0.005	0.261	0.84	0.809

a Wilcoxon Signed Ranks Test

b Based on negative ranks.

c Based on positive ranks.

Table 16: Wilcoxon Signed Ranks test for the iPhone user group

Smart 2 user group

VOICE	
N	95
Chi-Square	15.192
df	4
Asymp. Sig.	0.004

SMS	
N	95
Chi-Square	8.178
df	4
Asymp. Sig.	0.085

DATA	
N	95
Chi-Square	26.732
df	4
Asymp. Sig.	0.000

Table 17: Friedman Test analysis for the Smart 2 user group

	VOICE201211 - VOICE201208	VOICE201212 - VOICE201211	VOICE201301 - VOICE201212	VOICE201302 - VOICE201301	SMS201211 - SMS201208	SMS201212 - SMS201211	SMS201301 - SMS201212	SMS201302 - SMS201301	DATA201211 - DATA201208	DATA201212 - DATA201211	DATA201301 - DATA201212	DATA201302 - DATA201301
Z	-2.46b	-2.29c	-.823b	-1.58b	-.65b	-2.48c	-1.22b	-1.41b	-2.56b	-1.12b	-.087b	-1.19b
Asymp. Sig. (2-tailed)	0.014	0.022	0.41	0.113	0.512	0.013	0.219	0.157	0.01	0.262	0.93	0.231

a Wilcoxon Signed Ranks Test
b Based on positive ranks.
c Based on negative ranks.

Table 18: Wilcoxon Signed Ranks test for the Smart 2 user group

Control Group

VOICE	
N	118
Chi-Square	17.313
df	4
Asymp. Sig.	0.002

SMS	
N	118
Chi-Square	13.693
df	4
Asymp. Sig.	0.008

Table 19: Friedman Test analysis for the control group

	VOICE201211 - VOICE201208	VOICE201212 - VOICE201211	VOICE201301 - VOICE201212	VOICE201302 - VOICE201301	SMS201211 - SMS201208	SMS201212 - SMS201211	SMS201301 - SMS201212	SMS201302 - SMS201301
Z	-.401b	-.409c	-1.675c	-2.980c	-.960b	-.190c	-1.333c	-3.294c
Asymp. Sig. (2-tailed)	0.688	0.682	0.094	0.003	0.337	0.85	0.182	0.001

Table 20: Wilcoxon Signed Ranks test for the control group

		N	Mean Rank	Sum of Ranks
DATA201211 - DATA201208	Negative Ranks	45[a]	31.62	1423.00
	Positive Ranks	19[b]	34.58	657.00
	Ties	31[c]		
	Total	95		
DATA201212 - DATA201211	Negative Ranks	27[d]	33.48	904.00
	Positive Ranks	28[e]	22.71	636.00
	Ties	40[f]		
	Total	95		
DATA201301 - DATA201212	Negative Ranks	31[g]	22.53	698.50
	Positive Ranks	21[h]	32.36	679.50
	Ties	43[i]		
	Total	95		
DATA201302 - DATA201301	Negative Ranks	22[j]	23.77	523.00
	Positive Ranks	19[k]	17.79	338.00
	Ties	54[l]		
	Total	95		
DATA201303 - DATA201302	Negative Ranks	23[m]	21.91	504.00
	Positive Ranks	23[n]	25.09	577.00
	Ties	49[o]		
	Total	95		

a. DATA201211 < DATA201208
b. DATA201211 > DATA201208
c. DATA201211 = DATA201208
d. DATA201212 < DATA201211
e. DATA201212 > DATA201211
f. DATA201212 = DATA201211
g. DATA201301 < DATA201212
h. DATA201301 > DATA201212
i. DATA201301 = DATA201212
j. DATA201302 < DATA201301
k. DATA201302 > DATA201301
l. DATA201302 = DATA201301
m. DATA201303 < DATA201302
n. DATA201303 > DATA201302
o. DATA201303 = DATA201302

Table 21: Ranks in detail for Smart 2 User Group

		N	Mean Rank	Sum of Ranks
DATA201211 - DATA201208	Negative Ranks	96[a]	96.80	9293.00
	Positive Ranks	122[b]	119.49	14578.00
	Ties	68[c]		
	Total	286		
DATA201212 - DATA201211	Negative Ranks	101[d]	98.90	9988.50
	Positive Ranks	108[e]	110.71	11956.50
	Ties	77[f]		
	Total	286		
DATA201301 - DATA201212	Negative Ranks	109[g]	96.54	10522.50
	Positive Ranks	94[h]	108.34	10183.50
	Ties	83[i]		
	Total	286		
DATA201302 - DATA201301	Negative Ranks	97[j]	112.00	10864.00
	Positive Ranks	113[k]	99.92	11291.00
	Ties	76[l]	9	
	Total	286		

a. DATA201211 < DATA201208

b. DATA201211 > DATA201208

c. DATA201211 = DATA201208

d. DATA201212 < DATA201211

e. DATA201212 > DATA201211

f. DATA201212 = DATA201211

g. DATA201301 < DATA201212

h. DATA201301 > DATA201212

i. DATA201301 = DATA201212

j. DATA201302 < DATA201301

k. DATA201302 > DATA201301

l. DATA201302 = DATA201301

Table 22: Ranks in detail for iPhone 4S User Group

Appendix III: Screen Shots of Applications

A3.1 Pinterest

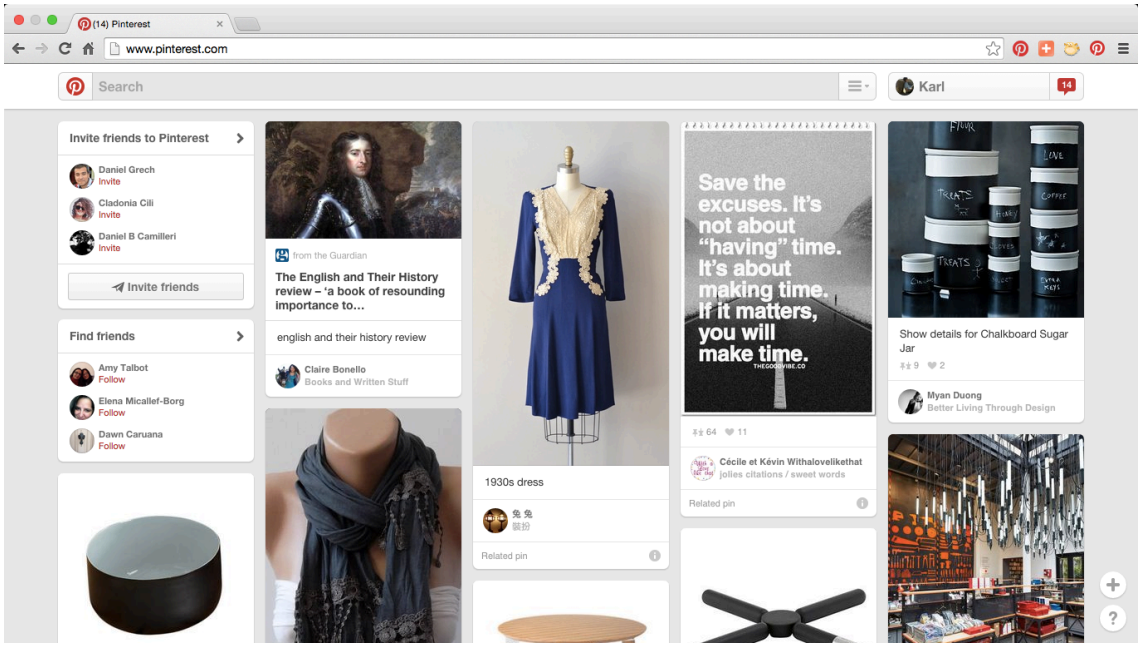

Figure 27: The grid-like layout on Pinterest

A3.2 Google Wave

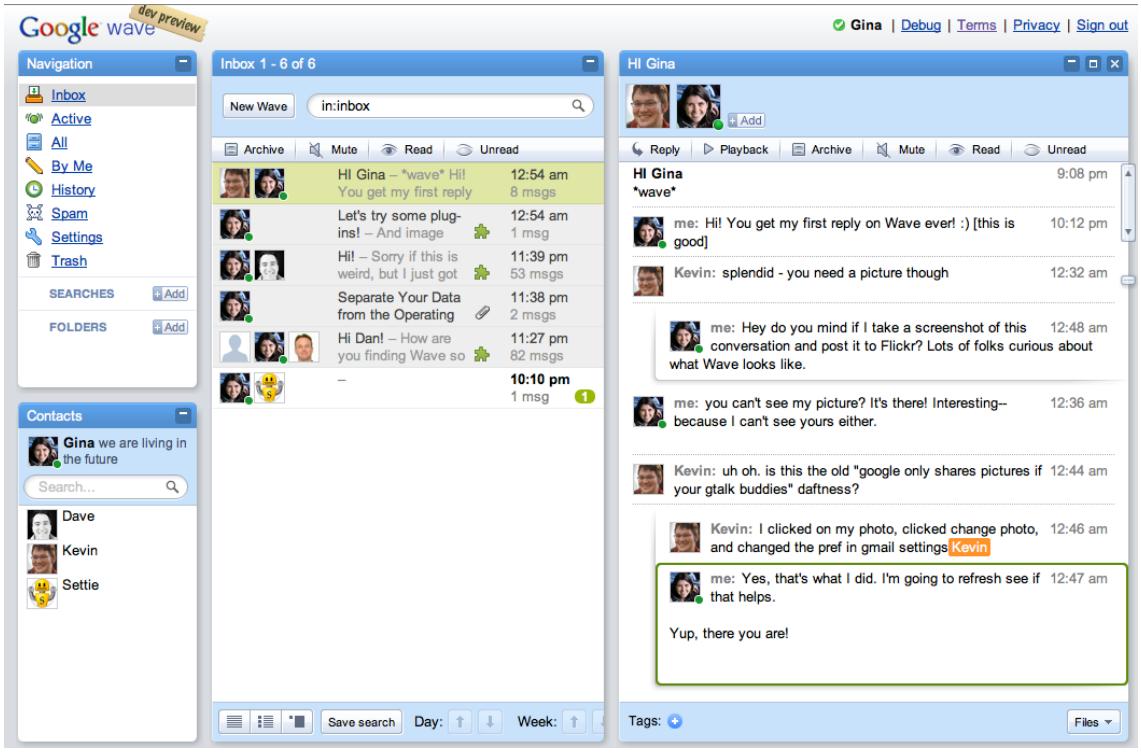

Figure 28: Conversation thread approach in Google Wave

A3.3 Vodafone 360

Figure 29: Vodafone 360 contacts menu

References

Aakhus, M. & Katz, J. E. (eds) (2002). *Perpetual contact: Mobile communication, private talk, public performance*. Cambridge University Press.

Agle, M. (2006) *Computer Mediated Communication: Interaction and Interactivity.* Communication Theses. Georgia State University. Available online: http://scholarworks.gsu.edu/communication_theses/14 [Accessed 19/08/2013].

Alekstra (2013) WhatsApp ascent threatens Nordic carriers. Available online: http://www.alekstra.com/whatsapp-ascent-threatens-nordic-carriers/ [Accessed 25/06/2014]

Apache Incubator (2014) Available online: http://incubator.apache.org/wave/about.html. [Accessed 23/11/2013]

AppBrain (2013) *Number of Available Android Applications.* Available online: http://www.appbrain.com/stats/number-of-android-apps [Accessed 19/08/2013].

Apple Press Info (2008) *iPhone App Store Downloads Top 10 Million in First Weekend.* Available online: http://www.apple.com/pr/library/2008/07/14iPhone-App-Store-Downloads-Top-10-Million-in-First-Weekend.html [Accessed 21/09/2013]

Apple Press Info (2014) *Apple's App Store Marks Historic 50 Billionth Download.* Available online: http://www.apple.com/pr/library/2013/05/16Apples-App-Store-Marks-Historic-50-Billionth-Download.html [Accessed 31/10/2014].

Backstrom, L., Huttenlocher, D., Kleinberg, J., Lan, X. (2006) Group formation in large social networks: membership, growth, and evolution. *12th ACM SIGKDD international conference on Knowledge discovery and data mining*.

Baron, N. S. (2008) *Always on: Language in an online and mobile world.* Oxford: Oxford University Press, USA.

Beaumont, C. (2009) BlackBerry App World Application store launched*. The Telegraph,* Internet edition. 1 April. Available online: http://www.telegraph.co.uk/technology/blackberry/5088182/BlackBerry-App-World-application-store-launched.html [Accessed 16/9/2013].

Benevenuto, F., Rodrigues, R., Almeida, V., Almeida, J., and Ross, K. (2009) Video interactions in online video social networks. *ACM Transactions on Multimedia Computing, Communications, and Applications (TOMCCAP),* 5(4).

Benkler, Y., (2006) *The Wealth of Networks, How Social Production Transforms*

Markets and Freedom. Yale University Press.

Berger, P. & Luckmann, T. (1966). The social construction of knowledge: A treatise in the sociology of knowledge. *Open Road Media: Soho, NY, USA*.

Boase, J. (2008) Personal Networks and The Personal Communication System: Using Multiple Media to Connect. *Information, Communication & Society,* 11:4.

Bordewijk, J. L. & Kaam, B. V. (1986) Towards a New Classification of TeleInformation Services. *Inter Media,* 14 (1).

Bordia, P. (1997) Face-to-face versus computer-mediated communication: A synthesis of the experimental literature. *Journal of Business Communication*, 34(1).

Boyd, D.M. (2004) Friendster and publicly articulated social networking. *Conference on Human Factors and Computing Systems (CHI 2004)*, Vienna.

Brannen, J. (1992) Combining qualitative and quantitative approaches: an overview. In Brannen, J. (ed) *Mixing Methods: Qualitative and Quantitative Research.* Aldershot: Avebury.

Bryman, A. (2006) Integrating quantitative and qualitative research: how is it done? Qualitative Research, 6(1).

Cameron, A. (2007). *Juggling multiple conversations with communication technology: towards a theory of multi-communicating impacts in the workplace.* Doctoral Thesis. Queen's University Kingston. Available online: http://dl.acm.org/citation.cfm?id=1329737. [Accessed 17/03/2012].

Carr, N. (2008) *The Big Switch: Rewiring the world, from Edison to Google.* WW Norton & Company.

Carver, C.S. & Scheier, M.F. (1987) The blind men and the elephant: selective examination of the public-private literature gives rise to faulty perception. *Journal of Personality*, 55, 525-41

Cashmore, P. (2006) MySpace, America's Number One*. Mashable Social Media.* 7 November. Available online: http://mashable.com/2006/07/11/myspace-americas-number-one/ [Accessed 12/11/2013]

Castells, M. (1989) *The Informational City: Information Technology, Economic Restructuring, and the Urban Regional Process.* Oxford: Blackwell,
Castells, M. (1996) *The Rise of the Network Society.* Massachusetts: Blackwell.

Cha, M., Kwak, H., Rodriguez, P., Ahn, J., Moon, S. (2007) I Tube, You Tube, Everybody Tubes: Analyzing the World's Largest User Generated Content Video System. *7th ACM SIGCOMM conference on Internet measurement*. San Diego, California: ACM

Cheang, A. (2009) Your thoughts on waving so far*. The Google Wave Blog*. 27 November. Available online: *http://googlewave.blogspot.com/2009/11/your-thoughts-on-waving-so-far.htm* [Accessed 27/11/2013]

Cisco (2011) *The Internet of things: How the next evolution of the internet is changing everything.* Cisco Internet Business Solutions Group (IBSG). Available online: http://www.cisco.com/web/about/ac79/docs/innov/IoT_IBSG_0411FINAL.pdf [Accessed 19/08/2013].

Cluley, G. (2012) Poll reveals widespread concern over Facebook Timeline. *Nacked Security*, 27 January. Available online: http://nakedsecurity.sophos.com/2012/01/27/poll-reveals-widespread-concern-over-facebook-timeline/ [13/01/2013]

CommercialKid (2009) *iPhone3g Commercial "There's An App For That"* [Video]. Available online: <http://www.youtube.com/watch?v=szrsfeyLzyg> [Accessed 1 June 2013].

Costello (2014) How Many Apps Are in the iPhone App Store. *About.com*. 16 October. Available online: http://ipod.about.com/od/iphonesoftwareterms/qt/apps-in-app-store.htm [Accessed 27/11/2013]

Cowhey, P. F. & Aronson, J. D. (2012). *Transforming Global Information and Communication Markets*. MIT Press.

Creswell, J. W. (2003) *Research design: Qualitative, quantitative, and mixed methods approaches.* Thousand Oaks, CA: Sage Publication.

Creswell, J. W. & Miller, D. L. (2000) Determining validity in qualitative inquiry. *Theory into Practice,* 39.

Crick, A. P. (2011) Rethinking Oldenburg: Third Places and Generation Y in a Developing Country Context. *International CHRIE Conference,* July 29. Refereed Track. Paper 7.

Crotty, M. (1998) *The foundations of social research: Meaning and perspective in the research process.* London: Sage.

Daft, R.L. & Lengel, R.H. (1984) Information richness: a new approach to managerial behaviour and organization design. *Research in Organizational Behaviour,* 6, 191-233.

De Renesse, R. (2012). *Smartphone markets: worldwide trends, forecasts and strategies 2012 – 2017.* London: Analysys Mason.

DeFleur, M. L. & Ball-Rokeach, S. (1989) *Theories of mass communication*, 5th edition. New York: Longman.

Donner, J. (2008) Research Approaches to Mobile Use in the Developing World: A Review of the Literature. *The Information Society,* 24(3).

