

## The Impact of Mobile Phones on Indigenous Social Structures: A Cross-cultural Comparative Study

Arnold Groh

*Faculty of Humanities, Technical University of Berlin, P.O.Box FH4-3, Germany  
Telephone: +493031422958, E-mail: arnold.groh@tu-berlin.de*

**KEYWORDS** Culture. Globalisation. Indigenous. Mobility. Telephone Communication

**ABSTRACT** Mobile phones are part of a major growth industry in so-called Third World countries. As in other places, the use of this technology changes communication behaviour. The influence of these changes on indigenous social structures was investigated with a mixed-type questionnaire that targeted parameters such as: in-group vs. out-group communication, involvement with dominant industrial culture and the use of financial resources. Data was collected from indigenous representatives at the United Nations, as well as in Africa from subjects of various cultural backgrounds, and from a control group in Berlin. The results reflect widespread use of mobile phones among indigenous persons, having a segregating effect within the indigenous community, but also enhancing in-group communication and especially the use of the indigenous language. Mobile phones also facilitate moves from village to town, with the opportunity of frequently communicating with other in-group members.

### INTRODUCTION

The idea for this paper was triggered already in 2004 by an oral report of Mr. Phillip Lategan, South African representative at the Internationale Tourismus-Börse Berlin (ITB), the world's largest trade fair on travel business, of the social structures of "Bushmen", as he said, being changed by mobile phones. In view of the fact that not only South Africa is affected by globalisation, but that indigenous peoples all over the world are confronted with modern communication technology, it seems necessary to investigate the impact of mobile phones on indigenous social structures in more detail. There is need for clarification of the ongoing processes which affect indigenous communities, and which are caused by the availability of mobile telephony. In order to understand the general mechanisms of these social changes, this investigation takes into consideration indigenous societies not only from one particular region, but from various regions of the world.

### Objectives

Up to now, the social impact of mobile phones on indigenous communities has hardly been taken into consideration. Also, most investigations so far have emphasised a certain region, or even restricted their investigation to that particular geographical area, such as Pradhan and Bajracharya (2015) who found that literacy rate corre-

lates with access to mobile phones in Nepal, or Beaton et al. (2015) presenting a case report on the emergence of a telecommunication company that is owned by an indigenous community in northern Canada. There are some papers that highlight technological aspects, for example Cocq (2015), Brand et al. (2015) and Morris (2015) giving account of smartphone apps for indigenous languages. Some of the findings are contradictory and need further examination. According to Brady and Dyson (2015) who found high prevalence of mobile phones among the indigenous population of northeastern Australia, mobile communication strengthens the cultural interconnectedness and the cultural identity of indigenous persons. In contrast to that, Suwamaru (2015), although primarily focusing on health-care, schooling and business aspects, reports that the usage of the official languages English and Tok Pisin has increased among the indigenous population, since mobile telephony has been introduced in Papua New Guinea. This supports what Temple (2015) points out in her investigation, in which she found that not only is the use of the official languages increasing in Papua New Guinea due to mobile communication, but that this increase also has an impact on the indigenous languages in terms of word borrowing and neologisms, which goes along with a general impact on the indigenous cultures.

Taking the existing literature into consideration, there is need for an investigation that gives an overview on the impact of mobile phones on

indigenous societies, elaborating the general phenomena of this impact which can be found across indigenous communities. At the same time, it appears necessary to take greater account of social, rather than technical, issues. The paper presented here does not focus on a particular indigenous community or geographical region. Indigenous representatives of various regional backgrounds were interviewed at international meetings, as well as students from different African regions and German control groups. The structured interview applied focused on social aspects.

### **Theoretical Aspects: General Changes of Communication due to Modernisation**

Within the past century, a radical change of communication structures within families has occurred in the industrial culture. In the beginning of the 20<sup>th</sup> century, families typically sat together in the evenings, and family members chatted with each other. Families often were larger at that time, comprising of the generations from grandparents to grandchildren. Within that communication, a bias can be assumed in the sense that the older generations passed more information to the younger ones than vice versa.

A hundred years later, families were remarkably smaller, and the form of communication was totally different. These smaller families were still sitting together, sometimes, but they were barely interacting with each other. Instead, in a typical setting, information flowed out of the television set (Groh 2001).

From a perspective of Information Theory, it can be said that in 1900, there were millions of different channels within a country at such a given point in time, since in each of the families that communicated, a different topic was treated; or, if the same topic was treated, it was treated differently. In 2000, the number of channels had dramatically decreased, being represented by the number of available TV channels.

Thus, a loss of information flowing in the overall social system had taken place which, however, was not necessarily perceived by the individual, as it was not considered that millions of people were receiving the same input from TV at the same time.

With regard to indigenous peoples, it can be predicted for communities who have entered into these processes, that even if they have not ad-

vanced to a state as characterised above for a typical situation of a modernised, early 21<sup>st</sup> century family, the direction is set in a similar sense as in the globalised world, where the change of communication structures goes along with changes of family structures (Woessmann 2015). However, the effects of these changes are not limited to globalised societies, but rather have inter- and transcultural effects (Waisbord 2015).

Whereas, in a traditional setting, there is an in-group exchange of information, a key feature of the modern setting is the external input of information. Yet, since 2000, another technology has gained ground, competing with TV and overtaking it: Internet radically changed communication behaviour in modern society. That new communication device now bears features of both settings described above. There is an external input of information, but there is also exchange within that global Internet family, with a large proportion, if not the majority of users being in a similar role like the children of one hundred years ago who were witnessing, but less participating in, the conversations of the grown-ups. Other Internet users, however, engage in specific features of that technology, such as portals, chat rooms and other platforms of exchange, which, like e-mail, are forms of bi-directional information flow that are close, and in many ways comparable, to mobile phone communication.