Donner, J. & Steenson, M. (2009) Beyond the personal and private: Modes of mobile phone sharing in urban India. In Campbell, S.W. & Ling, R. (eds) *The Reconstruction of Space and Time: Mobile Communication Practices.* New Jersey: Transaction Publishers, 231-250.

Dredge, S. (2013) Vine iPhone app brings short, sharp video to Twitter. *Guardian Apps,* 25 January. Available online: http://www.guardian.co.uk/technology/appsblog/2013/jan/24/twitter-vine-iphone-app [Accessed 23/01/2013]

Eagle, N., Pentland, A., Lazer, D. (2007) Inferring social network structure using mobile phone data. *PNAS*, 106(36).

Ebel, H., Mielsch, L., and Bornholdt, S (2002) Scale-free topology of e-mail networks. *Physical Review* E, 66(3).

Efimova, L. & de Moor, A. (2005) Beyond personal webpublishing: An exploratory study of conversational blogging practices. *38th Annual Hawaii International Conference on Systems Sciences,* January.

Erickson, T., Halverson, C., Kellog, W.A., Laff, M., Wolf, T. (2002) Social translucence: designing social infrastructures that make collective activity visible. *Communications of the ACM,* 45(4), 40-44

Eurostat (2014) *Population Density.* Available online: http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tps00003&plugin=1 [Accessed 22/10/2014].

Facebook (2013a) *How does my News Feed determine which content is most interesting?* Available online: https://www.facebook.com/help/166738576721085 [Accessed 27/11/2013]

Facebook (2013b) *Share where you are.* Available online: https://www.facebook.com/about/location [Accessed 27/11/2013]

Facebook (2013c) *Facebook Apps, 2013 - Bring your friends wherever you go.* Available online: https://www.facebook.com/about/platform [Accessed 27/11/2013]

Faloutsos, C., Seshadri, M., Machiraju, S., Sridharan, A., Bolot, J. and Leskove, J. (2008) Mobile call graphs: beyond power-law and lognormal distributions. *14th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining,* Las Vegas, 24 – 27 August 2008. Las Vegas: ACM

Galegher, J., Kraut, R. and Egido, C. (1988) Patterns of Contact and Communication in Scientific Research Collaboration. *ACM conference on Computer-supported cooperative work*.

Gergen, K.J. (2002) *The challenge of absent presence, Perpetual Contact Mobile Communication, Private Talk, Public Performance.* Cambridge: Cambridge University Press.

Gibson, J.J. (1979) *The Ecological Approach to Visual Perception.* Boston: Houghton Mifflin.

Goffman, E. (1959) *The presentation of self in everyday life.* New York: Anchor Books.

Goffman, E. (1963) *Stigma: Notes on the Management of Spoiled Identity.* New York, NY: Touchstone.

Goffman, E. (1981) *Forms of Talk.* New York: Anchor Books.

Goffman, E. (1983). The Interaction Order. *American Sociological Review,* 48, 1-17.

Goffman, E. (2009) *Stigma: Notes on the management of spoiled identity.* New York: Simon and Schuster.

Goodwin R.N. (1974) *The American Condition.* The New Yorker (January), 38.
Google (2009) *Google Wave Developer Preview at Google I/O 2009* [Video]. Available online: https://www.youtube.com/watch?v=v_UyVmITiYQ [Accessed 25/01/2013].

Graham, B.A., (1875) *Improvement in transmitters and receivers for electrical telegraphs.* US Patent USD161739 18750306. Available online: http://worldwide.espacenet.com/publicationDetails/biblio?CC=US&NR=161739&KC=&FT=E&locale=en_EP [Accessed 28/8/2014]
Greene, J.C., Caracelli, V.J. and Graham, W.F. (1989) Toward a Conceptual

Framework for Mixed-method Evaluation Designs. *Educational Evaluation and Policy Analysis,* 11(3).

Grey London (2013) *Vodafone - The Kiss* [Video]. Available online: http://www.youtube.com/watch?v=SkYkp34yw5E [Accessed 5th July 2013].

Grove, A.S. (1996) *Only the Paranoid Survive: How to Exploit the Crisis Points that Challenge Every Company and Career*. Random House of Canada.

Grunig, J. E., Grunig L. S. (1989) Toward a theory of the public relations behavior of organizations: Review of a program of research. *Public Relations Research Annual*, 1 (1-4).

GSM Arena (2010a) *Vodafone 360 H1.* Available online: http://wwwgsmarena.com/vodafone_360_h1-2946.php [Accessed 27/11/2013]

GSM Arena (2010b) *Vodafone 360 M1.* Available online: http://www.gsmarena.com/vodafone_360_m1-2947.php [Accessed 27/11/013]

Guba, E.G. & Lincoln, Y.S. (1994) Competing paradigms in qualitative research. In

Denzin N.K. & Lincoln Y.S. (eds.). (2011) *Handbook of Qualitative Research.* Sage.

Gunter R. (1974) *Sentences in dialog*. Columbia: Hornbeam Press

Hamilton, J. (2009) OurPlace: the convergence of locative media and online participatory culture. *21st Annual Conference of the Australian Computer-Human Interaction Special Interest Group: Design: Open 24/7*, ACM.

Hatchimonji, G. (2012) Microsoft Launches Windows Phone 8. *Brighthand Smartphone News & Reviews.* 29 October. Available online: http://www.brighthand.com/default.asp?newsID=19433&news=windows+phone+8+microsoft+launch+live+tiles+apps+kids+corner+rooms [Accessed 16/10/ 2013].

Helpman, E., & Trajtenberg, M. (1998) Diffusion of General Purpose Technologies, In Helpman, E. (ed) *General Purpose Technologies and Economic Growth.* MIT Press: Cambridge.

Hjerde (2011) The Phone Paradigm Shift. *Gpodder.net.* June 29. Available online: https://gpodder.net/podcast/emerging-communications/morten-hjerde-the-phone-paradigm-shift [Accessed 15/09/2013].

Hofmann, D. (2013) Introducing Vine. *Vine.* 21 January. Available online: https://vine.co/blog/introducing-vine [Accessed 01/06/2013].

Horn, S. (1998) *Cyberville: Clicks, Culture, and the Creation of an Online Town.* New York: Warner Books.

Huberman, B.A., Romero, D. M., Wu, F. (2009) Social networks that matter: Twitter under the microscope. *First Monday,* 14(1).

Humphreys, L. (2008) Mobile social networks and social practice: A case study of Dodgeball. *Journal of Computer‐Mediated Communication,* 13(1).

IDC (2013) *IDC EMEA Telecom Services Database, 3Q13.* New York. IDC

Internet World Stats (2014a) *European Union Statistics.* Available online: http://www.internetworldstats.com/europa.htm [Accessed 22/10/2014].

Internet World Stats (2014a) *European Union Statistics.* Available online: http://www.internetworldstats.com/europa.htm [Accessed 22/10/2014].

Internet World Stats (2014b) *Malta Internet Usage Statistics and Market Report.* Available online: http://www.internetworldstats.com/eu/mt.htm [Accessed 22/10/2014].

Internet World Stats (2014b) *Malta Internet Usage Statistics and Market Report.* Available online: http://www.internetworldstats.com/eu/mt.htm [Accessed 22/10/2014].

Internet World Stats (2014c) *Malta Statistics.* Available online: http://www.internetworldstats.com/europa.htm#mt [Accessed 22/10/2014].

Internet World Stats (2014d) *Internet Users in the World – Distribution by World Region-2012 Q2.* Available online: http://www.internetworldstats.com/stats.htm [Accessed 22/10/2014].

Internet World Stats (2014e) *Internet Usage in Africa.* Available online: http://www.internetworldstats.com/stats1.htm [Accessed 22/10/2014].

Isaacson, W. (2011) *Steve Jobs.* New York: Simon & Schuster.

Ito (2007) Introduction. In Varnelis, K. (ed) *Networked Publics.* The MIT Press.

Ito, M. (2005) Mobile phones, Japanese youth, and the replacement of social contact. *Mobile Communications.*

Ito, M. & Okabe, D. (2005) Intimate connections: Contextualizing Japanese youth and mobile messaging. *The inside text*.

Ito, M. & Okabe, D. (2005) Intimate connections: Contextualizing Japanese youth

and mobile messaging. *The inside text.* 127 - 145

ITU (2011) *Global ICT Developments.* Available online: http://www.itu.int/ITU-D/ict/statistics/ict/ [Accessed 22/10/2014]

ITU (2011) *Global ICT Developments.* Available online: http://www.itu.int/ITU-D/ict/statistics/ict/ [Accessed 22/09/2014]

Jansen, B.J., Chowdury, A., Cook, G. (2010) The ubiquitous and increasingly significant status message. *Interactions,* 17(3).

Jari, S.,Onnela, J.P., Hyvonen, J., Szabo, G., Lazer, D., Kaski, K., Kertesz, J., Barabasi, A.L., (2007) Structure and tie strengths in a mobile communication network. *Crossmark*, 104 (18).

Jayflex (2010) *Vodafone "Power To You" 2010 UK Advert* [Video]. Available online: http://www.youtube.com/watch/?v=Fl6FGoZNd6E [Accessed 16/04/2013].

Jenkins, H. (2006) *Convergence culture: Where old and new media collide.* New York: NewYork University Press.

Jensen, J.F. (1998) Interactivity: Tracing a New Concept in Media and Communication Studies. *Nordicom Review,* 19.

Joinson, A. N., & Piwek, L. (2013) *Technology and Behaviour Change, for Good and Evil.* Bristol: University of the West of England. Available online: http://www.joinson.com/home/pubs/joinson_piwek.pdf [Accessed 21/09/2014]

Joinson, A.N. (2003) *Understanding the Psychology of Internet Behaviour – Virtual Worlds, Real Life.* New York: Palgrave Macmillan.

Jovanovic, B. and Rousseau, P. L., 2005. General Purpose Technologies. Handbook of Economic Growth. In: Philippe Aghion & Steven Durlauf (eds), Handbook of Economic Growth, 1 (1). Elsevier.

Kalba, K. (2008) The adoption of mobile phones in emerging markets: Global diffusion and the rural challenge. *International Journal of Communication,* 2.

Karikoski, J. & Luukkainen, S. (2011) Substitution in smartphone communication services. *15th International Conference on Intelligence in Next Generation Networks.* Berlin, October 4-7 2013. IEEE.

Khan, M. A. (2007) Internet on mobile, not mobile Internet: Vodafone focus. *MobileMarketer.com*. 16 November. Available online: http://newsle.com/article/0/1737075/ [Accessed 19/08/2013].

Kiesler, S. (1997) *Culture of the Internet.* Mahwah: Erlbaum.

Kiousis, S. (2002) Interactivity: a concept explication. *New Media & Society,* 4(3).

Klang,M. & Olson, S. (1999). Virtual Communities. *22nd information systems conference*, Penn State University, 249-259.
Kossinets, G. and Watts, D. J. (2006) Empirical analysis of an evolving social network. *Science,* 311(5757).

Krogerus, M. & Tschapper, R. (2012) *Change Book – Fifty models to explain how things happen.* Great Britain: Profile Books.

Kumpula J.M., Onnela J.P., Saramäki J., Kaski K., Kertész J. (2007) Emergence of communities in weighted networks. *Phys Rev Lett.,*99(22):228701.

Lampe, C., Ellison, N. and Steinfield, C. (2006) A Face (book) in the crowd: Social searching vs. social browsing. *20th Anniversary Conference on Computer Supported Cooperative work.*

Lange, P.G. (2007) Publicly private and privately public: Social networking on YouTube. *Journal of Computer-Mediated Communication,* 13.

Langwell, L., Tong, S.T., Van Der Heide, B., Walther, J.B. (2008) Too Much of a Good Thing? The Relationship Between Number of Friends and Interpersonal Impressions on Facebook. *Journal of Computer-Mediated Communication,* 13(3)

Licoppe, C. (2004) 'Connected' presence: the emergence of a new repertoire for managing social relationships in a changing communication technoscape. *Environment and Planning D: Society and Space*, (22).

Licoppe, C. & Smoreda, Z. (2005) Are social networks technologically embedded?: How networks are changing today with changes in communication technology. *Social Networks,* 27(4).

Ling, R. S. (2004) Just connect: The social world of the mobile phone. *Psychology review,* (11).

Ling, R. S. (2008) *The Mediation of Ritual Interaction via Mobile Telephony. Mediated Ritual Interaction: Mobile communication's impact on social cohesion.* Cambridge MA: MIT Press.

Ling, R. S. & Campbell, S.W. (2009) *The Reconstruction of Space and Time: Mobile Communication Practices.* New Jersey: Transaction Publishers.

Malta Independent (2014) Troubled teenager tormented on Ask.fm. *The Malta Independent,* Internet edition. 30 March. Available online: http://www.independent.com.mt/articles/2014-03-30/news/troubled-teenager-tormented-on-askfm-4433281026/ [Accessed 22/04/2014]

Manjoo, F. (2009) It's Just Fancy Talk. *Slate Technology*. 13 October. Available online: http://www.slate.com/articles/technology/technology/2009/10/its_just_fancy_talk.html [Accessed 25/01/2013].

Markman, K.M. (2009) "So what shall we talk about": Openings and closings in chat based virtual meetings. *Journal of Business Communication,* 46(1).

Markus, M.L. (1994) Finding a happy medium: explain the negative effects of electronic communication on social life at work. *ACM Transactions on Information Systems,* 12, 119-49.

McCracken, G. (ed) (1988) T*he long interview*, Volume13. Sage.

McGuigan, J. (2005) Towards a sociology of the mobile phone. *Human Technology,* 1 (1).

McMillan, S.J. (2002) A Four-Part Model of Cyber-Interactivity: Some Cyber-Places are More Interactive Than Others. *New Media and Society*, 4(2).

Mikunda, C. (2004) *Brand lands, hot spots & cool spaces: Welcome to the third place and the total marketing experience*. Kogan Page Publishers.

Miller, S. (2008) *Conversation: A history of a declining art*. London: Yale University

Naughton, J, (2012) *From Gutenberg to Zuckerberg: What You Really Need to Know about the Internet.* London: Quercus Books.

Naughton, J. (2012) *From Gutenberg to Zuckerberg: What You Really Need to Know about the Internet.* London: Quercus Books.

Neuman, W.L. (2000) *Social Research Methods: Qualitative and quantitative approaches,* 4th edition. Boston: Allyn and Bacon

Nickleics (2007) *Vodafone - How Are You?* [Video]. Available online: http://www.youtube.com/watch?v=YnZD2A47LbE [Accessed 16/04/2013].

Norman, D.A. (1999) *The invisible computer: why good products can fail, the personal computer is so complex, and information appliances are the solution.* MIT Press.

NSO (2014) World Population Day 2014. Malta: NSO. Available online: http://www.nso.gov.mt/statdoc/document_view.aspx?id=3818&backurl=/themes/theme_page.aspx

Oehrle, A. & Cline, R. J. W. (1993) *The Next Best Thing to Being There: Differences in Relational Development Between Face-to-Face and Computer-Mediated Communication.* University of Florida.

Okabe, D., Anderson, K., Mainwaring, S.D., and Ito, M. (2005) Location-Based Moblogging as Method: New Views into the Use and Practices of Personal, Social and Mobile Technologies. *Hungarian Academy of Science Conference: Seeing, Understanding, Learning in the Mobile Age,* Budapest.

Oldenburg, R. (1991) *The Great Good Place.* New York: Marlowe Company

Olmstead, T. (2012) Facebook Timeline and Users: Not Quite a Love Affair. *Mashable*, 31 January. Available online: http://mashable.com/2012/01/31/facebook-timeline-poll-results/ [Accessed /01/2013].

Oxford English Dictionary. (1989) 2nd edition. Oxford: Clarendon Press.

Paczkowski, J. (2013) WhatsApp: Bigger Than Twitter. *All Things,* 16 April. Available online: http://allthingsd.com/20130416/WhatsApp-bigger-than-twitter/ [Accessed 01/06/2013].

Patton, M.O. (1980) *Qualitative evaluation methods.* Beverly Hills, CA: Sage.

Pertierra, R. (2005) Mobile phones, identity and discursive intimacy. *Human Technology,* 1(1).

PEW (2012) *Photos and Videos as Social Currency Online.* PEW Research Centre. Available online: http://pewinternet.org/Reports/2012/Online-Pictures.aspx [Accessed 23/11/2013]

Phadnis, S. & Sharma, S. (2014) WhatsApp-like services eat into SMS revenues. *The Times of India,* Internet edition. 22 February. Available online: http://timesofindia.indiatimes.com/tech/tech-news/WhatsApp-like-services-eat-into-SMS-revenues/articleshow/30823165.cms [Accessed 25/06/2014]
Press.

Quan-Haase, A. (2008) Instant Messaging on Campus: Use and Integration in University Students' Everyday Communication. *The Information Society,* 24(2).

Rheingold (1993) *The Virtual Community.* United States of America: MIT Press.

Rheingold, H. (1999) Look who's talking. *Wired,* Internet Edition. January. Available online: http://archive.wired.com/wired/archive/7.01/amish.html?pg=1&topic=&topic_se

t=[Accessed 30/08/2013].

Rheingold, H. (2002) *Smart Mobs: The Next Social Revolution: Transforming Cultures and Communities in the Age of Instant Access.* Cambridge, Perseus Book Group.

Roda, C. & Thomas, J. (2003) Digital interaction: introduction to the first international workshop. *1st international symposium on Information and communication technologies*, Trinity College Dublin.

Rossman, G. B., & Wilson, B. L. (1985) Numbers and Words Combining Quantitative and Qualitative Methods in a Single Large-Scale Evaluation Study. *Evaluation review*, *9*(5), 627-643.

Rouse, R. (1991). Mexican migration and the social space of postmodernism. *Diaspora,* 1(1), 8–24.

Russell, A. & Pitcher, E. (2011) *The Story of Vodafone.* London: Vodafone Group Plc.

Sack, W., (2000) *Design for Very Large-Scale Conversations.* PhD thesis. Massachusetts Institute of Technology.

Schegloff E.A. & Sacks, H. (1973) Opening up Closings. *Semiotica,* 8, 289-327.

Schonfeld, E. (2008) Facebook Widens The Gap With MySpace Internationally. *Techcrunch.* 29 October. Available online: http://techcrunch.com/2008/10/29/facebook-widens-the-gap-with-myspace-internationally/ [Accessed 12/08/2013]

Schroeder, R. (2006) Being there together and the future of connected presence. *Presence: Teleoperators and Virtual Environments,* 15(4).

Schwandt, T.A. (1997). Qualitative inquiry: A dictionary of terms. Thousand Oaks, CA: Sage.

Sciriha, L. (2004) *Keeping in Touch. The sociolinguistics of mobile telephony in Malta.* Luqa: Agenda

Sedgwick, H. D. (1970) *The Art of Happiness.* New York: Books for Libraries Press

Senft, T.M. (2008) *Camgirls: celebrity & community in the age of social networks.* New York: Peter Lang Publishing Inc.

Shiny C. (2009) Vodafone 360 adds Facebook/Windows Live Messenger connectivity. *TechDigest.* 24 September. Available online: http://www.techdigest.tv/2009/09/vodafone_360_ad.html [Accessed 27/11/2013]

Short, J., Williams, E. & Christie, B. (1976) *The Social Psychology of Telecommunications.* London: Wiley.

Simpson, J., (2005). Conversation floors in synchronous text-based CMC discourse. *Discourse Studies,* 7(30), 337-361.

Spears R. & Lea, M. (1992). Paralanguage and social perception in computer-mediated communication. *Journal of Organizational Computing,* 2, 321–341.

Sproull, L. & Kiesler, S. (1986) Reducing social context cues: electronic mail in organizational communication. *Management Science*, 32, 1492-512.

Statista (2014) *Number of smartphones sold to end users worldwide from 2007 to 2013.* Available online: http://www.statista.com/statistics/263437/global-smartphone-sales-to-end-users-since-2007/ [Accessed 12/09/2014]

Steuer, J. (1995) Defining Virtual Reality: Dimensions Determining Telepresence. In Biocca, F. & Levy, M.R. (eds) *Communication in the Age of Virtual Reality, Hillsdale*, New Jersey: Lawrence Erlbaum Associates.

Suyata (2009) Real-time chat and other complications in Google Wave. *Agriya.*19 December. Available online: http://blogs.agriya.com/real-time-chat-and-other-complications-in-google-wave [Accessed 25/01/2013].

Szuprowicz, B.O. (1995) *Multimedia Networking.* New York: McGraw-Hill

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: combining qualitative and quantitative approaches.* Thousand Oaks, CA: Sage.

TeliaSonera (2004) *Swedes like to talk while they eat.* [Press Release], cited in Baron (2008)

The Verge (2013) BlackBerry 10 Event Online Live Commentary. *The Verge*. 30 January. Available online: http://live.theverge.com/blackberry-10-event-live-blog/ [Accessed 16/10/2013]

Thorburn-Winsor (2014) Is Facebook becoming the next Myspace? *Seeking Alpha*. 10 February. Available online: http://seekingalpha.com/article/2006951-is-facebook-becoming-the-next-myspace [Accessed 22/10/2014]

Top App Charts (2013) *SnapChat.* [online], Available At: http://www.topappcharts.com/447188370/app-details-Snapchat.php [Accessed 22/10/2013]

Turkle, S. (2012). *Alone together: Why we expect more from technology and less from each other*. Basic books.
Turner, J. W., Reinsch, L. & Tinsley, C. (2008) Multicommunicating: A practice whose time has come? *Academy of Management Review,* 33(2)

Utz, S. (2010) Show me your friends and I will tell you what type of person you are: How one's profile, number of friends, and type of friends influence impression formation on social network sites. *Journal of Computer‐Mediated Communication,* 15(2).

Viswanath B., Mislove, A., Cha, M., Gummadi, K. P. (2009) On the evolution of user interaction in Facebook. *2nd ACM workshop on Online social networks*. Available online: http://ww.mpi-sws.org/~gummadi/papers/wosn23-viswanath.pdf [Accessed 16/08/2013].

Vodafone (2010) *Wayfinder Media Statement.* 11 April 2010. Available online: http://www.vodafone.com/content/index/media/group_press_releases/2010/wayfinder_statement.html [Accessed 20/10/2013]

Vuillemot, R., Petit, J. M. and Hacid, M. S. (2010) Shift-BOX: INBOX Time Shifting to Reduce Email Clutter. *CEAS 2010 - Seventh annual Collaboration, Electronic messaging, AntiAbuse and Spam Conference*, Washington, 13-14 July 2010.
Walter, J (1996) Computer-Mediated Communication: Impersonal, Interpersonal, and Hyperpersonal. *Interaction Communication Research*, 23 (1).

Walter, J. (1996) Computer-Mediated Communication: Impersonal, Interpersonal, and Hyperpersonal. *Interaction Communication Research*, 23 (1).

Webit (2012) W*ebit wins best social game award at the Facebook HACK in London*. Available online: http://www.webitstudios.com/webit-wins-best-social-game-award-at-the-facebook-hack-in-london [Accessed 01/06/2013].

WebRTC (2012). Available online: http://www.webrtc.org/ [Accessed 30/08/2013].

WhatsApp (2014) 500000000. *WhatsApp Blog*. 22 April. Available online: http://blog.whatsapp.com/613/500000000 [Accessed 25/06/2014]

Ziv, N. D. and Mulloth, B. (2006) An exploration on Mobile Social Networking: Dodgeball as a case in point. *ICMB'06 - International Conference on Mobile Business.* Copenhagen: Department of Management, Polytechnic University.

DATA SOURCE - Smartphone Adoption

Unique Id	MODEL	DATA201208	DATA201211	DATA201212	DATA201301	DATA201302	VOICE201208	VOICE201211	VOICE201212	VOICE201301	VOICE201302	SMS201208	SMS201211	SMS201212	SMS201301	SMS201302
6708001	1	0.00	55.00	0.00	0.00	0.00	81.87	50.57	44.32	57.28	42.75	72.00	67.00	51.00	33.00	23.00
3127002	1	0.00	0.00	0.00	0.00	0.00	49.62	79.50	72.10	90.78	86.58	15.00	19.00	11.00	18.00	19.00
6874003	1	0.00	0.00	0.00	0.00	0.00	341.60	889.30	723.58	389.52	266.82	0.00	0.00	0.00	2.00	3.00
5696004	1	0.00	0.00	0.00	0.00	0.00	670.07	356.83	510.62	434.93	338.85	86.00	74.00	60.00	53.00	45.00
4848005	1	0.00	0.00	0.00	0.00	0.00	68.02	87.73	77.40	113.87	68.35	21.00	36.00	37.00	24.00	16.00
4508006	1	0.00	0.00	0.00	0.00	0.00	46.40	107.33	127.33	19.72	22.45	86.00	249.00	151.00	161.00	163.00
5706007	1	0.00	0.00	0.00	0.00	0.00	45.25	9.10	20.12	13.82	15.28	6.00	1.00	2.00	1.00	0.00
7194008	1	0.00	0.00	0.00	0.00	0.00	40.57	14.82	13.35	19.40	11.65	3.00	3.00	1.00	3.00	13.00
8880009	1	0.00	0.00	0.00	0.00	0.00	1.20	27.13	1.35	3.13	0.30	0.00	0.00	0.00	0.00	0.00
6506010	1	0.00	0.00	0.00	0.00	0.00	36.77	58.32	36.10	32.12	18.90	40.00	90.00	72.00	94.00	59.00
3243011	1	0.00	0.00	0.00	0.00	0.00	335.07	283.72	421.67	332.68	344.40	0.00	0.00	0.00	0.00	0.00
4291012	1	0.00	0.00	0.00	0.00	0.00	128.22	130.45	178.25	187.95	68.50	179.00	138.00	173.00	149.00	174.00
6472013	1	0.00	0.00	0.00	0.00	0.00	33.17	3.30	0.88	0.08	2.45	28.00	27.00	20.00	3.00	3.00
0545014	1	0.00	0.00	0.00	0.00	0.00	28.18	37.22	49.02	84.20	49.37	70.00	51.00	77.00	103.00	71.00
7082015	1	0.00	0.00	0.00	0.00	0.00	11.00	13.22	21.35	7.77	18.38	34.00	18.00	29.00	19.00	14.00
5156016	1	0.00	0.00	0.00	0.00	0.00	65.78	126.10	136.08	91.53	84.30	0.00	0.00	0.00	0.00	0.00
7717017	1	0.00	0.00	0.00	0.00	0.00	815.55	301.12	2021.30	2011.88	1039.35	21.00	5.00	59.00	87.00	48.00
2470018	1	0.00	0.00	0.00	0.00	0.00	355.17	32.20	504.70	373.30	263.03	206.00	169.00	148.00	114.00	85.00
2582019	1	0.00	0.00	0.00	0.00	0.00	101.98	176.13	152.80	131.85	121.12	79.00	42.00	63.00	57.00	27.00
8535020	1	0.00	0.00	0.00	0.00	0.00	32.40	29.78	20.87	22.87	30.50	21.00	5.00	0.00	1.00	1.00
8452021	1	0.00	0.00	0.00	0.00	0.00	167.12	246.28	202.42	212.98	195.47	41.00	90.00	87.00	86.00	58.00
9905022	1	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.65	2.83	1.25	0.00	2.00	0.00	0.00	6.00
4725023	1	0.00	5.00	2.53	0.00	0.00	63.63	6.80	154.80	66.35	154.25	5.00	0.00	8.00	2.00	2.00
6366024	1	0.00	0.00	0.00	0.00	0.00	7.08	13.40	11.48	29.93	11.67	208.00	247.00	228.00	297.00	256.00
6389025	1	0.00	0.00	0.00	0.00	0.00	100.28	254.15	241.32	154.62	52.40	0.00	1.00	0.00	0.00	0.00
9333026	1	0.00	0.00	0.00	0.00	0.00	39.22	10.17	36.28	25.83	12.87	3.00	0.00	3.00	0.00	6.00
7032027	1	0.00	0.00	0.00	0.00	0.00	133.68	93.92	22.07	0.80	48.62	6.00	14.00	9.00	0.00	12.00
7034028	1	0.00	0.00	0.00	0.00	0.00	401.32	362.50	401.32	383.95	402.17	36.00	26.00	8.00	10.00	9.00
1692029	1	0.00	0.00	0.00	0.00	0.00	7.35	7.68	17.70	7.97	40.33	1.00	0.00	0.00	2.00	0.00
4030030	1	0.00	0.00	0.00	0.00	0.00	11.13	2.23	11.78	5.73	4.35	3.00	0.00	0.00	0.00	0.00
3320031	1	0.00	0.00	0.00	0.00	0.00	5.03	14.88	4.78	0.45	73.23	0.00	6.00	21.00	1.00	5.00
2022032	1	0.00	0.00	0.00	0.00	0.00	189.15	390.40	311.10	130.08	55.93	49.00	41.00	120.00	24.00	29.00
3026033	1	0.00	0.00	0.00	0.00	0.00	161.35	183.78	460.93	307.75	380.13	88.00	124.00	140.00	98.00	81.00
1528034	1	0.00	0.00	0.00	0.00	0.00	196.78	163.33	212.50	133.90	165.63	120.00	91.00	111.00	153.00	122.00
1819035	1	0.00	0.00	0.00	0.00	0.00	125.00	94.35	96.87	56.40	96.20	0.00	0.00	0.00	0.00	0.00
1957036	1	0.00	0.00	0.00	0.00	0.00	11.42	32.42	17.67	11.65	6.52	0.00	0.00	0.00	1.00	0.00
4816037	1	0.00	0.00	0.00	0.00	0.00	13.77	29.15	9.12	70.62	7.88	0.00	2.00	0.00	2.00	0.00
8401038	1	0.00	0.00	0.00	0.00	0.00	15.93	21.32	20.25	10.98	10.23	0.00	0.00	0.00	0.00	0.00
9676039	1	0.00	0.00	0.00	0.00	0.00	71.02	27.85	33.90	20.08	20.87	1.00	1.00	1.00	4.00	0.00
2101040	1	0.00	0.00	0.00	0.00	0.00	335.12	745.87	543.18	448.53	237.73	56.00	81.00	60.00	58.00	32.00
2064041	1	0.00	0.00	0.00	0.00	0.00	46.57	17.62	4.32	45.70	63.03	0.00	0.00	3.00	0.00	0.00
0727042	1	0.00	0.00	0.07	0.00	0.00	44.77	39.17	32.63	64.12	112.05	3.00	10.00	6.00	2.00	3.00
2561043	1	0.00	0.00	0.00	0.00	0.00	39.03	24.12	56.17	31.10	23.98	83.00	68.00	109.00	52.00	46.00
3426044	1	0.00	0.00	0.00	0.00	0.00	17.10	87.37	55.53	55.87	10.13	45.00	80.00	124.00	106.00	88.00
3655045	1	0.00	0.00	0.00	0.00	0.00	121.42	118.38	131.33	120.82	101.87	151.00	62.00	50.00	39.00	35.00
6584046	1	0.00	0.00	0.00	0.00	0.00	2.33	1.27	0.00	2.67	6.33	4.00	1.00	0.00	4.00	1.00

8560047	1	0.00	0.00	0.00	0.00	0.00	4.20	8.03	2.37	1.57	5.60	39.00	25.00	25.00	30.00	22.00
8148048	1	0.00	0.00	0.00	0.00	0.00	161.37	246.47	329.78	361.30	213.23	1.00	2.00	0.00	1.00	0.00
8701049	1	0.00	0.00	0.00	0.00	0.00	36.57	0.00	0.00	0.00	0.00	37.00	0.00	0.00	0.00	0.00
9570050	1	0.00	0.00	0.00	0.00	0.00	66.57	99.02	115.07	95.48	58.83	1.00	1.00	0.00	2.00	0.00
4996051	1	0.00	0.00	0.00	0.00	0.00	1.55	1.47	0.33	1.83	0.73	81.00	141.00	110.00	130.00	109.00
2557052	1	0.00	0.00	0.00	0.00	0.00	11.22	3.95	5.58	5.05	3.67	110.00	168.00	146.00	145.00	100.00
4257053	1	0.00	0.00	0.00	0.00	0.00	67.90	28.60	30.10	90.03	81.07	9.00	14.00	16.00	47.00	24.00
4306054	1	0.00	0.00	0.00	0.00	0.00	83.97	113.70	79.38	142.78	91.40	0.00	2.00	16.00	14.00	15.00
9007055	1	0.00	1.00	6.59	1.00	0.00	5143.23	5413.13	5991.60	5357.13	5032.98	550.00	326.00	347.00	368.00	269.00
1471056	1	0.00	0.00	0.00	0.00	0.00	63.40	33.85	31.32	47.07	55.63	0.00	1.00	3.00	2.00	0.00
2631057	1	0.00	0.00	0.00	0.00	0.00	43.93	10.90	9.30	17.93	26.20	20.00	34.00	19.00	10.00	9.00
4218058	1	0.00	0.00	0.00	0.00	0.00	0.60	0.78	0.00	1.57	3.22	0.00	0.00	0.00	0.00	0.00
5416059	1	0.00	0.00	0.00	0.00	0.00	14.60	26.33	51.20	38.68	29.47	35.00	186.00	244.00	354.00	298.00
6251060	1	0.00	0.00	0.00	0.00	0.00	40.63	53.95	105.40	71.83	79.03	422.00	307.00	374.00	334.00	348.00
1300061	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	1.82	0.00	0.00	1.00	0.00	0.00
8056062	1	0.00	0.00	0.00	0.00	0.00	65.00	48.82	132.58	61.02	39.52	5.00	0.00	0.00	1.00	0.00
1774063	1	0.00	0.00	0.00	0.00	0.00	275.95	268.55	165.82	181.27	140.45	103.00	117.00	106.00	224.00	270.00
3368064	1	0.00	0.00	0.00	0.00	0.00	6.58	5.85	3.00	7.32	0.82	0.00	0.00	0.00	0.00	0.00
4817065	1	0.00	0.00	0.00	0.00	0.00	6.77	10.15	11.95	4.87	3.67	6.00	6.00	0.00	2.00	6.00
7583066	1	0.00	0.00	0.00	0.00	0.00	24.65	17.18	13.98	23.68	13.28	2.00	14.00	3.00	11.00	5.00
8172067	1	0.00	0.00	0.00	0.00	0.00	30.40	45.53	57.57	54.77	29.83	76.00	81.00	58.00	99.00	43.00
1068068	1	0.00	0.00	0.00	0.00	0.00	48.58	29.95	20.87	135.13	153.13	6.00	3.00	4.00	2.00	0.00
0859069	1	0.00	0.00	0.00	0.00	0.00	69.10	59.00	62.85	75.05	53.40	47.00	33.00	43.00	32.00	66.00
2605070	1	0.00	0.00	0.00	0.00	0.00	37.65	26.82	28.20	16.72	18.13	7.00	0.00	4.00	0.00	0.00
4187071	1	0.00	0.00	0.00	0.00	0.00	51.23	68.63	36.12	57.05	99.72	0.00	0.00	0.00	0.00	4.00
4965072	1	0.00	0.00	0.00	0.00	0.00	58.85	114.35	84.97	78.07	47.65	0.00	0.00	0.00	1.00	0.00
6897073	1	0.00	0.00	0.00	0.00	0.00	83.10	73.93	56.97	55.07	32.97	0.00	6.00	0.00	1.00	0.00
7063074	1	0.00	0.00	0.00	0.00	0.00	39.00	35.43	28.30	36.62	13.50	63.00	64.00	50.00	72.00	58.00
6893075	1	0.00	0.00	0.00	0.00	0.00	801.30	368.67	198.47	289.22	309.22	24.00	66.00	22.00	41.00	24.00
0445076	1	0.00	0.00	0.00	0.00	0.00	3.67	12.85	4.90	7.25	10.75	198.00	229.00	165.00	424.00	298.00
8765077	1	0.00	0.00	0.00	0.00	0.00	57.37	246.27	130.83	227.17	170.90	10.00	11.00	7.00	6.00	6.00
3991078	1	0.00	0.00	0.00	0.00	0.00	37.08	24.85	1.27	45.32	36.92	0.00	1.00	0.00	2.00	1.00
4366079	1	0.00	0.00	0.00	0.00	0.00	209.22	237.28	232.50	228.60	260.32	0.00	0.00	0.00	0.00	1.00
8053080	1	0.00	0.00	0.00	0.00	0.00	12.12	12.18	3.58	4.77	3.10	0.00	0.00	0.00	0.00	0.00
6386081	1	0.00	0.00	0.00	0.00	0.00	5.35	22.27	23.22	19.67	1.88	0.00	0.00	0.00	0.00	0.00
0744082	1	0.00	0.00	0.00	0.00	0.00	4.83	7.57	10.73	2.43	10.12	0.00	0.00	0.00	0.00	0.00
4391083	1	0.00	0.00	0.00	0.00	0.00	9.08	7.72	7.95	3.33	14.92	0.00	0.00	0.00	2.00	0.00
4643084	1	0.00	0.00	0.00	0.00	0.00	22.12	33.53	31.32	38.52	18.45	0.00	0.00	0.00	0.00	0.00
0680085	1	0.00	0.00	0.00	0.00	0.00	89.17	0.37	0.30	0.17	0.03	41.00	0.00	0.00	0.00	0.00
3691086	1	0.00	0.00	0.00	0.00	0.00	13.28	11.77	12.60	9.85	13.70	0.00	0.00	0.00	0.00	0.00
1038087	1	0.00	0.00	0.00	0.00	0.00	0.07	1.92	25.43	0.28	7.62	0.00	0.00	23.00	0.00	3.00
1061088	1	0.00	0.00	0.00	0.00	0.00	84.45	65.25	69.42	42.93	59.57	23.00	77.00	48.00	19.00	9.00
2897089	1	0.00	0.00	0.00	0.00	0.00	29.77	22.80	5.40	0.00	3.63	78.00	19.00	0.00	0.00	0.00
6584090	1	0.00	0.00	0.00	0.00	0.00	39.12	52.10	53.73	45.43	44.55	3.00	8.00	4.00	7.00	6.00
7229091	1	0.00	0.00	0.00	0.00	0.00	47.77	12.80	18.10	11.32	9.87	295.00	341.00	276.00	63.00	124.00
5775092	1	0.00	0.00	0.00	0.00	0.00	18.23	13.78	5.37	15.30	15.53	0.00	2.00	2.00	0.00	0.00
9918093	1	0.00	0.00	0.00	0.00	0.00	34.63	12.50	36.40	16.15	22.82	8.00	39.00	40.00	36.00	41.00
7861094	1	0.00	0.00	0.00	0.00	0.00	48.88	28.85	24.58	9.92	16.23	86.00	113.00	60.00	59.00	48.00
7026095	1	0.00	0.00	0.00	0.00	0.00	31.32	116.50	83.10	25.72	2.20	3.00	17.00	38.00	4.00	4.00
1828096	1	0.00	0.00	0.00	0.00	0.00	20.05	20.22	6.52	8.88	10.42	0.00	0.00	0.00	0.00	0.00