### **Basic Considerations**

With the introduction of mobile phones, new communication patterns have emerged. The device itself, on the one hand, is just another technical gadget, by which persons become more attached to the industrial and economic system; but on the other hand, there are some features of mobile phone communication that have the potential to counteract the loss of personal closeness that came along with increased mobility.

The emerging research questions can be summarised as follows: Are the changes elicited by mobile phones positive or negative for indigenous peoples? This has to be further specified: Are these changes supportive or destructive with regard to the culture or, depending on the theoretical perspective, to the social system?

Thus, the concept of the mobile phone can be investigated under the aspect of:

- a) a technical device, leading to dependence on the industrial culture, but which,
- b) if it enhances in-group communication, has the potential of strengthening the cultural autonomy of the respective people.

### **Effects of Globalisation on Language Use**

Changes in oral communication, such as the introduction of a device supporting interaction by speech over long distances and relatively independent of locations, always have an impact on the use of a spoken language. Therefore, mobile phones are highly relevant to the questions of maintenance vs. loss of languages. It is estimated that half of the world's languages have become extinct during the past 500 years. Of today's 7.000 languages of the world, every 14 days a language dies. If these processes continue, 90 percent of today's spoken languages would disappear during the 21<sup>st</sup> century.<sup>1</sup>

### **Consequences from a Psychological Perspective**

Language not only defines a culture, but it also defines an individual's cultural identity. Even without following the assumptions subsumed as Linguistic Relativity,<sup>2</sup> there is general consent that languages determine specific ways of cognitively structuring the world. Moreover, languages also contain culture-specific knowledge. What Klaus Töpfer said in 2001 – then being director of the United Nations Environment Programme-, can certainly be seen in connection with the particular language of an indigenous people concerned: "The freeing up of markets around the world may well be the key to economic growth in rich and poor countries alike. But this must not happen at the expense of the thousands of indigenous cultures and their traditions." (UNEP News Release, Nairobi, 8 Feb. 2001). He then continued by explaining that there is valuable information stored in indigenous cultures, and that the loss of their knowledge would be quite problematic for this planet.

"We are seeing in front of our eyes the erosion of the human knowledge base." (David Harrison, Pennsylvania's Swarthmore College, in: Lovgren 2007).

The question that comes to mind here is – can mobile phones counteract that erosion?

### **Research on Indigenous Use of Mobile Phones**

Whereas there has been considerable work on the role of mobile phones in modern society (for example, Licoppe and Smoreda 2005; Ishii 2006; Chayko 2007; Kennedy and Wellman 2007; Kim et al. 2007; Chen and Katz 2009), recent literature touching aspects concerning the impact of mobile phones on indigenous societies is not very extensive. Dyson et al. (2015) published a volume indigenous peoples and mobile technologies in general which contains some contributions that pertain to mobile phones. However, those chapters cover very specialised aspects, such as the comparison of different theoretical approaches on indigenous persons' mobile phone use by Orticio (2015), a Papua New Guinea case study by Watson and Duffield (2015) comparing traditional communication with drums and mobile telephony, a report on a mobile phone company run by an indigenous group in Canada (Beaton et al. 2015), research on socio-economic effects of mobile phones in a rural South African area (Dalvit 2015) and in Nepal (Pradhan and Bajracharya 2015), and a chapter on linguistic effects of mobile phone use in Papua New Guinea (Temple 2015).

Some years earlier, the World Bank had presented a paper (Gebreab 2002) on the diffusion of mobile phones in Africa. Shanmugavelan (2004) pursued the factors of mobile phones with regard to industry growth in Africa. A case study on post war Sierra Leone was provided by Sesay (2004), highlighting the role of mobile phones in that specific context. Donner (2005, 2007) examined the effects of mobile phones on small business in the so-called Third World. Likewise, Sey (2008) focused on economical effects of mobile phones in Ghana.

Also, there were several Vodafone papers in 2005 - by Waverman et al. on the economical impact of mobile phones in the so-called Third World; by Williams on mobile phones and Foreign Direct Investment in Africa; Samuel et al. carried out a survey on mobile phones in some selected African countries; and Adeyinka et al. presented a case report on mobile phones in Nigeria.

### **Aspects of Mobile Phones and Indigenous Societies**

Already the Shanmugavelan (2004) report estimated an annual growth rate of mobile sub-

scriptions in Africa of 65 percent (world: 33%; Europe: 35%); this contrasts the fact that half of the African population earn less than a dollar a day. The lack of infrastructure in terms of roads, landline phones and electricity, but also the lack of a regular income is regarded as the driving force of the increase in mobile phone use. Besides, this increase is seen in connection with faster economic growth, as in the Vodafone investigation mentioned above it was suggested that a rise of mobile phone availability by 10 percent between 1996 and 2003 was responsible for a gross domestic product (GDP) rise of .59 percent during that period.

Karger (2006) reported of a strong global growth of mobile phone subscriptions, from little more than 200 million in 1997 to two billion in 2005, and an estimated continuation of that growth. However, the mobile phone subscriber penetration differs remarkably for the regions of the world, from less than 20 percent in most African countries to more than 90 percent to be found particularly in some European countries and Australia. But this penetration changes quickly; for example, in Indonesia, for the time being with a growth rate of 24 percent, there was a subscriber increase from assumed less than ten million in 2001 to about 60 million in 2006 (Karger 2006). In that Nokia report, squatter cities in Asia, Africa and South America are seen as key growth markets for mobile phones, since there are 1.3 million arrivals per week of new people to join these slum areas in the outskirts of cities in the so-called Third World where they make their living at the low end of the labour force in self-organised, but also innovative ways (Karger 2006).

“The African mobile (telephone) market has been the fastest-growing market of all regions, growing at twice the rate of the global market” (ECOSOC 2008).