6626097	1	0.00	0.00	0.00	0.00	0.00	40.27	11.62	5.57	19.10	4.10	1.00	0.00	0.00	0.00	0.00
1594098	1	0.00	0.00	0.00	0.00	0.00	75.67	354.25	394.43	441.68	311.85	417.00	235.00	299.00	324.00	308.00
4298099	1	0.00	0.00	0.00	0.00	0.00	42.52	57.35	34.65	21.83	18.42	67.00	93.00	105.00	72.00	91.00
0180100	1	0.00	0.00	0.00	0.00	0.00	12.00	197.10	128.65	152.12	134.60	0.00	0.00	1.00	0.00	5.00
2738101	1	0.00	0.00	0.00	0.00	0.00	29.85	32.67	107.72	116.77	47.33	44.00	47.00	56.00	67.00	79.00
7434102	1	0.00	0.00	0.00	0.00	0.00	4.33	7.75	11.42	15.08	4.58	0.00	0.00	0.00	0.00	0.00
7788103	1	0.00	0.00	0.00	0.00	0.00	101.05	40.75	61.23	45.03	50.82	159.00	184.00	236.00	260.00	221.00
9760104	1	0.00	0.00	0.00	0.00	0.00	152.02	60.47	83.87	100.75	74.60	1.00	0.00	0.00	0.00	0.00
3597105	1	0.00	0.00	0.00	0.00	0.00	158.20	269.40	451.95	396.80	394.80	378.00	339.00	317.00	265.00	267.00
3559106	1	0.00	0.00	0.00	0.00	0.00	7.87	10.02	8.85	9.43	3.38	161.00	197.00	218.00	188.00	150.00
8452107	1	0.00	0.00	0.00	0.00	0.00	27.27	13.12	22.45	14.68	8.43	0.00	0.00	0.00	0.00	0.00
4277108	1	0.00	0.00	0.00	0.00	0.00	43.37	40.45	40.35	35.03	40.03	0.00	0.00	0.00	1.00	1.00
7687109	1	0.00	0.00	0.00	0.00	0.00	42.30	88.17	54.18	132.62	37.20	0.00	0.00	7.00	2.00	0.00
2359110	1	0.00	0.00	0.00	0.00	0.00	35.52	41.93	32.88	35.12	25.23	36.00	16.00	93.00	18.00	15.00
2476111	1	0.00	0.00	0.00	0.00	0.00	39.78	27.65	98.97	35.93	17.88	42.00	37.00	47.00	43.00	31.00
7531112	1	0.00	0.00	0.00	0.00	0.00	33.22	25.93	23.68	18.62	17.20	0.00	0.00	0.00	0.00	0.00
0203113	1	0.00	0.00	0.00	0.00	0.00	36.08	37.55	24.33	21.05	27.02	0.00	0.00	0.00	1.00	0.00
3150114	1	0.00	0.00	0.00	0.00	0.00	4.97	1.33	2.45	0.77	1.48	11.00	2.00	15.00	14.00	5.00
3879115	1	0.00	0.00	0.00	0.00	0.00	50.38	135.65	54.35	51.80	39.87	44.00	140.00	66.00	28.00	51.00
4598116	1	0.00	0.00	0.00	0.00	0.00	30.32	48.23	31.08	38.18	42.35	76.00	89.00	62.00	35.00	45.00
7871117	1	0.00	0.00	0.00	0.00	0.00	2.22	14.63	4.32	7.62	9.25	10.00	125.00	33.00	15.00	6.00
1196118	1	0.00	0.00	0.00	0.00	0.00	1.37	29.37	21.13	34.77	58.90	82.00	142.00	247.00	138.00	119.00
8844119	0	58.36	6.28	28.82	40.33	35.48	11.53	84.92	77.45	147.15	41.10	46.00	31.00	39.00	52.00	10.00
0595120	0	127.89	47.35	655.60	1277.76	177.31	15.95	11.83	54.38	50.48	36.52	242.00	65.00	130.00	382.00	306.00
1117121	0	411.37	259.64	250.72	536.68	246.37	83.02	101.02	152.03	130.53	87.45	218.00	258.00	293.00	268.00	186.00
8163122	0	50.00	0.00	0.00	0.00	0.00	8.95	0.00	0.00	0.00	4.92	6.00	0.00	0.00	0.00	12.00
1028123	0	29.55	0.00	12.85	0.00	0.00	20.77	0.00	29.38	0.00	0.00	81.00	0.00	52.00	1.00	0.00
4888124	0	352.42	173.73	345.02	831.65	1026.98	192.55	171.22	294.53	170.52	161.17	286.00	148.00	230.00	129.00	126.00
6316125	0	21.14	0.00	0.00	0.00	0.00	3.73	0.00	0.87	0.00	0.02	3.00	0.00	10.00	0.00	0.00
4953126	0	297.24	152.17	64.90	93.82	106.11	84.93	277.45	96.02	257.32	243.33	84.00	87.00	51.00	46.00	30.00
1566127	0	0.00	0.00	0.00	764.08	21.49	2.50	1.78	2.75	31.03	5.00	1.00	0.00	0.00	114.00	114.00
3037128	0	0.00	0.00	0.00	0.00	158.29	3.10	4.15	3.37	12.23	45.00	423.00	1510.00	713.00	666.00	1235.00
2277129	0	84.52	40.20	0.00	0.00	0.36	16.22	18.12	4.45	8.25	3.47	221.00	344.00	283.00	235.00	167.00
7201130	0	614.11	326.27	356.07	446.23	358.68	9.65	3.68	16.45	8.08	0.80	207.00	234.00	188.00	142.00	89.00
2406131	0	0.00	195.39	210.73	151.01	326.15	2.50	51.42	96.58	79.10	93.97	129.00	89.00	67.00	86.00	52.00
1092132	0	54.46	6.32	447.03	228.77	65.58	24.93	13.80	19.45	7.83	17.72	2.00	5.00	5.00	29.00	3.00
5824133	0	0.00	48.58	304.83	282.22	206.52	84.73	75.60	69.98	92.03	66.55	257.00	185.00	186.00	125.00	98.00
7450134	0	448.67	462.94	300.91	1574.57	750.72	190.78	919.48	452.25	397.48	487.78	79.00	401.00	399.00	290.00	348.00
1826135	0	491.69	782.25	645.19	504.77	554.39	39.60	20.72	20.75	13.85	6.18	58.00	22.00	35.00	23.00	88.00
0893136	0	23.44	52.74	17.55	0.00	0.00	0.63	11.20	6.85	1.75	16.45	143.00	134.00	90.00	81.00	113.00
6502137	0	0.15	37.24	122.06	101.62	143.25	38.85	34.98	47.00	57.77	53.40	21.00	57.00	69.00	54.00	29.00
2295138	0	450.12	239.07	800.12	171.37	5.01	20.10	92.68	120.77	45.00	25.17	204.00	100.00	115.00	106.00	13.00
2619139	0	202.76	52.10	170.84	143.94	168.55	3.83	1.57	6.42	3.95	7.62	12.00	25.00	27.00	14.00	25.00
2664140	0	496.27	399.18	272.00	198.08	223.48	11.05	12.23	9.80	9.15	9.07	119.00	507.00	381.00	147.00	132.00
6683141	0	463.84	220.15	140.13	177.95	318.84	86.70	62.35	36.08	47.00	70.27	314.00	220.00	221.00	127.00	168.00
3203142	0	582.80	780.30	987.01	1533.33	1479.75	28.47	3.53	5.02	14.22	62.70	179.00	123.00	155.00	1057.00	808.00
3434143	0	268.50	265.11	259.98	160.16	357.15	6.33	1.50	17.38	23.78	12.17	159.00	78.00	154.00	114.00	41.00
9891144	0	20.06	0.00	46.44	25.21	0.00	1.45	0.00	52.35	1.85	0.00	272.00	0.00	305.00	153.00	0.00
1283145	0	0.00	147.61	77.82	57.75	68.76	93.18	54.87	81.82	75.55	70.10	89.00	89.00	140.00	118.00	99.00
3307146	0	143.46	608.63	301.46	121.67	166.70	8.58	12.53	7.63	2.90	7.38	223.00	444.00	470.00	365.00	199.00

3585147	0	0.00	0.00	761.59	7.32	36.98	0.00	57.07	132.42	9.02	7.33	0.00	5.00	4.00	6.00	13.00
5854148	0	223.80	105.66	88.87	82.87	50.35	169.75	136.70	78.68	106.15	42.07	215.00	169.00	200.00	100.00	45.00
2119149	0	1487.95	493.61	328.07	352.55	392.30	84.67	116.37	87.07	50.20	112.07	224.00	304.00	280.00	267.00	273.00
4793150	0	208.32	71.12	104.99	135.76	11.71	3.13	7.58	14.47	8.57	12.30	50.00	30.00	15.00	31.00	13.00
6322151	0	27.07	10.98	90.30	50.41	0.00	4.05	1.83	1.05	0.03	0.02	205.00	66.00	47.00	41.00	45.00
0578152	0	64.37	198.08	124.01	20.32	54.53	726.42	655.62	1325.48	1030.98	22.17	43.00	65.00	256.00	79.00	65.00
6092153	0	0.00	0.00	0.00	0.00	95.07	0.82	19.25	45.92	27.83	33.47	25.00	29.00	7.00	17.00	11.00
8542154	0	9.31	633.84	2742.59	202.06	1255.32	45.27	34.23	30.88	28.80	34.58	208.00	168.00	336.00	416.00	345.00
4425155	0	975.34	589.23	699.85	582.17	486.94	13.32	29.18	14.07	30.12	6.95	434.00	838.00	481.00	469.00	360.00
1120156	0	2.30	0.00	0.00	0.00	0.00	13.50	3.03	7.10	4.53	6.77	24.00	21.00	24.00	11.00	14.00
3501157	0	0.07	0.60	107.14	0.00	0.00	25.63	1.72	12.85	1.77	3.48	3761.00	1741.00	2704.00	2915.00	1789.00
9770158	0	0.00	41.24	0.00	0.00	0.00	5.52	0.43	7.63	6.15	1.80	11.00	10.00	6.00	10.00	9.00
6545159	0	0.00	0.00	0.00	0.00	0.00	16.13	21.73	20.22	21.27	52.67	111.00	224.00	219.00	111.00	225.00
8478160	0	0.00	175.66	0.00	0.14	935.52	0.00	30.63	0.00	0.00	74.92	0.00	70.00	1.00	67.00	46.00
8766161	0	5.19	57.74	29.83	2.92	2.03	22.07	39.30	48.28	31.48	75.25	72.00	98.00	88.00	98.00	87.00
9246162	0	806.49	2508.16	1803.24	4166.89	2028.72	32.10	11.95	10.92	6.72	30.35	594.00	85.00	23.00	17.00	21.00
0404163	0	0.00	1.89	0.00	0.00	0.00	17.58	9.60	1.05	13.27	35.37	16.00	30.00	8.00	13.00	7.00
4949164	0	0.00	289.82	0.00	140.19	87.35	87.22	503.78	733.97	446.17	318.82	11.00	52.00	48.00	7.00	5.00
3834165	0	3.09	44.32	13.23	15.17	21.06	22.80	56.95	38.62	52.27	25.60	8.00	10.00	28.00	3.00	1.00
4128166	0	0.00	216.34	356.58	292.35	6.34	3.40	7.77	28.88	28.80	3.77	4.00	32.00	23.00	64.00	7.00
2157167	0	67.93	20.02	252.78	246.11	49.41	35.23	24.17	53.53	35.08	31.88	162.00	146.00	102.00	94.00	39.00
5125168	0	7.12	150.71	190.83	235.19	339.02	24.55	25.07	15.17	21.68	11.97	51.00	78.00	174.00	73.00	49.00
6291169	0	0.54	8.92	44.60	4.86	140.58	21.25	24.13	26.43	17.62	21.90	37.00	71.00	36.00	38.00	48.00
9363170	0	0.00	0.00	0.00	0.00	0.00	0.00	4.17	8.50	17.47	41.17	0.00	11.00	1.00	13.00	37.00
8928171	0	77.86	73.26	95.91	91.32	97.81	2.93	1.35	5.90	2.37	1.22	6.00	3.00	10.00	5.00	14.00
2251172	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.05	0.80	0.15	0.00	0.00	0.00	289.00	36.00
3540173	0	0.00	52.83	0.00	0.00	0.00	1.02	1.67	0.32	7.72	1.25	62.00	107.00	81.00	112.00	132.00
6400174	0	0.00	0.00	0.00	0.00	0.00	3.73	2.32	0.75	1.97	0.85	171.00	258.00	167.00	229.00	138.00
2055175	0	161.92	437.83	165.13	196.56	307.02	12.10	5.97	19.98	2.23	5.95	51.00	26.00	24.00	11.00	3.00
8698176	0	0.00	0.00	0.00	0.00	0.00	26.63	16.55	19.87	15.28	15.07	24.00	18.00	31.00	26.00	33.00
1697177	0	31.87	304.56	68.98	31.80	62.93	12.08	33.38	43.95	5.10	16.50	255.00	529.00	1026.00	204.00	80.00
2311178	0	389.89	190.10	678.99	549.73	447.50	13.47	15.47	5.83	3.53	4.03	2.00	1.00	6.00	3.00	1.00
2496179	0	0.00	201.21	394.66	234.56	373.26	38.65	163.27	110.27	176.20	143.07	6.00	33.00	39.00	42.00	21.00
7569180	0	0.00	0.00	110.08	0.00	11.28	0.00	79.93	38.88	22.25	24.83	0.00	48.00	33.00	93.00	46.00
0540181	0	49.26	88.93	145.20	388.95	398.56	17.63	4.68	5.72	0.43	7.27	22.00	38.00	16.00	8.00	15.00
0808182	0	0.00	0.00	0.00	0.00	0.00	28.28	3.42	4.97	4.98	5.30	66.00	29.00	47.00	33.00	35.00
2925183	0	0.00	2.15	24.31	9.96	5.70	1.88	40.82	89.48	39.98	54.93	6.00	48.00	68.00	63.00	64.00
3686184	0	320.33	198.93	214.71	135.53	0.00	10.00	18.08	12.75	17.15	15.75	80.00	128.00	150.00	73.00	80.00
4021185	0	0.00	0.00	0.00	0.00	0.00	52.57	11.48	45.08	10.23	26.77	2.00	15.00	48.00	53.00	15.00
7766186	0	0.00	143.18	155.19	175.03	163.03	0.27	24.17	18.75	10.90	29.45	45.00	24.00	34.00	20.00	28.00
7991187	0	638.91	384.83	787.60	145.71	186.97	27.10	32.53	37.85	22.75	28.68	7.00	0.00	2.00	0.00	2.00
0873188	0	459.16	37.14	29.20	0.00	140.52	4.28	0.75	0.40	1.38	3.55	2.00	2.00	1.00	1.00	2.00
0205189	0	5.82	0.00	0.00	0.00	66.60	2.32	5.05	4.03	0.00	10.65	8.00	5.00	10.00	0.00	10.00
1182190	0	0.00	0.04	293.23	465.00	68.70	5.90	0.10	6.30	5.77	4.87	99.00	84.00	671.00	1467.00	252.00
6039191	0	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.28	207.00	0.00	0.00	0.00	0.00
8128192	0	0.00	0.00	0.00	0.00	0.00	32.70	30.53	25.52	17.95	12.90	0.00	23.00	24.00	17.00	12.00
4641193	0	133.94	374.21	781.26	850.57	0.00	17.62	123.85	153.07	84.78	0.32	43.00	127.00	108.00	55.00	12.00
1899194	0	0.00	138.29	82.56	66.84	135.65	0.08	55.37	36.72	48.45	37.77	0.00	20.00	24.00	14.00	17.00
2600195	0	0.00	0.00	0.00	0.00	0.00	0.73	0.03	0.80	0.02	0.03	18.00	15.00	17.00	9.00	16.00
5925196	0	233.50	179.20	53.87	193.13	167.53	75.90	24.32	4.80	23.53	52.65	108.00	51.00	21.00	34.00	60.00

9906197	0	0.00	737.26	479.97	558.24	838.24	231.58	614.60	935.75	1209.63	1214.23	39.00	176.00	118.00	216.00	94.00
0299198	0	228.79	58.13	196.96	131.10	206.44	6.83	2.08	8.38	4.08	14.57	76.00	103.00	77.00	39.00	94.00
1718199	0	0.01	0.00	0.00	0.00	0.00	4.93	9.70	7.05	2.37	2.18	8.00	17.00	25.00	26.00	22.00
3414200	0	0.00	0.01	0.00	254.73	8.12	5.90	14.40	9.20	14.92	16.83	12.00	18.00	25.00	14.00	12.00
5274201	0	485.81	241.52	420.28	343.99	238.44	19.57	11.18	15.13	8.17	15.95	603.00	329.00	395.00	298.00	362.00
5135202	0	28.23	13.50	44.17	132.88	49.32	3.93	17.85	9.05	4.83	1.35	25.00	59.00	70.00	43.00	65.00
1102203	0	0.56	0.00	0.00	0.00	0.00	2.67	1.42	0.00	0.03	0.02	6.00	1.00	1.00	0.00	0.00
5434204	0	82.09	269.70	161.39	220.20	319.45	3.57	28.07	0.13	0.00	0.00	6.00	4.00	5.00	3.00	7.00
1833205	0	129.48	290.76	487.30	369.67	400.74	14.33	25.75	40.73	47.02	78.28	334.00	452.00	633.00	565.00	553.00
1946206	0	0.00	35.51	18.30	18.80	59.78	22.55	82.42	148.33	91.95	163.73	18.00	35.00	53.00	41.00	47.00
2162207	0	0.00	27.12	0.00	0.00	0.00	1.92	0.12	0.95	0.18	3.48	0.00	1.00	5.00	2.00	3.00
2528208	0	0.00	997.44	79.28	340.25	564.43	0.03	128.73	101.20	145.95	98.58	0.00	40.00	23.00	84.00	72.00
0548209	0	0.00	0.00	0.00	0.00	0.00	0.00	14.13	16.05	0.07	6.35	0.00	2.00	1.00	0.00	1.00
3522210	0	899.51	887.90	950.90	939.85	1235.47	7.10	1.47	3.37	5.83	0.00	25.00	65.00	89.00	64.00	50.00
1135211	0	0.00	0.00	0.00	0.00	12.37	10.72	4.72	1.02	13.82	9.02	77.00	23.00	55.00	47.00	22.00
3262212	0	0.00	0.00	32.67	1.25	13.87	14.53	7.83	11.12	26.20	32.17	51.00	14.00	33.00	18.00	36.00
4736213	0	9.48	50.30	13.46	37.56	0.08	0.12	2.17	0.93	0.00	0.80	26.00	9.00	45.00	21.00	24.00
7107214	0	0.00	218.79	243.06	0.00	0.00	1.00	6.88	1.78	0.03	0.80	0.00	22.00	6.00	0.00	0.00
7667215	0	222.56	68.35	190.87	33.28	16.87	36.90	11.38	23.13	21.87	19.40	75.00	58.00	110.00	100.00	56.00
0678216	0	0.00	36.06	9.25	0.00	102.95	29.07	16.52	17.42	6.42	9.87	44.00	77.00	57.00	47.00	62.00
1422217	0	0.00	0.00	0.00	0.00	0.00	0.00	9.88	57.92	4.38	0.28	0.00	1.00	8.00	9.00	0.00
2787218	0	8.47	1.09	1.45	0.00	0.21	3.92	2.15	14.98	10.27	4.10	62.00	24.00	24.00	24.00	22.00
8111219	0	0.00	54.60	190.60	0.00	0.22	145.97	255.20	119.30	137.15	75.53	8.00	44.00	8.00	57.00	21.00
8503220	0	737.72	1279.79	1688.87	844.35	808.12	10.02	5.68	6.17	10.28	13.40	71.00	34.00	32.00	32.00	22.00
9980221	0	0.00	0.00	0.00	0.00	0.00	12.13	46.45	35.43	88.53	56.63	11.00	11.00	10.00	15.00	8.00
3373222	0	523.51	501.49	755.34	996.50	1006.70	19.43	11.35	25.57	49.03	30.55	122.00	69.00	121.00	86.00	46.00
6533223	0	6.60	0.00	0.00	0.00	40.32	6.32	14.12	18.28	13.88	10.50	380.00	230.00	301.00	301.00	138.00
7403224	0	48.50	8.04	0.00	0.00	0.00	0.78	30.52	3.90	5.27	1.40	4.00	12.00	17.00	8.00	6.00
9335225	0	86.20	131.66	137.45	91.52	96.07	13.57	14.28	60.52	30.43	16.33	258.00	459.00	369.00	340.00	176.00
0791226	0	530.65	139.60	344.46	162.66	210.32	14.73	26.98	25.52	18.33	7.98	41.00	92.00	80.00	69.00	46.00
3465227	0	81.28	47.38	59.95	111.10	103.80	51.38	51.17	76.57	64.02	73.77	262.00	247.00	208.00	197.00	208.00
8151228	0	0.00	0.00	0.00	0.00	25.00	26.65	18.33	19.60	16.57	2.10	89.00	22.00	34.00	46.00	14.00
3723229	0	0.00	66.12	44.00	75.13	8.21	38.90	36.20	23.37	111.67	24.92	34.00	30.00	30.00	74.00	16.00
7554230	0	0.00	0.00	358.55	177.08	224.84	0.00	0.00	29.22	31.97	104.13	0.00	0.00	2.00	1.00	2.00
2698231	0	36.46	40.89	78.29	22.91	1.83	23.98	26.10	29.33	42.92	23.18	14.00	13.00	94.00	7.00	7.00
2710232	0	218.15	0.00	0.00	0.00	0.00	109.32	15.42	34.42	3.55	0.10	13.00	7.00	2.00	0.00	0.00
5989233	0	592.20	586.14	603.82	344.17	561.07	6.37	21.05	33.68	9.15	11.87	8.00	4.00	5.00	3.00	4.00
1066234	0	76.05	0.00	160.26	117.83	29.66	11.70	5.12	21.85	3.07	2.93	63.00	80.00	45.00	28.00	28.00
5157235	0	59.95	87.50	147.80	154.82	126.24	17.15	11.23	8.78	22.53	47.08	611.00	810.00	1055.00	812.00	685.00
2249236	0	101.52	0.00	56.88	25.26	0.00	7.08	1.00	34.67	3.92	0.03	26.00	8.00	10.00	11.00	13.00
8694237	0	405.95	690.21	408.96	560.29	376.06	0.85	3.57	4.63	5.53	3.20	347.00	127.00	164.00	98.00	152.00
4506238	0	14.37	1004.94	849.68	1147.47	0.00	9.42	14.92	12.52	68.97	54.18	691.00	1045.00	1445.00	1636.00	1312.00
3611239	0	0.00	0.00	0.00	0.00	0.00	0.00	1.97	0.00	4.62	1.13	0.00	7.00	0.00	6.00	6.00
6490240	0	0.13	1.69	0.00	0.00	0.00	16.50	13.33	13.13	1.08	2.53	9.00	3.00	1.00	0.00	0.00
2346241	0	139.01	104.67	0.00	0.00	203.92	7.78	1.57	0.07	0.03	6.25	37.00	37.00	0.00	0.00	28.00
3942242	0	0.00	0.00	0.00	4.89	20.11	62.63	12.58	2.27	7.27	32.37	101.00	84.00	58.00	131.00	121.00
4692243	0	6.13	0.00	0.00	0.00	0.00	172.43	34.08	47.07	37.22	92.50	47.00	30.00	36.00	46.00	52.00
8224244	0	153.10	27.96	19.37	58.15	0.00	29.45	39.97	15.82	23.08	39.92	144.00	28.00	46.00	58.00	37.00
0425245	0	93.76	52.07	50.21	210.57	52.43	64.42	9.37	42.63	34.07	12.45	48.00	35.00	89.00	63.00	26.00
1666246	0	31.17	39.13	21.53	34.81	14.79	57.57	32.42	52.05	39.93	38.70	18.00	23.00	44.00	30.00	37.00

1942247	0	553.30	655.68	579.62	534.54	390.08	49.88	15.30	65.93	23.57	55.38	347.00	161.00	252.00	128.00	225.00
2420248	0	0.00	0.00	237.45	38.23	29.25	0.00	88.52	97.62	118.90	103.70	0.00	9.00	26.00	22.00	9.00
3131249	0	304.28	363.74	462.88	276.75	125.88	134.98	232.57	186.85	142.08	131.50	92.00	120.00	101.00	58.00	52.00
8397250	0	17.66	167.62	44.35	39.69	19.87	12.48	36.77	4.25	19.33	15.68	65.00	76.00	45.00	134.00	108.00
9809251	0	374.31	307.82	272.19	65.90	0.29	115.97	122.88	234.10	69.73	140.57	665.00	975.00	918.00	666.00	593.00
3356252	0	0.00	0.00	0.00	0.00	0.00	65.00	14.92	45.00	142.80	95.90	112.00	26.00	66.00	69.00	94.00
5313253	0	0.00	158.16	120.38	269.08	165.13	7.87	3.22	4.37	10.43	1.30	170.00	162.00	180.00	381.00	432.00
0271254	0	0.01	0.01	6.77	0.00	0.00	5.70	22.87	4.67	0.65	8.83	44.00	169.00	87.00	91.00	86.00
0616255	0	0.00	1.15	0.00	0.00	70.32	55.23	12.32	7.87	3.63	0.53	36.00	15.00	27.00	13.00	11.00
0686256	0	0.24	0.24	0.00	0.00	0.00	57.52	25.58	15.05	13.18	9.75	88.00	35.00	38.00	31.00	37.00
3058257	0	42.79	32.30	25.18	37.11	41.49	14.52	8.03	10.12	12.93	2.57	42.00	19.00	40.00	55.00	65.00
4736258	0	38.48	0.00	40.68	95.58	112.98	19.73	6.40	13.42	14.95	7.68	109.00	129.00	169.00	81.00	63.00
6223259	0	0.00	0.00	109.45	97.78	5.75	15.62	7.35	8.55	15.18	7.28	98.00	90.00	95.00	70.00	32.00
9929260	0	2633.63	2004.73	2145.35	5702.79	1238.36	11.07	18.00	2.67	9.37	12.73	269.00	473.00	259.00	376.00	257.00
0528261	0	0.00	29.44	139.31	114.58	387.97	125.33	51.93	63.55	19.03	36.17	52.00	48.00	58.00	60.00	48.00
7712262	0	43.31	195.20	463.75	0.41	0.41	1.45	5.53	1.80	0.00	0.53	279.00	93.00	121.00	68.00	59.00
6529263	0	0.00	0.00	0.00	0.00	0.00	14.73	13.83	22.08	6.23	4.20	96.00	54.00	67.00	40.00	36.00
7448264	0	0.00	0.00	0.00	0.00	0.00	25.17	92.65	31.00	28.67	63.18	28.00	34.00	25.00	36.00	20.00
4754265	0	33.85	0.00	41.10	69.68	87.80	31.55	11.65	36.00	43.40	46.95	10.00	5.00	29.00	25.00	17.00
5150266	0	0.00	105.99	66.10	233.56	183.30	6.08	25.75	27.68	9.95	7.27	112.00	84.00	71.00	141.00	76.00
7024267	0	71.72	785.39	92.32	271.87	160.08	0.00	22.02	14.73	29.27	24.60	2.00	27.00	23.00	19.00	20.00
7859268	0	55.16	195.33	62.09	0.00	35.44	10.60	0.32	10.22	1.60	1.13	612.00	2514.00	1673.00	2104.00	2049.00
9818269	0	0.00	0.00	0.00	0.00	0.00	25.62	0.25	21.07	18.33	2.48	95.00	22.00	113.00	92.00	18.00
8117270	0	447.76	611.02	477.38	473.73	450.42	8.57	7.15	7.20	9.37	6.52	428.00	271.00	303.00	113.00	122.00
3706271	0	3.85	0.59	0.21	2.51	0.00	15.07	19.52	22.52	10.15	17.28	4.00	56.00	35.00	10.00	58.00
5638272	0	96.68	69.59	108.21	100.86	263.11	24.67	78.97	116.78	161.33	100.28	179.00	46.00	94.00	58.00	37.00
7855273	0	115.47	342.16	106.64	123.44	0.00	234.00	67.18	137.47	149.52	46.97	351.00	202.00	266.00	265.00	45.00
8906274	0	2.35	1.04	49.05	60.50	147.41	7.72	97.67	158.42	96.32	120.23	17.00	102.00	165.00	235.00	140.00
0232275	0	400.72	298.32	9.60	36.42	5.89	4.32	5.03	2.93	12.62	0.00	60.00	5.00	28.00	111.00	6.00
5675276	0	0.00	0.00	0.00	0.00	0.00	1.80	3.77	3.77	5.55	1.93	11.00	40.00	56.00	34.00	12.00
0631277	0	65.34	0.00	0.00	15.97	0.00	3.80	4.08	6.52	6.53	1.03	5.00	4.00	2.00	4.00	2.00
0867278	0	253.18	754.32	486.36	482.32	484.80	115.30	167.95	111.18	167.53	209.80	139.00	126.00	184.00	251.00	110.00
3555279	0	0.00	1.62	1.60	0.00	12.00	5.37	9.65	14.50	0.00	0.00	3.00	126.00	165.00	46.00	37.00
8478280	0	0.00	34.16	346.62	181.78	218.02	4.55	28.33	69.55	30.20	88.53	1.00	35.00	28.00	23.00	13.00
4202281	0	29.17	0.00	0.00	841.88	337.18	18.87	31.62	100.55	25.43	41.42	100.00	111.00	140.00	142.00	137.00
5853282	0	0.00	13.98	0.73	0.00	0.00	0.00	5.83	8.88	8.52	2.38	15.00	7.00	14.00	6.00	1.00
6423283	0	0.01	0.00	0.00	0.00	0.00	307.33	0.02	0.00	0.03	0.03	2.00	0.00	0.00	0.00	0.00
1689284	0	55.97	74.93	138.32	389.71	132.41	43.52	71.93	152.28	233.87	152.37	69.00	107.00	70.00	77.00	96.00
3678285	0	39.06	148.28	182.52	101.13	122.00	5.72	19.55	6.70	7.12	163.83	12.00	35.00	79.00	38.00	5.00
4441286	0	51.53	120.85	54.23	69.95	12.56	11.30	3.43	8.75	2.05	8.07	463.00	923.00	469.00	522.00	243.00
0661287	0	3126.54	3595.35	538.49	2919.52	2313.13	40.08	42.53	19.68	8.58	17.22	224.00	152.00	88.00	85.00	117.00
1399288	0	108.51	553.94	1264.23	3018.25	714.13	76.72	58.50	39.35	28.20	4.75	371.00	85.00	160.00	232.00	41.00
5208289	0	0.00	0.00	0.00	0.00	0.00	1.42	1.03	13.32	3.52	4.30	14.00	22.00	70.00	31.00	10.00
5929290	0	130.31	60.40	179.30	74.96	144.11	158.47	179.63	106.05	99.60	87.40	88.00	99.00	102.00	70.00	214.00
6390291	0	6.55	777.04	1014.74	1427.19	1080.69	573.28	563.20	927.52	694.22	531.07	76.00	146.00	201.00	187.00	116.00
9262292	0	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.07	0.02	0.00	19.00	0.00	0.00	0.00
0627293	0	136.63	15.88	1.59	24.48	16.72	13.72	45.55	15.98	24.12	42.92	43.00	58.00	85.00	39.00	46.00
7017294	0	0.00	0.00	0.00	0.00	0.00	1.35	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9690295	0	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.03	48.05	0.00	0.00	0.00	0.00	14.00
5184296	0	500.76	88.15	175.82	53.96	161.66	232.80	44.70	89.78	46.12	114.07	35.00	24.00	36.00	22.00	42.00