A 2014 Ericsson report predicts a tenfold increase of mobile data traffic globally from 2013 to 2019, and even a twenty-fold increase for Sub-Saharan Africa during that time.

### General Effects of Mobile Phones

Some aspects of what has been said about mobile phones effects on society in general are also relevant for this investigation’s research questions. Petrovcic (2008) gives an excellent overview on research concerning processes of social structuring related to the use of mobile

phones. It is not only that close personal relationships are defined by those communicating with each other by mobile phones, but even space and time become less relevant, as the portable device enables the users to speak to each other wherever they are and whenever they want. Mobile telecommunication also has an effect on face-to-face communication, since encounters are less left to chance; instead, appointments are done consciously, which results in networks of relationships that are defined by choice of the individuals. People, who know each other face-to-face, can then keep up and foster their relationships, even when they don’t see each other, by using mobile phones. Communicating with the help of portable devices has a catalyst effect on relationships. People can easily call each other for help, or arrange tasks being carried out together. Being constantly connected also results in emotional ties which are often expressed in the exchange of text messages with intimate content. Even the relations of household members are strengthened, as they spend more time together, though over distance, by communicating through mobile phones. Petrovcic (2008) also shows that mobile phone use parallels to many of the phenomena known from the Internet: “People use online and mobile technologies to work, coordinate and socialize – to do the things that support reciprocity and commitment and invigorate stable personal networks” (Petrovcic 2008: 8). However, Ishii (2006) found that people, who preferred text messaging, had fewer social skills, compared to those who preferred speaking over their mobile phones.

The effect of social ties being strengthened by the use of mobile phones, as also described by Kim et al. (2007), apparently is sometimes overshot. As one participant of the Chen and Katz (2009) study put it, “I feel the phone is always controlling me” (p. 185). In fact, it was not the mobile phone, but it was rather her parents calling her from early morning and throughout the day, to enquire about her whereabouts and to remind her of her schedule. But then again, it is not only that existing social networks can be strengthened, but also new peer groups (though this term needs revision for non-visual communication) come into existence, “technically generated communities” (Chayko 2007: 373).

Beyond that, in the course of a general technological consolidation, the urban-rural divide

of communication patterns is decreasing, as call frequencies in small towns and villages have increased and thus assimilated to those of cities, along with the proliferation of mobile phones (Licoppe and Smoreda 2005). Within ten years, the rate of mobile subscribers has grown from 20 percent to 50 percent of the world's population in 2015. For 2020, a global penetration rate of 60 percent is expected (GSMA Report 2015).

### **Further Considerations**

Directing the focus back on the processes of rapid change due to the use of mobile phones by indigenous persons, it is doubtful, though, that the actual number of indigenous mobile phone users is sizable. Especially in low-income settings, mobile phone users prefer prepay from subscription systems. Depending on the policy of the particular country, they might then not even be registered anywhere as users.

Another point that has to be mentioned is some conflicting factors regarding mobile phone users especially in Africa. A key mineral for the production of mobile phones is tantalum, derived from the ore coltan; 80 percent of the world's tantalum reserves are located in Africa, of which again 80 percent are located in the Congo basin (Cuvelier and Raeymaekers 2002). There is a clear connection between the mobile phones boom and the ongoing crisis in that region (Vetter 2008). Despite investigations of the problem by United Nations (UN) experts and their recommendations to the Security Council, no interventions have been undertaken so far (Bleischwitz and Dittrich 2009). With regard to this investigation's research questions, these interconnections of a crisis that is directly related to the production of mobile phones, with the circumstances, under which the potential mobile phone users of this large African region have to live, are important. The living conditions of those who are mining the minerals necessary for mobile phone technology are much harsher than, for example, for most mobile phone users in the part of the world highlighted in the Karger (2006) report, Indonesia, or in some other so-called Third World regions. It seems rather cynical that those who particularly contribute to the bare fact that mobile phones are available to users worldwide at all are subject to threats and inhuman conditions that ever using a mobile phone themselves remains but a very distant, or rather unreachable, prospect.

## **METHODS**

### **Research Problems**

As we can see, the former papers mentioned above (Gebreab 2002; Sesay 2004; Shanmugavelan 2004; Vodafone 2005; Karger 2006; Donner 2007; Sey 2008; Dalvit 2015; Pradhan and Bajracharya 2015) have a strong economical focus. With regard to continuing research, it is somewhat difficult that there is an interference of mobile phones user's behavioural factors with other cultural factors, which cannot even be exactly determined without precise investigations. Also, there is an interdependence of further factors, for example of mobility and the use of mobile phones. These aspects led to the decision to conduct an investigation with the design of a structured interview, in order to gain a general overview.

### **Arising Questions**

On grounds of the preceding considerations, the research interest can be further specified by formulating the following questions:

- Do mobile phones counteract the processes of progressive language loss?

In connection with this question, it would make sense to find out:

- Which language do indigenous persons speak when they use mobile phones?
- Do mobile phones lead to an increase of in-group communication?
- Has the mobility of indigenous persons increased due to facilitated communication?

In addition, questions arise with regard to social dynamics:

- Do mobile phones lead to social distinction within the cultural group?

And:

- Have expenditures been reorganised in order to finance mobile phones?

Since these research questions focus on processes, a longitudinal survey would render a deeper insight into the changes triggered by the introduction of mobile phones. However, one would have to wait for several years to be able to define long-term changes. Taking into account the speed of technological changes, such research would take the risk of being outdated and irrelevant at the time of publication, only

providing data that are more historically interesting than anything else. So, the focus of this paper is directed at the subjects' understanding of the processes taking place. Thus, the data reflect these perspectives, and of course, it would still be possible to do such surveys again later on, in order to look for changes over time.

### **Procedure**

The structured interview ( $N=159$ ; mean age: 24.8,  $SD=8.4$ ; 56.6 % male, 40.9 % female) was carried out with indigenous representatives at international meetings ( $n=27$ ; mean age: 38.5,  $SD=11.5$ ; 77.8 % male, 14.8 % female), with students in Cameroon ( $n=32$ ; mean age: 23.0,  $SD=3.2$ ; 59.4 % male, 40.6 % female) and with students in South Africa ( $n=47$ ; mean age: 20.0,  $SD=2.0$ ; 53.2 % male, 46.8 % female); additionally, control data were gathered from students in Germany ( $n=53$ ; mean age: 23.8,  $SD=5.2$ ; 47.2 % male, 49.1 % female).

### **Questionnaire**

The interviews were conducted individually, based on a structured questionnaire that covered parameters focussing on perceived processes or changes (Tables 4-6), as well as on demographical data (Tables 1a-d). It was asked, how common mobile phones were in the respective subject's cultural group (Table 2c), and the coverage of the region had to be estimated by the subject (Table 2b). The subjects were asked if they used a mobile phone themselves, and if so, if they used a prepay system (Table 2a). Also, they were asked to name which kind of mobile phone they had, and to name the approximate cost of their phone. They were asked to estimate the ratio of prepay vs. contract mobile phones in their cultural group, and to indicate the purposes for which mobile phones were used within that group, given the choices of in-town business, in-town friends, town to village and village to village communication (Table 3). The subjects were asked which language mobile phone users from their cultural group speak when telephoning with each other (Table 5). They were asked to estimate the economical situation of mobile phone users in their cultural group, given the choices of rich, average, breadline, or below. With regard to the latter two, the interviewers then asked how these persons fi-

nanced their mobile phone. The subjects were asked if they had heard of anyone from their cultural group who had reduced the consumption of alcohol in order to spend the money for mobile phone calls, or if any other spendings were reduced for this purpose (Table 4). Then, it was asked if communication within the subjects' cultural group had increased due to mobile phones, and if so, if that was the case between family members or other closely related persons. The subjects were asked if people left their village and went to town more easily now because they could communicate with their people back home by using mobile phones. And if mobile phone owners of their cultural group were segregated, that is culturally distinguished, from those without a mobile phone. Finally, the subjects had the chance to give further comments of their own. Figure 1 in the Appendix shows the questionnaire.

### **Interviews**

The interviews with the indigenous representatives took place during UNHCHR conferences in Geneva, Switzerland ( $n=26$ )<sup>3</sup> and at the World Gathering of Nomads in La Granja / Segovia, Spain ( $n=1$ ). The interviews with students took place at the universities of Yaounde and Buea, Cameroon, at the University of Limpopo, South Africa, and in Germany at the Technical University of Berlin, at the Humboldt University of Berlin, and at the University of Marburg<sup>4</sup>. Interviewers had been instructed. Statements were optional for subjects. The data were evaluated with descriptive statistical analysis, and significances between groups were tested. Due to minor divergences of the German version, a few items were analysed without the Marburg data ( $n=12$ ), so that in these cases the German figure only comprises the Berlin data ( $n=41$ ; mean age: 24.0,  $SD=5.8$ ; 51.2 % male, 43.9 % female). These items are marked in the results below.

## **RESULTS**

Percentages do not always sum up to 100 because answers were optional. Thus, questions were sometimes left unanswered; also, when subjects were asked, for example, to rank the choices given, it happened that all options were set to top rank etc.

Below, there are at first the results that can be displayed in tables<sup>5</sup>, followed by descriptive results.

### Demographical Data

Subjects indicated age and sex, where they were born, where they had grown up, and where they lived presently, as shown in Tables 1 a, b, c, d. There are considerable variations, with South Africans having the largest and Cameroonians having the smallest proportion of subjects born, grown up or presently living in villages.

**Table 1a: Age and sex**

	Mean age	Male %	Female %
Total	24.8	56.6	40.9
IR	38.5	77.8	14.8
Cameroon	22.9	59.4	40.6
South Africa	20.0	53.2	46.8
Germany	23.8	47.2	49.1

**Table 1b: Place of birth**

Where born (%)	Total	IR	Came -roon	South Africa	Germany
Village	41.5	59.3	9.4	80.9	17.0
Town	22.6	14.8	34.4	12.8	28.3
City	23.3	14.8	15.6	4.3	49.1

**Table 1c: Place of growing up**

Where grown up(%)	Total	IR	Came -roon	South Africa	Germany
Village	28.9	37.5	0.0	61.7	14.3
Town	30.8	25.9	40.6	28.9	32.7
City	25.2	22.2	15.6	6.7	53.1

**Table 1d: Present residence**

Presently (%)	Total	IR	Came -roon	South Africa	Germany
Village	22.6	18.5	3.1	60.9	3.8
Town	27.1	11.1	46.9	28.3	22.6
City	42.8	63.0	28.1	10.9	69.8

### Mobile Phone Use

Subjects indicated if they used a mobile phone themselves, and if so, if they used a pre-pay vs. contract system, and they estimated the

percentage of prepay system users among the mobile phone users of their cultural group (Tables 2a-c).

**Table 2a: Prevalence and method of payment**

%	Use m.p.	Prepay	Prepay group est
Total	97.5	50.3	59.4
IR	96.3	70.4	79.0
Cameroon	93.8	31.3	51.5
South Africa	97.9	74.5	77.1
Germany	100.0	30.2	35.5

**Table 2b: Estimated mobile phone coverage of the subjects' home regions (%)**

	Total	IR	Came -roon	South Africa	Germany
High	55.8	48.1	28.1	46.8	92.7
Middle	25.2	18.5	25.0	48.9	2.4
Low	6.8	14.8	15.6	2.1	0.0

\* In this item's results, "Germany" only comprises the Berlin data.