0879297	0	0.00	512.02	0.00	2.32	0.00	0.00	61.20	6.75	8.10	24.93	0.00	23.00	9.00	15.00	34.00
5533298	0	122.67	0.00	0.00	0.00	1.63	42.17	0.00	0.00	0.00	5.60	17.00	0.00	0.00	0.00	6.00
8030299	0	470.08	0.00	0.00	0.00	0.00	0.67	0.88	0.08	0.03	0.07	41.00	0.00	0.00	0.00	0.00
0436300	0	0.00	0.00	0.00	0.00	1563.89	0.88	205.08	7.10	3.73	265.95	0.00	19.00	0.00	0.00	94.00
0757301	0	115.10	139.10	566.91	389.24	359.08	40.77	35.10	111.65	54.43	99.65	47.00	50.00	42.00	21.00	15.00
1342302	0	0.00	0.00	0.00	0.00	0.00	63.38	0.00	0.00	48.62	132.70	8.00	0.00	0.00	1.00	7.00
1956303	0	0.00	0.00	0.00	92.82	55.55	25.38	102.77	64.73	80.12	65.28	34.00	234.00	140.00	184.00	242.00
3677304	0	0.75	0.00	0.00	0.00	208.73	43.35	5.60	29.67	5.32	17.03	39.00	20.00	89.00	62.00	36.00
4297305	0	3445.66	4022.57	4294.27	4167.38	3666.10	4.02	25.35	3.90	2.08	0.83	177.00	215.00	302.00	221.00	147.00
8366306	0	0.00	1.53	0.00	0.00	0.00	78.18	30.90	31.52	0.42	0.08	247.00	189.00	16.00	1.00	0.00
0346307	0	0.00	0.00	0.00	0.00	0.26	32.17	23.27	19.82	8.68	10.63	17.00	5.00	5.00	8.00	2.00
0348308	0	0.00	0.00	172.02	538.56	244.67	1.88	0.02	252.33	40.25	0.02	1.00	0.00	6.00	8.00	8.00
7303309	0	0.20	0.00	0.00	0.00	0.00	593.95	141.52	1.65	1.53	0.57	174.00	17.00	0.00	0.00	0.00
7344310	0	57.34	140.68	30.05	0.00	200.87	1.15	1.20	4.40	0.00	15.20	8.00	0.00	11.00	0.00	14.00
7447311	0	0.00	0.00	0.00	0.00	0.00	0.53	1.22	3.32	3.50	1.98	33.00	25.00	29.00	22.00	24.00
7573312	0	165.50	14.28	0.00	6.03	8.48	53.03	40.62	31.60	52.12	16.58	22.00	3.00	7.00	2.00	0.00
7584313	0	0.00	205.54	0.00	0.00	7.68	9.08	44.25	18.97	22.05	0.00	3.00	3.00	5.00	0.00	0.00
7683314	0	277.93	153.30	97.03	31.44	370.58	88.42	23.67	36.75	8.45	23.15	190.00	46.00	53.00	30.00	27.00
7751315	0	208.89	1895.27	46.22	0.00	1981.06	22.10	50.05	5.70	0.00	43.43	78.00	106.00	106.00	25.00	257.00
8433316	0	0.00	0.00	0.00	0.00	0.00	0.78	0.02	0.00	0.02	0.00	1.00	0.00	0.00	0.00	0.00
8477317	0	0.00	0.00	796.96	1795.71	919.10	0.00	0.23	97.33	266.28	83.68	75.00	87.00	176.00	62.00	111.00
1178318	0	0.00	0.00	0.00	0.01	0.00	2.02	0.02	0.83	0.83	0.55	38.00	32.00	40.00	32.00	17.00
4737319	0	0.00	1989.45	778.97	2094.29	1027.44	2.70	46.65	50.40	24.55	42.43	84.00	49.00	13.00	15.00	10.00
4835320	0	0.00	261.56	405.36	0.00	226.65	0.00	105.57	53.60	23.82	36.88	0.00	56.00	46.00	37.00	56.00
6005321	0	0.18	0.00	0.00	0.00	0.00	54.42	0.00	0.00	0.05	0.00	50.00	0.00	0.00	0.00	0.00
9878322	0	807.03	214.07	30.89	147.74	338.21	40.55	141.42	14.97	55.32	96.80	1.00	5.00	2.00	7.00	13.00
9976323	0	0.00	0.00	0.00	0.00	0.00	6.33	1.22	1.45	0.30	1.87	110.00	28.00	49.00	17.00	78.00
0197324	0	0.86	269.81	257.03	12.40	113.00	11.60	17.03	9.57	2.13	0.72	26.00	137.00	110.00	10.00	33.00
0203325	0	200.92	372.23	432.49	320.89	0.00	36.23	15.25	9.15	7.40	18.47	76.00	67.00	65.00	72.00	56.00
0219326	0	81.34	131.66	138.38	171.76	332.63	27.13	27.82	45.42	16.00	43.87	17.00	25.00	45.00	18.00	36.00
0347327	0	5.74	0.00	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
0427328	0	508.91	193.09	0.00	0.00	0.00	14.97	2.28	2.55	2.48	0.13	26.00	18.00	0.00	0.00	1.00
0467329	0	0.00	21.95	27.79	0.00	40.25	83.87	54.30	47.23	45.58	54.30	40.00	2.00	10.00	35.00	5.00
0481330	0	0.00	0.00	51.19	101.15	0.00	0.18	2.60	3.68	1.03	6.62	53.00	45.00	82.00	40.00	81.00
1886331	0	377.04	283.14	247.14	435.23	492.02	51.75	52.08	89.85	128.13	89.18	502.00	649.00	446.00	721.00	607.00
3525332	0	0.00	0.00	0.00	0.00	0.00	12.22	16.18	28.15	18.18	40.85	12.00	61.00	16.00	24.00	39.00
1631333	0	639.76	642.89	185.32	394.83	814.33	72.43	110.97	28.43	134.07	179.88	92.00	39.00	31.00	16.00	20.00
2586334	0	0.00	339.62	209.69	325.18	544.44	39.07	107.45	8.98	92.62	71.63	9.00	63.00	25.00	24.00	30.00
5648335	0	0.00	0.00	0.00	0.00	0.00	145.22	23.35	11.72	27.73	2.22	25.00	1.00	0.00	7.00	5.00
6808336	0	270.52	79.81	81.37	31.13	28.45	145.43	618.17	630.70	261.35	180.22	15.00	7.00	23.00	6.00	8.00
7646337	0	0.00	76.13	247.01	190.59	197.75	37.87	21.78	92.62	81.35	46.62	87.00	115.00	155.00	69.00	82.00
8642338	0	25.75	0.00	0.00	0.00	0.00	17.42	0.00	0.00	0.00	0.00	4.00	29.00	0.00	0.00	0.00
9438339	0	0.00	0.00	53.29	23.92	251.23	77.15	485.70	268.63	538.43	303.58	56.00	164.00	131.00	120.00	123.00
2524340	0	0.00	0.00	0.00	0.00	0.00	0.00	7.52	5.60	4.33	0.08	0.00	23.00	36.00	18.00	0.00
8667341	0	182.08	148.04	114.13	24.50	159.20	74.98	33.80	2.62	39.92	175.17	29.00	108.00	30.00	13.00	41.00
8827342	0	103.61	47.69	26.41	5.93	101.06	25.22	10.98	7.43	6.12	11.27	73.00	70.00	6.00	26.00	28.00
8830343	0	0.00	0.00	0.00	0.00	0.00	30.40	20.63	48.53	10.53	11.90	47.00	47.00	87.00	22.00	27.00
8833344	0	0.00	0.00	0.25	0.00	0.01	5.72	6.62	1.32	1.35	1.38	83.00	82.00	130.00	118.00	83.00
8839345	0	0.00	0.00	0.00	0.00	0.00	47.85	0.85	0.27	0.02	0.05	49.00	0.00	0.00	0.00	0.00
8949346	0	10.90	10.46	44.45	0.00	0.00	78.13	87.10	100.82	20.07	4.58	664.00	25.00	75.00	23.00	19.00

9011347	0	0.00	57.06	179.00	392.60	1607.25	3.08	17.32	11.88	4.18	13.37	29.00	9.00	9.00	4.00	17.00
9057348	0	0.00	0.00	0.00	521.71	157.19	0.00	13.12	2.35	12.63	6.68	0.00	30.00	15.00	10.00	12.00
9103349	0	272.10	217.49	623.50	288.49	204.40	6.82	0.13	76.68	9.60	91.52	20.00	1.00	87.00	27.00	42.00
9454350	0	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.05	0.60	0.00	0.00	0.00	0.00	0.00	0.00
9514351	0	689.20	752.81	0.00	50.77	939.07	24.75	68.23	0.05	40.68	41.20	75.00	158.00	0.00	67.00	74.00
9676352	0	0.00	37.02	0.00	0.00	0.00	52.55	100.20	0.12	0.18	0.03	3.00	19.00	0.00	0.00	0.00
9693353	0	0.00	46.37	0.00	0.00	473.57	0.00	1.90	0.00	0.00	43.13	6.00	2.00	0.00	0.00	10.00
9807354	0	0.00	2736.41	1642.66	550.98	776.60	0.00	0.00	0.53	0.22	0.33	0.00	13.00	29.00	18.00	5.00
9700355	0	0.00	181.15	872.72	453.50	1003.93	178.77	131.10	323.15	434.32	660.70	60.00	92.00	183.00	253.00	140.00
2939356	0	0.00	0.00	0.00	1510.52	704.71	159.27	190.37	106.42	111.12	97.18	85.00	65.00	61.00	166.00	130.00
0029357	0	0.00	0.00	0.00	0.00	0.00	30.35	10.53	35.27	10.23	7.92	7.00	7.00	14.00	57.00	8.00
0882358	0	50.46	69.20	197.70	477.82	156.13	1.42	22.32	13.40	46.82	9.02	221.00	86.00	214.00	199.00	90.00
2181359	0	127.26	0.00	0.00	234.02	0.00	54.50	0.15	0.00	36.80	0.10	49.00	0.00	0.00	55.00	0.00
2183360	0	353.69	245.01	221.27	216.03	270.07	16.85	29.97	68.88	26.98	36.08	91.00	24.00	34.00	41.00	15.00
2206361	0	200.27	316.76	221.33	327.71	15.95	29.82	107.93	31.62	9.93	3.62	59.00	160.00	97.00	95.00	37.00
2919362	0	890.05	443.17	656.14	908.72	1626.39	5.62	2.83	5.83	14.20	63.28	47.00	52.00	26.00	50.00	19.00
4173363	0	0.00	1235.50	1682.68	850.27	1274.05	0.00	22.02	9.15	0.47	10.57	0.00	92.00	85.00	4.00	25.00
5872364	0	0.00	741.47	436.98	0.00	0.00	0.00	190.78	99.17	0.00	0.00	0.00	364.00	165.00	0.00	0.00
9448365	0	49.19	557.97	474.52	13.00	36.05	20.35	14.95	11.43	6.10	15.28	120.00	51.00	187.00	345.00	305.00
9784366	0	607.69	594.37	630.20	519.43	511.11	15.05	62.70	97.57	7.85	9.12	151.00	105.00	112.00	45.00	66.00
4015367	0	0.00	0.00	0.00	0.00	451.17	0.00	360.78	185.32	205.00	295.28	0.00	25.00	21.00	25.00	13.00
7041368	0	0.00	123.27	50.00	0.00	414.39	7.85	49.35	20.87	12.90	17.73	2.00	10.00	7.00	0.00	7.00
8127369	0	0.00	307.89	706.15	0.00	0.00	0.00	3.05	0.00	0.00	0.07	0.00	18.00	18.00	0.00	0.00
8141370	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.53	0.00	0.00	0.00	0.00	0.00
8201371	0	0.00	437.05	266.80	292.42	238.92	0.00	12.32	10.57	20.15	19.78	0.00	56.00	64.00	39.00	67.00
0154372	0	1.86	0.00	0.00	0.00	0.00	0.12	5.05	1.27	9.13	3.18	26.00	46.00	25.00	88.00	73.00
3313373	0	198.31	200.37	106.72	61.09	1197.13	68.97	44.67	50.45	94.98	124.12	142.00	47.00	44.00	124.00	25.00
7298374	0	0.00	0.00	0.00	0.00	140.06	69.00	46.75	70.20	62.73	75.50	47.00	34.00	105.00	80.00	68.00
8361375	0	106.55	144.80	146.42	344.08	208.50	31.67	26.23	37.40	16.32	23.93	96.00	68.00	94.00	78.00	79.00
9448376	0	158.47	197.12	256.92	149.03	53.83	43.03	37.28	90.57	33.23	7.95	29.00	11.00	34.00	18.00	11.00
1079377	0	0.00	50.00	393.49	1295.24	181.42	0.00	108.50	279.35	280.93	99.18	0.00	18.00	39.00	52.00	11.00
4869378	0	0.00	23.22	0.00	0.00	34.71	50.05	41.40	22.00	55.18	75.47	26.00	66.00	55.00	90.00	52.00
8258379	0	0.00	3228.74	0.00	2780.48	1846.04	0.00	11.83	0.00	21.38	5.75	0.00	26.00	0.00	34.00	34.00
9749380	0	0.01	0.00	0.00	0.00	0.00	24.55	3.58	7.65	8.82	5.22	42.00	5.00	20.00	32.00	18.00
0450381	0	342.87	351.46	279.29	242.99	317.71	15.83	7.10	17.65	9.35	26.42	184.00	183.00	308.00	204.00	102.00
1814382	0	1758.80	2131.61	1573.59	1961.39	2561.03	188.13	542.07	297.00	600.48	247.22	152.00	162.00	91.00	98.00	151.00
2585383	0	151.42	191.16	682.09	446.47	656.02	26.67	30.67	39.05	27.13	40.27	215.00	175.00	239.00	253.00	225.00
4020384	0	51.62	198.02	253.01	109.58	98.51	62.37	19.95	29.53	22.55	3.30	45.00	26.00	53.00	36.00	16.00
7257385	0	509.06	471.00	582.98	814.70	581.21	2.00	7.65	5.17	8.83	7.48	120.00	285.00	268.00	458.00	555.00
2904386	0	201.36	379.46	268.84	533.88	205.93	34.90	102.15	98.57	79.95	56.08	220.00	110.00	90.00	59.00	76.00
9475387	0	44.51	115.15	207.50	158.25	99.33	50.55	19.52	43.63	21.42	16.17	77.00	99.00	113.00	123.00	109.00
2576388	0	23.99	96.83	88.59	14.51	100.17	13.67	43.72	22.83	38.98	88.72	80.00	36.00	58.00	81.00	106.00
7009389	0	86.20	88.65	393.36	363.61	306.45	13.52	24.48	18.27	8.72	25.68	148.00	78.00	152.00	122.00	130.00
4182390	0	0.00	0.00	35.82	122.95	164.07	7.88	19.47	19.45	12.88	14.42	34.00	9.00	57.00	25.00	53.00
4569391	0	0.00	0.00	0.00	0.00	0.00	25.27	18.38	7.80	5.95	11.45	25.00	18.00	17.00	5.00	6.00
0705392	0	207.38	106.21	901.15	494.15	257.20	7.88	5.58	11.17	2.03	1.72	62.00	40.00	71.00	31.00	12.00
6594393	0	1609.17	0.00	0.00	0.00	0.00	62.80	12.30	9.65	11.13	11.98	5.00	0.00	6.00	2.00	0.00
8661394	0	0.00	0.00	0.00	0.00	0.00	24.93	15.40	11.98	15.08	22.03	26.00	22.00	43.00	31.00	18.00
8719395	0	139.77	169.21	84.48	151.40	257.60	5.87	17.12	15.62	4.75	13.98	468.00	454.00	475.00	362.00	426.00
2122396	0	400.00	77.74	59.17	87.82	10.02	190.18	114.50	87.58	151.25	15.50	87.00	4.00	8.00	56.00	2.00