**Table 2c: Item "How common are mobile phones in your cultural group?" (%)**

	Total	IR	Came -roon	South Africa	Germany
High	57.2	40.7	34.4	61.7	75.5
Middle	21.4	14.8	28.1	34.0	9.4
Low	10.1	33.3	12.5	4.3	1.9

### Purposes

Subjects indicated and ranked the purposes of mobile phone use in their own cultural group (%). Communication with friends within the same town is most prominent in Germany and Cameroon, whereas village-to-village calls have the largest proportion in South Africa (Table 3).

### Specific Effects

Subjects reported if they had heard of anyone of their own cultural group who had reduced the consumption of alcohol in order to spend the money for mobile phone calls; also, they gave their opinions if people left their village and went to town more easily now because they could communicate with their people back home by using mobile phones; and they reported if mobile phone owners of their cultural group were segregated or culturally distinguished from those

**Table 3: Purposes of mobile phone use**

	Total	IR	Came -roon	South Africa	Germany
<i>In-town Business</i>					
Most	17.0	33.3	21.1	4.3	17.0
Second	22.6	7.4	12.5	14.9	43.4
Third	10.7	11.1		23.4	5.7
Fourth	20.8	7.4		48.9	15.1
<i>In-town Friends</i>					
Most	50.9	37.0	59.4	27.7	73.6
Second	15.7	18.5	6.3	19.1	17.0
Third	12.6		6.3	38.3	
Fourth	3.1	3.7		8.5	
<i>Town to Village</i>					
Most	16.4	18.5	25.5	23.4	3.8
Second	19.5	14.8	9.4	42.6	7.5
Third	33.3	18.5	12.5	23.4	62.3
Fourth	4.4	3.7		4.3	7.5
<i>Village to Village</i>					
Most	14.5	3.7	3.1	40.4	3.8
Second	10.1			17.0	15.1
Third	7.5	11.1		6.4	11.3
Fourth	33.3	22.2	21.9	27.7	50.9

of their group who did not have a mobile phone (Table 4):

**Table 4: Specific effects**

%	Alc. red.	Leave village	M.P. users segr.
Total	21.8	66.0	25.2
IR	25.9	48.1	18.5
Cameroon	34.4	90.6	34.4
South Africa	27.7	91.5	19.1
Germany	2.4*	37.7	28.3

\*In this item's results, "Germany" only comprises the Berlin data.

### In-group Phone Language

Subjects indicated if mobile phone users from their cultural group, when telephoning with each other, spoke their indigenous language, or a colonial language, or if the language use depended on the circumstances (%) (Table 5). Most indigenous representatives and most South Africans stated that they used the indigenous lan-

**Table 5: In-group phone language**

	Total	IR	Came -roon	South Africa	Germany
Indigenous	51.6	51.9	25.0	51.1	67.9
Colonial	10.7	7.4	34.4		7.5
Depends	29.6	40.7	34.4	46.8	5.7

guage, followed by those who choose between indigenous and colonial language according to the circumstances. More than a third of the Cameroonian generally use a colonial language.

### Communication Increase due to Mobile Phones

Subjects gave their opinion if communication within their cultural group had increased due to mobile phones (%) (Table 6). Again, Cameroonian differ from the other groups by stating with identical proportions that communication had increased both with family members and with friends, while indigenous representatives and South Africans predominantly stated that communication had increased with friends.

**Table 6: Communication increase**

	Total	IR	Came -roon	South Africa	Germany
Yes, with family	52.8	59.3	68.8	59.6	34.0
Yes, with friends (of same kin)	71.7	77.8	68.8	76.6	66.0
No increase	13.2	11.1	3.1	2.1	30.2

Furthermore, all indigenous representatives at UN sessions reported of work experience, whereas of the 132 students (that is all African and German), only 24 answered that question at all, out of which three said to have no work experience. Most indigenous representatives and most Cameroonian students did not answer the question concerning their economical status, and also the German students were not clear about that status (either missing (16), or saying "student" (12), "medium", "ok" etc.). The most precise statements to this question were given by the South African students, with answers like "poor" (10), "average" (17) or "rich" (1).

### Between-group Significances

Groups were compared with Pearson's chi-square test (cross-tab). Because of repeated testing for significances, Bonferroni correction was employed to avoid alpha error accumulation (resulting  $\alpha$  was .006). The comparison of the Cameroonian vs. the South African data did not yield any significant differences. However, significance levels were reached in a number of other constellations.

### **Communication Increase**

When considered as one group, significantly more African, that is, Cameroonian and South African, than German students reported that communication had increased (that is, they did not choose “no” at the communications increase question - see Table 6) due to mobile phones ( $p < .001$ ), especially within their families ( $p = .001$ ). When compared separately with German students, the general communication increase was still clear for the South African students ( $p = .001$ ), and the communication increase within families could also be found for the Cameroonian students ( $p = .006$ ).

### **Mobility**

Also, African students rather than German students ( $p < .001$ ), and rather than indigenous representatives ( $p < .001$ ) reported that people left their village more easily and went to town because they could communicate with their people back home by mobile phone (Table 4); indigenous representatives reported this more often than German students ( $p = .005$ ). When compared separately with indigenous representatives, this mobility increase was reported more often by Cameroonian ( $p = .001$ ), as well as by South African ( $p < .001$ ) students. The highly significant differences were also found when the Cameroonian ( $p < .001$ ) and the South African ( $p < .001$ ) students were compared separately with the German students.

### **Reduced Alcohol Consumption**

Compared to Berlin students, African students ( $p < .001$ ) as well as indigenous representatives ( $p < .001$ ) reported more often that they knew of persons who had reduced the consumption of alcohol in order to spend the money for mobile phone calls (Table 4). When considered separately, this item reached significance for both Cameroonian (.001) and for South African ( $p = .002$ ) students, in comparison with Berlin students.

### **Residuals Check**

To determine if a group contrasted with the total sample, a  $k \times 2$  chi-square test was performed, and standardised residuals were

checked, applying the Fuchs-Kennett test (cf. Bortz and Lienert 2008) to test the differences between expected and observed values for significance. This check covered the item concerning the alcohol reduction, the three items concerning the communication increase (family / friends / no increase), the mobility item, and the item concerning the segregation of mobile phone users from other members of the cultural group. Significant differences (Cramer's  $V = .318$ ;  $p = .003$ ) of answering the question concerning the alcohol reduction could be ascribed to the Berlin students, most of whom reported that they had not heard of anyone who had decided to reduce his or her alcohol consumption in order to finance his or her mobile phone. Differences of reporting a communication increase within the families (Cramer's  $V = .290$ ;  $p = .005$ ) could be ascribed to the German students' majoritarian statement that there was no such increase. Contrasts with regard to the “no increase” option (Cramer's  $V = .372$ ;  $p < .001$ ) were found to be caused by the German students, who confirmed that there was no increase, as well as by the South African students and indigenous representatives who both did not decide that there was no increase. With regard to the mobility item, the highly significant differences (Cramer's  $V = .526$ ;  $p < .001$ ) could be attributed to a bias of the German students to claim that people do not leave their village more easily due to mobile phones, and a converse bias of the South African students, affecting both options (yes/no) of these two groups' answers, and the Cameroonian students' preference not to choose the “no” answer, when asked if people leave their village more easily due to mobile phones.

## **DISCUSSION**

When comparing the results with findings of other investigations, it should be considered that research on similar topics is usually done with regard to a particular indigenous society. With regard to local languages of Papua New Guinea, Temple (2015) found “evidence of rapid linguistic change as a direct consequence of mobile phone use”, so that “languages will inevitably lose their usefulness in social exchanges, which will probably lead to their eventual demise” (Temple 2015: 287). In the investigation presented here, only Cameroonians showed no distinct reservations against the use of colonial

languages, whereas the indigenous representatives, as well as South Africans, mostly used the indigenous language, followed by those who used a colonial language if the situation required so. The peculiarity of the Cameroon data might be accounted for by the high density of indigenous languages, and perhaps also by the country's specific history, characterised by the change of colonial powers. Brady and Dyson (2015) reported high prevalence of mobile phones among indigenous persons of northeast Australia, with strengthened interconnectedness and stronger cultural identity due to the use of mobile phones. On the one hand, this conforms to the researcher's finding that communication had increased within indigenous groups due to the use of mobile phones. But on the other hand, about one third of Cameroonian in this investigation stated that mobile phone users were socially segregated because they used that modern technology. As Ling (2007) has pointed out, the use of mobile phones has an emancipating effect among the younger generations; in particular, this applies to young women, according to Komunte (2015). These findings can certainly also be applied to mobile phone users from indigenous groups, as their social cohesion is being increased by the new communication possibilities. Yet, the effects of mobile phones on indigenous social systems are quite different from the re-structuring occurring in highly technological contexts (Ito 2005), as the ability to have real-time speech communication over long distances interacts with mobility behaviour in the sense of crossing cultural boundaries. Anticipated loss of connection is counterbalanced by the recourse to mobile communication. However, some effects of cultural dominance, exerted by the industrial culture on indigenous cultures, can be expected (Groh 2005): With regard to the overlapping systems of industrial and indigenous culture, the former is unlikely to change in the course of the intercultural contact, whereas the latter will strive for compromises along the way from the hybrid situation to a cultural synthesis, nevertheless being prone to then giving up most of its own cultural elements.

It can be inferred that phenomena and mechanisms known from classical theories on groups (for example, Kiesler and Corbin 1965) come into bear within the communication networks of mobile phone users, and also, that cultural factors, as known from modern workplace research (for

example, McCann and Giles 2006) play a role. Since mobile phones have been transformed from a mere communication device to a multitasking tool, some indigenous communities have bypassed the era of personal computer (PC) based Internet access and started with smart phones straightforward (Northern Territory Government 2015), so that an interplay of cultural factors with various technology-based communication modes can be assumed.

## CONCLUSION

The first aspect to become evident is the reflection of specific cultural contexts in the data. The findings can be interpreted in terms of System Theory: Due to new communication opportunities, the structures of social systems change. Therefore, it can be assumed that people also leave their village *because* they can keep in touch now with the help of mobile phones.

The availability of the technical device itself has some effects, among which it is remarkable that the consumption of alcohol is being reduced, according to some informants, in order to finance the use of mobile phones.

There is wide consent among the subjects that the availability of mobile phones has led to an increase of communication with relatives. Likewise, the use of the new technical device apparently supports in-group communication not only within family, but also within the culture concerned. About half of the indigenous representatives and half of the South African subjects use an indigenous language when communicating with the help of mobile phones. In Cameroon, it primarily depends on the specific situation if an indigenous or a colonial language is used. This is certainly due to the fact that this country has an extremely high density of languages. Since there are 278 cultures with their respective tongues in Cameroon, it is very likely to have a variety of languages spoken among one's contact persons.

## LIMITATIONS

Limitations of this investigation consist in the relatively small number of participants. It would be desirable to have not only a larger number, but also a coverage of more regions with indigenous populations, including Latin America, Southeast Asia and other parts of the

world with traditional cultures. The aspect of general effects of mobile telephony on indigenous societies has partly been accounted for by including the heterogeneous group of indigenous representatives, but the group size was not appropriate for differentiating these participants according to their cultural background for any useful statistical significances.

## RECOMMENDATIONS

A perspective that can be recommended to be taken by future research on the topic is to investigate to what extent phenomena and mechanisms known from classical theories on groups come into bear within the communication networks of mobile phone users, and in which ways cultural factors as known from modern workplace research play a role.