3340397	0	0.00	0.00	0.98	0.00	0.00	457.52	613.92	488.60	370.92	523.30	209.00	302.00	415.00	281.00	292.00
3342398	0	5.46	0.00	0.00	0.92	3.04	17.62	0.13	1.12	26.28	26.57	4.00	0.00	0.00	0.00	0.00
4598399	0	103.16	619.97	0.00	84.28	376.06	67.50	77.55	64.50	105.42	56.27	12.00	4.00	11.00	14.00	4.00
0999400	0	66.98	269.38	0.00	85.32	112.35	0.00	38.08	12.75	105.48	57.65	2.00	15.00	2.00	33.00	14.00
9579401	0	0.00	0.00	0.00	0.00	0.00	0.00	5.20	5.12	0.10	2.13	0.00	0.00	0.00	1.00	0.00
1104402	0	0.48	0.00	0.00	0.00	0.00	60.77	21.75	24.23	8.77	21.73	24.00	72.00	67.00	246.00	131.00
0879403	0	0.00	0.00	320.07	0.00	0.00	0.03	23.43	53.07	0.45	13.85	0.00	13.00	19.00	0.00	4.00
1028404	0	0.00	0.05	0.06	0.09	0.00	16.42	27.08	17.97	6.85	24.75	2.00	30.00	31.00	36.00	45.00
3908405	2	6.86	0.00	10.62	0.00	0.00	19.90	4.43	1.42	6.88	10.22	44.00	8.00	49.00	6.00	34.00
1151406	2	310.09	0.00	0.22	0.00	0.00	0.00	0.62	2.70	1.45	3.58	38.00	47.00	73.00	55.00	33.00
2474407	2	0.00	0.00	0.00	0.00	0.00	0.42	2.93	7.63	5.03	1.68	87.00	126.00	148.00	118.00	125.00
4633408	2	1.62	0.00	0.00	0.00	0.00	83.33	35.98	45.48	42.88	40.62	196.00	83.00	102.00	133.00	60.00
0294409	2	0.00	0.00	0.00	0.00	0.00	1.30	0.72	2.05	0.82	3.33	116.00	79.00	205.00	98.00	115.00
5105410	2	0.00	0.00	0.00	0.00	0.00	41.20	0.00	0.15	0.13	0.50	2.00	0.00	0.00	0.00	0.00
3271411	2	13.02	0.00	0.00	23.00	167.00	64.22	61.17	73.43	81.22	52.95	59.00	16.00	45.00	100.00	100.00
3071412	2	3.64	6.00	2.49	0.00	0.00	6.65	7.25	20.33	7.95	5.68	17.00	18.00	10.00	29.00	5.00
2521413	2	253.50	68.00	138.49	134.00	57.00	88.87	70.47	77.08	51.57	49.00	693.00	613.00	442.00	412.00	450.00
9555414	2	0.00	0.00	81.66	13.00	50.00	3.00	14.73	15.12	4.13	14.83	6.00	198.00	188.00	109.00	131.00
4534415	2	0.00	0.00	0.00	0.00	0.00	21.92	7.03	7.32	5.48	4.40	156.00	115.00	186.00	108.00	60.00
7920416	2	22.50	71.00	32.55	83.00	123.00	16.37	48.47	19.78	19.75	33.70	62.00	87.00	61.00	66.00	74.00
5587417	2	0.00	0.00	0.02	0.00	0.00	0.55	0.00	0.63	1.97	0.17	0.00	0.00	0.00	0.00	0.00
0432418	2	0.00	1683.00	1175.62	2558.00	2495.00	93.18	207.92	537.88	421.78	144.13	104.00	219.00	572.00	578.00	423.00
4478419	2	0.00	0.00	0.09	0.00	0.00	19.07	35.10	61.73	9.30	0.37	18.00	10.00	11.00	12.00	7.00
3022420	2	0.00	0.00	0.00	0.00	0.00	8.42	1.42	3.93	2.53	2.50	20.00	9.00	24.00	8.00	27.00
0246421	2	375.96	0.00	0.00	0.00	0.00	6.63	1.78	7.12	5.85	13.13	2.00	0.00	2.00	1.00	2.00
9091422	2	0.14	0.00	0.00	0.00	0.00	5.80	16.88	43.97	12.85	0.33	612.00	1105.00	813.00	221.00	0.00
3190423	2	0.00	0.00	0.00	0.00	0.00	230.68	204.75	185.57	206.68	208.52	94.00	271.00	246.00	241.00	194.00
7529424	2	3.46	0.00	0.00	0.00	0.00	2.68	0.07	0.50	0.07	2.40	101.00	49.00	35.00	27.00	25.00
5864425	2	1004.40	21.00	0.17	663.00	410.00	55.72	48.82	1.80	99.57	68.97	12.00	31.00	0.00	12.00	18.00
0298426	2	0.00	0.00	0.01	0.00	1.00	4.78	2.40	12.58	4.23	4.02	16.00	19.00	42.00	9.00	39.00
2112427	2	0.00	0.00	0.00	0.00	0.00	5.47	0.05	0.27	0.00	0.00	41.00	5.00	11.00	0.00	0.00
2383428	2	26.37	3.00	1.77	23.00	16.00	14.03	2.70	3.85	5.77	2.00	137.00	87.00	210.00	267.00	134.00
4081429	2	76.00	73.00	12.66	13.00	19.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
1105430	2	59.34	0.00	0.02	5.00	0.00	3.67	0.07	0.77	1.60	5.57	56.00	1.00	76.00	471.00	753.00
6600431	2	0.00	0.00	0.00	0.00	0.00	12.28	0.20	0.03	0.55	0.27	0.00	0.00	0.00	0.00	0.00
2000432	2	0.00	6.00	0.00	0.00	0.00	0.00	14.13	11.50	46.12	26.22	0.00	4.00	4.00	3.00	7.00
2001433	2	0.00	0.00	0.00	0.00	0.00	5.73	1.07	6.10	0.27	0.25	8.00	0.00	3.00	0.00	0.00
4265434	2	0.00	0.00	0.00	0.00	0.00	0.53	1.17	5.52	1.37	0.52	2.00	0.00	14.00	4.00	6.00
0822435	2	0.00	0.00	0.00	0.00	0.00	30.55	16.92	7.73	0.00	8.58	0.00	1.00	2.00	1.00	1.00
4139436	2	655.07	250.00	220.59	172.00	79.00	6.45	3.25	6.50	8.28	4.25	28.00	5.00	10.00	11.00	3.00
7039437	2	85.65	0.00	0.00	0.00	0.00	0.97	0.00	5.02	3.27	0.00	11.00	0.00	13.00	4.00	2.00
4310438	2	0.00	0.00	3.25	0.00	0.00	24.27	21.38	25.40	31.27	79.97	1.00	0.00	0.00	0.00	5.00
4606439	2	0.00	0.00	0.00	0.00	0.00	0.42	2.32	2.77	4.07	3.03	0.00	5.00	5.00	14.00	26.00
5835440	2	0.00	0.00	4.48	0.00	0.00	0.80	5.55	0.50	2.65	0.40	9.00	40.00	26.00	34.00	24.00
6402441	2	0.00	52.00	8.52	83.00	141.00	27.53	28.55	13.62	9.62	31.73	5.00	0.00	3.00	4.00	8.00
4151442	2	0.00	0.00	0.00	0.00	3.00	20.78	20.58	21.58	47.60	7.70	58.00	87.00	100.00	112.00	94.00
4862443	2	90.77	57.00	55.46	18.00	43.00	22.40	12.85	18.55	7.10	8.13	503.00	348.00	310.00	376.00	341.00
7783444	2	0.00	0.00	0.00	0.00	0.00	1.20	3.58	6.58	1.73	4.58	0.00	26.00	24.00	16.00	22.00
8348445	2	93.38	0.00	0.00	0.00	0.00	31.78	10.67	9.55	2.62	5.42	16.00	29.00	7.00	5.00	2.00
4605446	2	0.00	0.00	0.00	0.00	0.00	8.03	11.38	61.20	1.40	0.40	8.00	1.00	139.00	0.00	0.00

7675447	2	3.08	0.00	0.00	0.00	0.00	61.73	16.97	254.12	32.33	24.43	131.00	55.00	112.00	208.00	126.00
5455448	2	3.56	0.00	0.00	0.00	0.00	37.43	43.33	29.42	21.90	18.68	6.00	0.00	0.00	0.00	0.00
2001449	2	0.00	0.00	0.00	0.00	0.00	0.00	0.43	1.40	1.78	0.05	0.00	0.00	2.00	5.00	7.00
1670450	2	8.62	0.00	0.00	0.00	0.00	16.20	12.30	4.83	3.98	10.92	288.00	361.00	243.00	190.00	272.00
2001451	2	0.00	0.00	4.75	0.00	0.00	19.92	4.87	10.22	4.32	5.45	10.00	7.00	24.00	13.00	8.00
2981452	2	0.00	1.00	0.35	0.00	0.00	1.47	2.20	5.42	2.63	0.00	3.00	1.00	1.00	1.00	0.00
7213453	2	159.38	3.00	0.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	6.00	0.00	1.00	0.00
0874454	2	0.48	1.00	0.87	3.00	1.00	0.00	0.00	0.00	2.35	0.00	0.00	0.00	0.00	1.00	1.00
6313455	2	358.29	28.00	55.63	151.00	309.00	80.45	80.15	32.67	120.63	588.13	153.00	395.00	637.00	241.00	215.00
5686456	2	0.00	0.00	0.00	0.00	10.00	0.97	0.77	0.62	6.63	0.27	101.00	83.00	87.00	38.00	81.00
9711457	2	0.00	0.00	0.00	0.00	0.00	0.47	0.38	0.03	0.00	0.00	0.00	0.00	1.00	0.00	0.00
2125458	2	17.08	1.00	0.00	0.00	1.00	13.92	1.85	0.23	63.23	9.12	118.00	56.00	141.00	99.00	95.00
3560459	2	159.63	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5084460	2	6.88	7.00	0.43	0.00	0.00	0.00	0.00	1.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5229461	2	0.00	237.00	0.00	370.00	0.00	51.02	30.30	0.03	503.02	263.58	3.00	3.00	0.00	8.00	3.00
0752462	2	8.82	0.00	0.00	0.00	0.00	9.47	0.62	0.73	2.55	1.33	2.00	22.00	38.00	10.00	6.00
2954463	2	0.00	0.00	0.00	0.00	0.00	0.20	3.12	4.88	0.23	0.13	0.00	0.00	1.00	0.00	0.00
3839464	2	197.39	152.00	125.97	68.00	81.00	286.97	189.85	331.90	128.13	291.33	714.00	629.00	664.00	671.00	572.00
8077465	2	1.82	0.00	0.99	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9476466	2	45.89	62.00	55.77	103.00	43.00	26.43	23.93	22.50	20.85	40.05	209.00	146.00	154.00	189.00	211.00
6527467	2	0.00	0.00	0.00	0.00	3.00	0.18	1.17	0.43	0.53	0.27	15.00	23.00	27.00	62.00	17.00
8893468	2	95.39	53.00	0.00	0.00	0.00	53.72	42.75	1.85	0.00	0.00	46.00	49.00	22.00	0.00	0.00
0893469	2	356.43	0.00	3.27	1.00	2.00	14.87	0.00	2.38	2.68	4.82	6.00	0.00	2.00	15.00	23.00
1869470	2	33.90	0.00	0.00	0.00	0.00	2.48	5.33	15.47	5.07	11.28	16.00	52.00	34.00	29.00	58.00
7339471	2	0.00	0.00	364.63	36.00	0.00	40.62	10.15	138.22	207.73	15.42	69.00	285.00	886.00	1492.00	539.00
7297472	2	0.08	0.00	0.01	0.00	0.00	8.97	2.38	8.38	4.23	3.32	20.00	4.00	101.00	36.00	14.00
5578473	2	204.14	582.00	437.66	160.00	95.00	8.90	2.30	0.53	0.00	7.07	7.00	12.00	4.00	2.00	8.00
2355474	2	1.06	0.00	1.02	3.00	0.00	5.65	2.02	1.77	0.38	0.72	3.00	1.00	0.00	0.00	0.00
8394475	2	14.21	23.00	22.32	83.00	54.00	0.00	52.23	67.78	73.58	47.35	1.00	35.00	44.00	51.00	38.00
4410476	2	0.26	0.00	14.99	10.00	0.00	13.62	28.75	21.65	15.10	18.95	55.00	73.00	49.00	53.00	48.00
4931477	2	5.79	0.00	0.00	0.00	0.00	1.87	1.03	0.00	1.42	0.92	76.00	9.00	38.00	49.00	26.00
6774478	2	0.00	0.00	1.82	2.00	0.00	13.73	0.93	1.60	3.22	1.25	1.00	3.00	1.00	10.00	3.00
6784479	2	829.18	0.00	0.00	0.00	0.00	2.32	0.83	1.47	1.63	1.75	20.00	52.00	38.00	69.00	47.00
7949480	2	407.89	0.00	0.18	0.00	0.00	27.38	0.03	2.52	66.53	35.73	12.00	0.00	0.00	37.00	33.00
8400481	2	394.51	1.00	1.00	0.00	27.00	2.38	0.05	0.03	0.15	4.20	3.00	0.00	0.00	0.00	1.00
1426482	2	1.26	0.00	0.00	0.00	0.00	87.78	0.90	0.00	0.58	20.13	0.00	0.00	0.00	0.00	0.00
2700483	2	11.89	0.00	0.20	0.00	0.00	12.10	0.07	0.00	1.33	1.18	18.00	0.00	0.00	0.00	0.00
3271484	2	18.80	6.00	37.01	49.00	81.00	0.43	1.38	0.42	0.00	1.85	37.00	6.00	15.00	3.00	7.00
3736485	2	4.60	0.00	0.00	0.00	0.00	2.57	2.80	0.67	7.00	0.57	15.00	37.00	25.00	17.00	19.00
3738486	2	33.37	29.00	0.50	0.00	0.00	0.47	0.00	0.18	1.03	0.00	0.00	1.00	0.00	2.00	4.00
5031487	2	122.81	326.00	147.99	21.00	26.00	4.07	13.88	0.00	3.78	1.60	0.00	46.00	1.00	6.00	4.00
6112488	2	819.98	235.00	431.88	402.00	273.00	28.45	44.20	70.27	180.92	90.08	36.00	72.00	117.00	132.00	115.00
2875489	2	32.61	145.00	0.00	0.00	13.00	13.15	192.42	44.22	89.02	111.07	11.00	118.00	132.00	67.00	92.00
4056490	2	0.00	0.00	0.00	0.00	0.00	37.85	31.72	42.33	15.83	10.87	3.00	8.00	8.00	15.00	17.00
5924491	2	62.09	0.00	0.00	0.00	0.00	5.23	12.85	17.07	16.77	24.82	35.00	27.00	40.00	36.00	46.00
0803492	2	0.00	166.00	97.05	131.00	64.00	22.45	49.18	123.08	60.00	38.50	93.00	99.00	281.00	165.00	140.00
5136493	2	15.48	0.00	0.72	0.00	19.00	34.10	4.30	9.00	16.02	11.22	58.00	14.00	16.00	9.00	1.00
5516494	2	212.44	682.00	571.11	1064.00	861.00	13.92	7.85	10.17	9.90	11.12	666.00	428.00	357.00	328.00	384.00
9308495	2	0.00	302.00	214.87	131.00	109.00	55.70	35.03	28.53	25.78	23.07	78.00	64.00	78.00	44.00	33.00
8383496	2	0.12	5.00	9.42	8.00	6.00	18.33	7.47	21.97	44.28	9.20	31.00	10.00	54.00	11.00	22.00

8305497	2	45.36	0.00	0.00	0.00	0.00	34.72	24.12	82.08	18.93	11.73	23.00	29.00	43.00	35.00	25.00
4122498	2	190.47	397.00	625.67	975.00	0.00	4.82	63.72	291.07	547.70	43.13	9.00	3.00	9.00	22.00	0.00
1246499	2	0.00	0.00	1.74	3.00	0.00	2.78	17.60	14.25	3.77	3.77	9.00	3.00	7.00	10.00	7.00

Model Code

1 - Control Group - Non-smartphone

0 - Smartphone Adopter - iPhone 4S

2 - Smartphone Adopter - Smart 2

DATA SOURCE - Facebook Conversation Instances

Record ID	ShareTag	ConvClass	ConvType	ContentType	FriendSize	StartTime	EndTime	DaysLater	NoLikes	NoComments	NoShares	Commentatc	AdditionalLik	UserCommer	Tags	viaMobile	Location	Duration
001	1	2	3	1	1393	12.45	14.13		26	5	0	2	0	2	0	1	1	88
002	1	1	2	4	1160				2	0	0	0	0	0	0	0	0	0
003	1	1	3	1	515	15.07	16.1		0	4	0	4	0	0	0	0	0	54
004	1	5	1	5		14.02			0	0	0	0	0	0	0	0	0	0
005	1	3	2	1	1256	23			8	0	0	0	0	0	0	0	1	0
006	3	2	2	4	335				3	0	0	0	0	0	1	1	1	0
007	0	1	3	2	855	23.19	23.32		0	1	0	1	0	0	0	0	1	13
008	1	1	3	4	1825				15	1	0	1	2	0	0	1	1	0
009	1	1	3	4	646	14.54			5	1	0	1	0	0	0	0	0	0
010	1	1	3	1	1116	17.52	6.19	1	1	1	0	1	0	0	0	1	1	747
011	1	1	3	2	676	9.45	15.54	0	3	4	0	2	1	2	0	0	0	369
012	1	2	3	1	645	18.22	22.45	0	5	9	0	3	0	4	0	1	1	263
013	0	1	3	1	1184	17.35	23.16	0	0	16	0	2	2	7	3	1	1	341
014	0	1	3	1	1254	3.48	9.58	0	2	1	0	1	0	0	0	1	0	370
015	1	2	3	1		20.37	20.39	0	3	6	0	3	2	2	0	1	1	2
016	1	1	3	1	496	21.03	23.14	0	6	7	0	2	0	3	0	1	1	131
017	1	1	3	1		21.11	21.48	0	8	8	0	5	0	2	0	1	0	37
018	1	3	3	1		14.49	14.55	0	8	4	0	3	1	1	0	0	0	6
019	0	1	3	1		12.16	12.46	0	36	1	0	1	1	0	0	0	0	30
020	1		3	6		0.28	3.56	0	1	1	0	1	9	9	9	0	0	208
021	1	1	3	6		22.14	7.51	1	4	2	0	1	2	1	0	0	0	577
022	0	1	3	4		21.39	17.16	2	95	3	0	3	3	0	0	0	0	4057
023	0	2	3	4	451	12.12	20.13	0	9	3	0	3	3	0	1	0	0	481
024	1	2	3	4		22.44	11.12	2	30	8	0	4	1	2	0	1	1	3628
025	1	1	3	1		2	11.07	0	0	21	0	4	8	9	0	1	0	547
026	0	1	3	6	1480	23.16	10.14	1	16	5	2	5	0	1	1	0	0	658
027	2	1	3	6		20.14	10.39	1	0	1	0	1	0	0	1	1	0	865
028	1	2	3	6	711	23.47	11.35	1	24	9	0	6	6	2	1	1	1	708
029	1	1	3	6	1457	20.42	20.43	0	1	1	0	1	0	0	1	0	0	1
030	1	2	3	4	235	10.17	18.29	0	12	2	0	1	0	1	1	1	0	492
031	1	1	3	6		23.43	0.11	1	4	1	0	1	0	0	0	0	0	28
032	0	1	3	2	522	22.56	23.01	0	1	1	0	1	0	0	0	0	0	5
033	1	1	3	1	422	21.13	8.35	1	0	3	0	2	1	1	0	1	0	682
034	1	1	3	1	1944	21.25	21.28	0	1	1	0	1	0	0	1	0	0	3
035	1	4	3	4	404	20.28	20.24	1	79	14	0	14	3	0	1	0	0	1436
036	0	5	3	5	994	15.17	19.15	0	8	4	1	4	1	0	0	0	0	238
037	1	1	3	1		15.43	22.56	0	1	4	0	1	1	2	1	0	0	433
038	1	1	3	4	825	17.02	7.5	1	29	2	0	2	0	0	0	1	0	843
039	0	1	3	4	244	17.43	20.39	0	5	1	0	1	0	0	0	0	0	176
040	1	1	3	4		22.54	19.26	1	2	6	0	2	1	2	0	0	0	1232
041	3	1	3	4	1132	14.21	15.26	0	2	1	0	1	1	0	1	0	0	65
042	1	1	3	5		19.29	19.32	0	1	1	0	1	0	0	0	0	0	3
043	1	1	3	4	967	14.12	14.56	0	17	18	0	6	5	5	0	0	0	44
044	1	5	3	4		6.4	6.46	0	0	1	1	0	1	1	0	0	0	42
045	1	1	3	4		20.19	18.42	1	22	3	0	2	2	1	0	0	0	1343
046	1	1	3	4	1039	19.06	14.22	1	12	17	0	8	11	4	2	0	0	1156
047	1	1	3	1	794	16.17	17.31	0	5	2	1	2	0	0	0	0	0	74
048	1	2	3	6	1003	18.39	20.52	0	7	12	0	4	2	5	3	1	1	133