Another challenge for future research would also be to find methodological ways to distinct the factors confounded in the use of smart phones, by which quite different modes of communication have been merged, such as voice telephony, video telephony, text messaging and various Internet-based applications.

## NOTES

- 1 Cf. Ethnologue.com (constantly updated); Lehmann C (1993).
- 2 Overview: Lehmann B (1998).
- 3 At the United Nations office in Geneva, a Spanish translation of the interview form, translated by an official translator at the UN, was used parallel to the English form, for interviewing Spanish-speaking subjects.
- 4 In Marburg, a German version of the interview form was used.
- 5 All tables by the author.

## REFERENCES

- Beaton B, Burnard T, Linden A, O'Donnell S 2015. Keewaytinook mobile: An indigenous community-owned mobile phone service in northern Canada. In: LE Dyson, S Grant, M Hendriks (Eds.): *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge, pp. 109-124.
- Bleischwitz R, Dittrich M 2009. Coltan Mining in Central Africa and Implications for Industry and Markets. *Contribution to the International Conference "Competition and Conflicts on Resource Use"* at the University of Darmstadt, convened by IANUS – Interdisciplinary Research Group Science, Technology and Security, Darmstadt, Germany, 4 – 6 May.
- Bortz J, Lienert G 2008. *Kurzgefasste Statistik Für Die Klinische Forschung. Leitfaden für die Verteilungs-*freie Analyse kleiner Stichproben. 3rd Edition. Heidelberg: Springer.
- Brady F, Dyson LE 2015. Why mobile? Indigenous people and mobile technologies at the edge. In: LE Dyson, S Grant, M Hendriks (Eds.): *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge, pp. 25-44.
- Brand P, Herbert T, Boechler S 2015. Language vitalization through mobile and online technologies in British Columbia. In: LE Dyson, S Grant, M Hendriks (Eds.): *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge, pp. 265-273.
- Chayko M 2007. The portable community: Envisioning and examining mobile social connectedness. *International Journal of Web Based Communities*, 3(4): 373-385.
- Chen Y, Katz J 2009. Extending family to school life: College students' use of the mobile phone. *International Journal of Human-Computer Studies*, 67: 179-191.
- Cocq C 2015. Mobile technology in indigenous landscapes. In: In: LE Dyson, S Grant, M Hendriks (Eds.): *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge, pp.147-159.
- Cuvelier J, Raeymaekers T 2002. European Companies and The Coltan Trade: An Update, Part 2. *IPIS Report*, Antwerp, Belgium, IPIS, September.
- Dalvit L 2015. Mobile phones in rural South Africa: Stories of empowerment from the Siyakhula living lab. In: LE Dyson, S Grant, M Hendriks (Eds.): *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge, pp. 205-222.
- Donner J 2005. Microentrepreneurs and mobiles: An exploration of the uses of mobile phones by small business owners in Rwanda. *Information Technologies and International Development*, 21: 1-21.
- Donner J 2007. Customer Acquisition Among Small and Informal Businesses in Urban India: Comparing Face to Face and Mediated Channels. *Paper submitted to the Conference on Living the Information Society: The Impact of ICT on People, Work, and Communities in Asia*, 23-24 April, Manila, Philippines.
- Dyson LE, Grant S, Hendriks M (Eds.) 2015. *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge.
- ECOSOC 2008. *Report of the Economic and Social Council at the United Nations Organisation. Ericsson Mobility Report Sub-Saharan Africa*. June 2014.
- Gebreab FA 2002. Getting Connected: Competition and Diffusion in African Mobile Telecommunications Markets. *Policy Research Working Paper 2863*. Washington: The World Bank.
- Groh A 2001. Informationsverlust in der Globalisierung. *Dialektik*, 1: 131-152.
- Groh A 2005. Globalisation and indigenous identity. *Psychopathologie Africaine*, 33(1): 33-47.
- GSMA 2015. *The Mobile Economy Report 2015*. London: Groupe Speciale Mobile Association.
- Ishii K 2006. Implications of mobility: The uses of personal communication media in everyday life. *Journal of Communication*, 56: 346-365.
- Ito M 2005. Mobile phones, Japanese youth and the replacement of social contact. In: R Ling, P Pedersen

- sen (Eds.): *Mobile Communications: Renegotiation of the Social Sphere*. London: Springer, pp. 131-148.
- Karger A 2006. Mobile Communication in New Growth Markets and How it Applies to Indonesia. *Nokia Presentation*, Jakarta, 14 September.
- Kennedy T, Wellman B 2007. The networked household. *Information, Communication and Society*, 10(5): 645-670.
- Kiesler C, Corbin L 1965. Commitment, attraction, and conformity. *Journal of Personality and Social Psychology*, 2: 890-895.
- Kim H, Kim GJ, Park HW, Rice RE 2007. Configurations of relationships in different media: FtF, Email, Instant Messenger, Mobile Phone, and SMS. *Journal of Computer-Mediated Communication*, 12: 1183-1207.
- Komunte M 2015. Usage of mobile technology in women entrepreneurs: A case study of Uganda. *The African Journal of Information Systems*, 7(3): 52-74.
- Lehmann B 1998. *ROT ist nicht »rot« ist nicht [rot]. Eine Bilanz und Neuinterpretation der linguistischen Relativitätstheorie*. Tübingen: Narr.
- Lehmann C 1993. Sprachen sterben aus. Linguisten kümmern sich um die Erhaltung und Dokumentation bedrohter Sprachen. *Forschung an der Universität Bielefeld*, 8: 3-9.
- Licoppe C, Smoreda Z 2005. Are social networks technologically embedded? How networks are changing today with changes in communication technology. *Social Networks*, 27: 317-335.
- Ling R 2007. Children, youth and mobile communication. *Journal of Children and Media*, 1(1): 60-67.
- Lovgren S 2007. Languages Racing to Extinction in 5 Global "Hotspots". National Geographic News - 18 September. From <<http://news.nationalgeographic.com/news/2007/09/070918-languages-extinct.html>> (Retrieved on 16 February 2016).
- McCann R, Giles H 2006. Communication with people of different ages in the workplace: Thai and American data. *Human Communication Research*, 32: 74-108.
- Morris TL 2015. An example of excellence: Chickasaw language revitalisation through technology. In: LE Dyson, S Grant, M Hendriks (Eds.): *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge, pp. 293-304.
- Northern Territory Government 2015. 2015 Regional Telecommunications Review. Submission by the Northern Territory Government Department of Corporate and Information Services to the Regional Telecommunications Independent Review Committee, July 2015. From <<https://www.communications.gov.au/sites/g/files/net301/f/Northern%20Territory%20Government%20-%20Public%20Submission%20RTIRC%202015.pdf>> (Retrieved on 16 December 2015).
- Orticio G 2015. The indigenous digital Collectif: The translation of mobile phones among the iTadian. In: LE Dyson, S Grant, M Hendriks (Eds.): *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge, pp. 71-91.
- Petrovic A 2008. Social Cohesiveness of Network and Mobile Sociality-Exploring the Personal Networks and Social Participation of ICT Users. *Paper presented at the ICT and S Doctoral Students Meeting organized by the ICT and S Center at the University of Salzburg*, Salzburg, Austria, 20 June.
- Pradhan S, Bajracharya G 2015. Socio-economic impacts on the adoption of mobile phones by the major indigenous nationalities of Nepal. In: LE Dyson, S Grant, M Hendriks (Eds.): *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge, pp. 223-236.
- Sesay B 2004. From Guns to Mobile Phones: Calling for Change in Sierra Leone. Panos Features, 06/02/2004. From <<http://dspace.cigilibrary.org/jspui/bitstream/123456789/14470/1/From%20Guns%20To%20Mobile%20Phones%20Calling%20For%20Change%20In%20Sierra%20Leone.pdf?1>> (Retrieved on 23 September 2013).
- Sey A 2008. Mobile Communication and Development: A Study of Mobile Phone Appropriation in Ghana. *Dissertation presented to the Faculty of the Graduate School, in partial fulfillment of the requirements for the degree Doctor of Philosophy*. Los Angeles, USA: University of Southern California.
- Shanmugavelan M 2004. Completing the Revolution: The Challenge of Rural Telephony in Africa. New Panos Report, Wed, 14 Jul 2004. From <<http://dspace.cigilibrary.org/jspui/bitstream/123456789/14467/1/Completing%20the%20Revolution%20-The%20Challenge%20of%20Rural%20Telephony%20in%20Africa.pdf?1>> (Retrieved on 23 September 2013).
- Suwamaru JK 2015. Aspects of mobile phone usage in Papua New Guinea: A socio-economic perspective. *Contemporary PNG Studies: DWU Research Journal*, 22: 1-16.
- Temple O 2015. The influence of mobile phones on the languages and cultures of Papua New Guinea. In: LE Dyson, S Grant, M Hendriks (Eds.): *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge, pp. 274-292.
- Vetter T 2008. Resource Wars and Information and Communication Technologies. Could Accelerating Sales of Mobile Phones Test a Fragile Congolese Democracy? *IISD Commentary. Opinions and Insights from the International Institute for Sustainable Development*, April 2008, pp. 1-3.
- Vodafone 2005. Africa: The Impact of Mobile Phones. *Vodafone Policy Paper Series* No. 3, March 2005.
- Waisbord S 2015. Three challenges for communication and global social change. *Communications Theory*, 25(2): 144-165.
- Watson AHA, Duffield LR 2015. Private Mobile Phones and Public Communication Drums in Rural Papua New Guinea. In: LE Dyson, S Grant, M Hendriks (Eds.): *Indigenous People and Mobile Technologies*. New York and Abingdon: Routledge, pp. 92-105.
- Woessmann L 2015. An international look at the single-parent family: Family structure matters more for U.S. students. *Education Next*, 15(2): 42-49.

## APPENDIX

---

place	date:	interview language:	interviewer:
-------	-------	---------------------	--------------

**Interview on the use of mobile phones and its effect on indigenous social structures**

name	sex	age	country
culture of origin	mother tongue	secondary language(s)	
education	work experience	economic status	
Where do you live (a: born; b: grown up; c: now)?	village /	town /	city
How common are mobile phones in your cultural group? coverage of your region	h	m	I .....
Do you use a mobile phone? yes no	Do you use a prepay system? yes no		
Which kind of mobile phone do you use?	approx. cost (USD)		
estimated ratio of prepay vs. contract (%) m. ph. in your cultural group:			
purposes of using mobile phones in your cultural group (rank digits): in-town business / in-town friends / town-village / village to village			
Which language do mobile phone users from your cultural group speak when they telephone with each other -			
- indigenous language - colonial language (specify) - depends (specify)			
economical situation of mobile phone users in your cultural group:			
-*                   %*	0                   %	1                   %	2                   %
-1	breadline	average	rich
*: How do they finance the mobile phone? .....			
Have you heard of anyone from your cultural group who reduced the consumption of alcohol in order to spend the money for mobile phone calls? yes no			
any other spendings reduced for this purpose - .....			
Has communication within your cultural group increased due to mobile phones? Yes, with family members.      Yes, with friends (of same kin).      No.			
Do people leave their village and go to town more easily now because they can communicate with their people back home by using mobile phones? yes no			
Are mobile phone owners of your cultural group segregated (i.e. culturally distinguished) from those of your group who do not have a mobile phone? yes no			
further comments:			

---

**Questionnaire as used by the interviewers**  
*Source:* Author