049	1	2	3	4	1139	16.11	16.19	0	13	1	0	0	0	0	0	1	0	8
050	1	4	3	1		12.44	14.51	1	0	10	0	3	0	3	0	1	0	1567
051	0	1	3	6	2525	8.27	9.08	0	28	2	1	2	0	0	0	1	1	41
052	1	1	3	4	365	20.38	21.42	1	2	1	0	1	0	0	0	0	0	1504
053	1	1	3	1		17.19	17.36	0	12	7	0	4	4	2	0	1	0	17
054	1	1	3	1	1532	12.14	15.14	0	15	6	0	2	11	1	0	0	0	180
055	1	2	3	4	312	20.1	17.03	1	9	10	0	6	1	2	0	0	0	1262
056	1	5	3	6	1185	10.15	10.22	0	3	1	0	1	1	0	0	1	0	7
057	1	1	3	2		21.1	21.2	0	4	1	0	1	0	0	6	1	0	1
058	1	1	3	1	723	12.53	13.31	0	2	3	0	1	2	1	1	1	0	38
059	1	1	3	6	316	23	23.06	0	5	2	1	1	2	1	0	1	0	6
060	0	1	3	2	1560	21.41	22.06	0	2	3	0	1	1	2	0	1	0	25
061	1	3	3	1	1820	19.38	20.27	0	1	4	0	1	1	2	0	1	1	49
062	1	1	3	6		20.55	21.06	0	6	1	0	1	0	0	0	0	0	11
063	0	1	3	2	720	16.46	17.07	0	0	2	0	1	1	1	0	0	0	21
064	1	2	3	4		11.59	13.06	0	2	3	0	2	1	0	4	1	1	67
065	1	1	3	5	535	15.48	0.16	1	7	12	0	5	11	3	0	1	0	508
066	1	2	3	4	484	22.22	22.33	0	3	2	0	1	0	1	0	1	0	11
067	1	1	3	4	515	22.33	16.51	2	15	2	2	2	1	0	0	0	0	3978
068	1	4	3	1		7.47	13.05	0	1	2	0	2	1	0	1	1	0	318
069	1	4	3	4		12.34	14.14	0	2	2	0	1	0	1	1	0	0	100
070	0	1	3	4		9.05	19.55	7	18	7	0	4	4	3	0	1	0	12170
071	0	4	3	1	919	6.41	22.02	0	65	6	0	3	3	2	0	1	0	921
072	2	4	3	1	1667	22.25	22.27	0	1	2	0	1	1	1	1	0	0	2
073	0	1	3	1	3926	11.3	22.15	0	31	2	0	2	0	0	0	1	0	672
074	1	1	3	4	1361	20.58	22	0	4	1	2	1	0	0	0	0	0	62
075	0	2	3	4	1039	12.34	19.58	0	10	4	2	3	0	0	1	0	1	444
076	0	2	3	1	963	16.21	16.4	0	5	4	0	1	4	2	0	0	1	0
077	1	1	3	4	897	8.19	9.22	0	8	4	1	2	2	2	0	0	0	63
078	1	1	3	4	1579	23.35	0.56	2	5	3	3	1	2	1	0	0	0	2961
079	1	5	3	1	641	19.28	0.11	1	2	2	0	1	0	1	0	1	0	283
080	1	5	3	1		20.24	16.26	1	21	10	0	5	8	2	7	1	0	1202
081	3	1	3	6		0.1	0.46	0	4	1	2	1	0	0	0	0	0	45
082	1	2	3	4	1017	16.48	20.58	3	17	6	0	2	0	2	1	1	1	6010
083	1	2	3	1	1011	13.04	11.32	1	5	11	0	6	4	2	5	1	0	1348
084	1	3	3	1	235	20.25	1.24	1	8	2	0	2	1	0	3	1	1	299
085	1	1	3	1		11.3	16.48	1	9	2	9	1	1	1	1	1	0	1785
086	0	1	3	4	1032	21.49	21.55	0	4	1	1	1	0	0	0	0	0	6
087	0	5	3	1	1228	20	8.02	1	0	1	0	0	0	0	0	0	0	722
088	0	1	3	5	2311	10.41	11.21	0	1	1	0	0	0	0	0	0	0	40
089	0	1	3	4	883	23.25	15.23	2	104	9	0	5	8	3	0	1	0	3838
090	1	3	3	1	482	22.38	22.47	0	0	7	0	1	0	2	1	1	1	9
091	1	3	3	5	927	20.48	0.44	1	0	3	0	2	1	1	0	1	0	236
092	1	2	3	4		12.45	13.31	0	5	2	0	2	0	0	0	1	0	46
093	1	1	3	1		8.45	14.45	0	16	11	0	5	8	2	0	1	0	360
094	1	1	3	4	213	23.1	10.24	1	5	2	0	1	1	1	1	1	0	683
095	1	3	3	1	416	20.12	21.14	0	23	1	0	1	1	0	1	0	1	62
096	1	1	3	6	435	16.19	16.3	0	2	1	0	1	0	0	0	0	0	0
097	1	1	3	2	651	20.13	10.01	1	7	3	0	2	2	1	0	1	0	828
098	0	2	3	4		22.53	12.53	1	14	3	0	2	0	1	0	1	0	840
099	1	1	3	4		19.34	20.04	0	48	1	0	1	0	0	0	1	0	30
100	1	1	3			9.16	9.18	0	2	1	0	1	1	0	0	0	0	2

101	1	1	3	4	1857	14.01	14.22	0	31	5	0	2	5	2	0	1	0	21
102	1	2	3	2		12.42	16.41	1	30	15	0	9	8	6	1	1	1	1679
103	1	2	3	4	864	21.52	22.13	0	13	4	0	1	0	2	0	0	0	21
104	1	1	3	4	678	21.58	11.26	1	1	6	0	1	0	3	1	1	0	808
105	0	1	3	4	3785	15.35	15.36	0	33	1	0	1	0	0	0	1	0	1
106	1	1	3	2		13.22	13.26	0	2	3	0	2	0	1	0	0	0	4
107	1	1	3	1	607	21.03	23.29	0	1	16	0	2	3	6	0	0	0	146
108	1	1	3	2	1358	23.53	1.36	1	3	7	0	1	2	3	0	0	1	103
109	0	1	3	4		15.09	16.2	0	1	1	0	1	1	0	0	0	0	53
110	0	4	3	6		18.23	9.5	1	69	20	21	20	0	0	0	0	0	882
111	1	1	3	4	589	23.45	19.1	1	6	2	0	2	1	0	0	1	0	1156
112	1	3	3	5	0	11.59	12.3	0	0	5	0	1	0	2	1	1	0	4
113	1	2	3	4	851	10.05	11.13	0	2	2	0	1	1	1	0	0	0	68
114	1	3	3	4		11	11.1	0	1	5	0	2	2	2	1	0	0	1
115	0	1	3	6	1395	18.07	18.54	0	1	1	0	1	0	0	0	0	0	47
116	0	1	3	1		17	22.25	0	32	2	0	2	2	0	0	1	0	325
117	1	1	3	1		16.03	20.28	0	1	1	0	1	0	0	0	1	0	265
118	1	4	3	4	784	17.18	9.37	3	35	5	0	5	5	0	1	1	0	5299
119	1	1	3	4	1080	17.07	21.34	0	4	5	0	1	1	3	2	1	0	267
120	3	2	3	4	2195	19.53	12.2	1	3	2	0	2	0	0	3	0	1	969
121	0	2	3	4		19.21	12.14	2	129	16	2	16	7	0	0	1	1	3893
122	1	1	3	1	940	7.24	16.55	0	13	5	0	3	2	1	0	0	0	571
123	0	1	3	1	4587	7.59	8.25	0	7	1	0	1	0	0	0	1	1	26
124	1	2	3	4	1270	7.05	12.16	2	87	11	0	7	5	1	3	1	1	4631
125	0	1	3	4	1004	11.49	23.37	0	14	5	0	3	0	1	0	1	0	708
126	1	5	3	4	867	17.49	17.54	0	2	1	0	1	0	0	0	0	0	5
127	1	1	3	2	911	19.43	20.26	0	6	1	0	1	1	0	0	0	0	43
128	3	1	3	1	278	19.43	21.38	9	1	2	9	1	9	1	1	0	0	14515
129	1	2	3	4	458	8.58	9.15	0	0	1	0	1	1	0	0	1	0	17
130	0	5	3	1	545	14.08	14.55	0	20	3	0	2	0	1	0	1	0	47
131	1	5	3	4		19.46	9.34	3	4	1	0	1	0	0	0	0	0	5148
132	1	2	3	1	758	18.32	8.08	1	8	2	0	1	0	1	0	1	0	816
133	1	1	3	4	478	8.1	12.18	0	1	1	0	1	0	0	0	0	0	257
134	1	2	3	4		7.59	20.26	0	19	3	0	3	1	0	0	0	1	747
135	1	5	3	6	574	20.25	21.33	1	9	3	0	2	4	1	1	0	0	1508
136	1	4	3	4	649	5.2	21.28	6	78	14	1	14	0	0	0	1	1	11066
137	0	1	3	4	1247	21.15	9.09	1	23	3	0	2	1	1	0	0	0	714
138	1	1	3	5	513	11.29	13.07	0	0	1	0	1	1	0	1	0	0	98
139	3	1	3	4	585	18.36	19.21	0	2	8	0	2	1	3	1	0	0	45
140	1	1	3	4		20.56	6.02	4	13	2	0	1	0	1	0	1	0	6306
141	1	2	3	1		18.12	22.38	0	2	1	0	1	1	0	0	1	0	266
142	0	1	3	4	704	0.18	7.43	0	2	2	0	1	0	1	0	1	0	445
143	0	2	3	2	1753	21.34	10.07	1	4	4	0	2	1	2	0	1	0	753
144	1	1	3	5	2657	9.1	20.24	0	7	2	1	2	3	0	0	0	0	683
145	1	1	3	1		9.21	11.06	0	14	1	0	1	1	0	1	1	0	105
146	1	1	3	2	1386	20	0.35	1	0	1	0	1	0	0	1	1	0	275
147	0	1	3	4	2042	9.41	15.43	2	47	8	0	5	5	2	0	1	0	4682
148	1	1	3	6	4017	18.33	19.36	0	7	1	1	1	0	0	0	0	0	63
149	1	1	3	6	779	20.5	21.09	0	4	1	0	1	1	0	0	0	0	64
150	1	2	3	4	660	5.28	12.29	0	5	2	9	1	9	1	9	1	1	421
151	1	5	3	5	482	14.3	16.44	0	6	1	0	1	1	0	0	0	0	161
152	3	1	3	5	641	19.59	21.01	0	4	1	0	1	0	0	1	0	0	62

153	0	1	3	1	714	13.27	23.28	0	11	2	0	2	0	0	0	1	0	601
154	0	2	3	4	3635	8.36	10	0	6	1	0	1	0	0	1	1	1	84
155	1	2	3	4	1473	12.45	17.13	0	16	4	0	4	0	0	0	1	0	268
156	1	1	3	6	583	23.31	23.36	0	8	1	0	1	1	0	0	0	0	5
157	0	1	3	5	387	22.4	22.45	0	0	3	0	2	0	0	0	0	0	41
158	1	1	3	1	731	17.13	20.53	0	1	8	0	2	1	7	0	0	0	220
159	1	1	3	6		14.08	15.59	0	9	4	0	2	0	1	0	0	0	111
160	1	1	3	4	1171	18.47	18.49	0	1	1	0	1	1	0	0	1	0	2
161	1	1	3	4	1299	22.57	23.24	0	3	4	0	1	0	2	1	0	0	27
162	2	1	3	6	613	23.42	20	1		2	0	2	0	0	1	0	0	1218
163	0	5	3	6	1529	22.19	12.4	1	26	14	1	6	10	5	12	1	0	825
164	3	1	3	6	790	22.38	8.02	1	1	1	0	1	0	0	0	1	0	564
165	1	1	3	6	772	18.56	19.44	0	9	4	0	4	4	0	5	1	0	48
166	0	1	3	4	1021	13.02	23.44	0	52	5	0	3	1	2	0	1	0	642
167	1	2	3	1	245	7.44	10.13	0	7	5	0	5	6	0	15	1	1	149
168	0	4	3	4	200	20.22	9.1	4	52	4	0	3	0	0	0	1	0	6519
169	1	4	3	4	385	18.08	11.32	7	3	11	0	5	1	5	3	1	0	11124
170	1	1	3	1	1262	3.34	3.47	0	5	1	0	1	1	0	0	1	0	13
171	1	2	3	4	2076	1.34	23.36	0	39	5	0	5	5	0	7	1	1	1322
172	1	1	3	1	480	13.28	14.48	0	0	1	0	1	0	0	1	1	0	80
173	1	1	3	6	1835	11.4	17.5	0	6	2	0	2	0	0	0	0	0	361
174	2	2	3	6	912	22.43	22.51	0	16	10	0	8	15	1	12	0	1	8
175	1	1	3	2	1132	21.4	22.3	0	3	1	1	1	0	0	0	0	0	59
176	1	1	3	4	1532	11.4	14.07	1	19	12	1	10	11	1	10	1	0	1623
177	1	1	3	2	614	19.57	20.08	0	5	4	0	1	1	2	0	0	0	11
178	1	1	3	1	1571	19.21	19.49	0	2	38	0	3	15	10	0	0	0	28
179	3	1	3	4	419	18.27	14.2	3	10	7	0	2	2	4	1	0	0	5495
180	1	1	3	1	3350	10.23	21.39	0	15	2	0	1	0	1	0	1	0	676
181	1	3	3	1	2427	13.29	19.39	0	7	4	0	3	1	1	6	0	0	370
182	1	1	3	5	1201	18	18.1	0	9	4	0	2	2	1	0	1	1	1
183	0	1	3	1	543	14.44	23.36	0	0	6	0	4	0	2	0	1	0	532
184	1	1	3	6	1638	0.26	13.58	3	0	9	0	6	5	2	0	1	0	6572
185	1	1	3	1	3943	2.48	21.18	0	30	4	0	3	2	1	17	1	1	1110
186	1	1	3	5	794	17.19	18.46	0	0	9	0	1	2	4	0	0	1	87
187	0	1	3	4		10.43	12.21	0	10	2	0	2	0	0	0	1	0	98
188	1	5	3	1	1246	20.31	11.15	1	10	4	0	2	3	2	2	1	0	884
189	2	1	3	4	460	22.52	7.58	2	9	3	0	3	2	0	1	0	0	3426
190	1	2	3	4	798	19.48	23.03	0	11	4	0	3	2	0	2	1	0	195
191	1	2	3	4	977	19.08	18.59	2	13	26	0	4	1	12	2	1	0	4311
192	0	1	3	1	954	12.52	8.04	1	4	11	0	3	2	2	0	1	0	1152
193	1	5	3	4		10.23	10.48	2	55	2	0	2	1	0	0	0	0	4345
194	1	1	3	1		6.17	18.32	0	2	3	0	2	1	0	0	1	0	735
195	1	2	3	4	1816	16.08	16.1	0	8	2	0	1	1	1	0	1	0	0
196	0	1	3	1	554	22.56	12.53	1	0	1	0	1	0	0	0	0	1	837
197	0	1	3	6	635	20.36	20.53	0	2	1	1	1	0	0	0	0	0	17
198	3	1	3	4		12.5	21.57	0	7	1	0	1	3	0	1	0	0	592
199	1	2	3	1		13.35	17.54	0	46	1	0	1	0	0	0	1	0	259
200	1	1	3	1		17.06	17.53	0	8	5	0	2	8	2	0	1	0	47