

# 2L02 Empirical Analysis of Institutional Sources Leading Turkey's Conspicuous Advancement in Mobile Phones Diffusion

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## Abstract

Whole nations in the world have been shifting to an information society. Consequently, nations' traditional structure has also been shifting to a new paradigm induced primarily by the new economy emerged in the US in the beginning of the 1990s. Turkey also takes its location in such an altering world with its ICT structure open to technological innovations. Conspicuous change can be observed in dramatic mobile phones diffusion. It is observed that Turkey has an institutional structure which enables it to adapt mobile phones leading to a conspicuous increase in the late 1990s. Sociability was considered to be a driving force lying on this advancement. However, this advancement was declined dramatically after 2000 resulting in sharp decrease in mobile phones. Fragile structure was considered as a source for this dramatic decline. Fragility could destruct sociability typically demonstrated in Russia in the late of 1990s in the course of transition to market economy.

## 1. Observations

### 1.1 Conspicuous Mobile Phones Increase in 1998-2000

PCs, Internet and mobile phones are incorporated into the study as the proxies of ICT. The study survey specifically focused on the diffusion of mobile phones in Turkey included comparison analysis concerning to PCs, Internet, and mobile phone users among 13 developing countries. Figs. 1, 2, and Fig. 3 illustrate PC, Internet and mobile phone user trends in 13 developing countries including Turkey.

As noticed in the figures, Turkey has more widespread and significant diffusion in mobile phones than PCs and Internet. Looking at the mobile phones data for 1000 people in Turkey from 1998 to 2002, an interesting statistical data is revealed. Focusing on the rank of Turkey for mobile phones per 1000

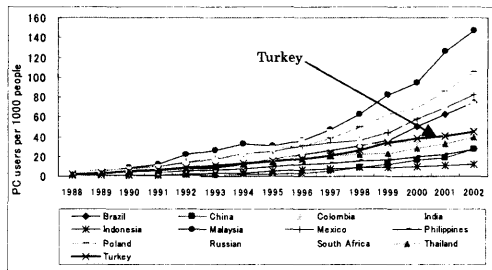


Fig. 1 PC Users Trend in 13 Developing Countries (1988-2002).

Source: World Development Indicators (World Bank, 2004).

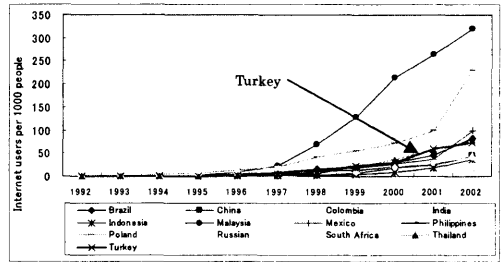


Fig. 2 Internet Trend in 13 Developing Countries (1988-2002).

Source: World Development Indicators (World Bank, 2004).

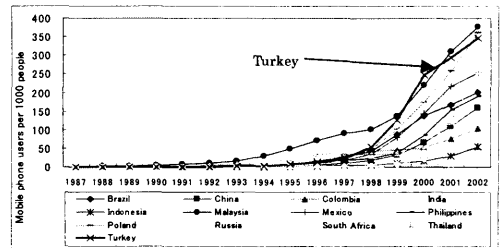


Fig. 3 Mobile Phone Users Trend in 13 Developing Countries (1987-2002).

Source: World Development Indicators (World Bank, 2004).

people data from 1998 to 2002 among 13 developing countries mentioned above, Turkey is the third in 1998, the second in 1999, and the first in 2000 as shown in Fig. 3.

Figs. 4, 5 and 6 show the average growth rate (% p.a.) of PCs, Internet users and mobile phone users among 13 countries.

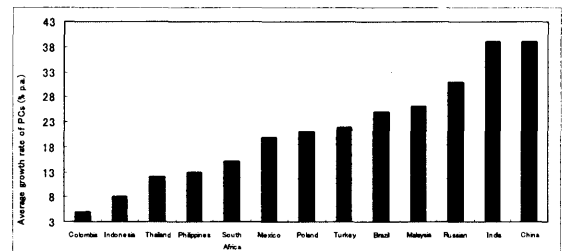


Fig. 4 Comparison of Average Growth Rate of PCs in 13 Developing Countries (1998-2000): % p.a.

Source: World Development Indicators 2004 (World Bank, 2004).

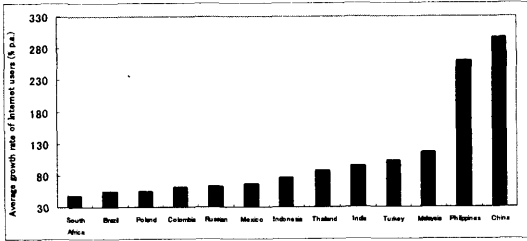


Fig. 5 Comparison of Average Growth Rate of Internet Users in 13 Developing Countries (1998-2000): % p.a.

Source: World Development Indicators 2004 (World Bank, 2004).

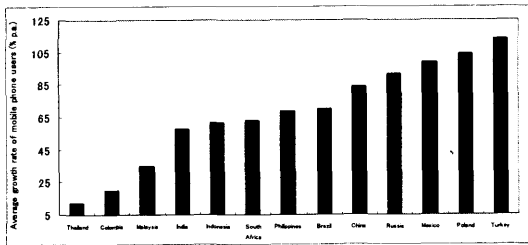


Fig. 6 Comparison of Average Growth Rate of Mobile Phone Users in 13 Developing Countries (1998-2000): % p.a.

Source: World Development Indicators 2004 (World Bank, 2004).

## 1. 2 High Sociability Value

### What is sociability?

Sociability is a proxy which represents the social relations of the people in the nation. It shows the social-cultural structure of the institution. It is composed of family, friend/acquaintance, leisure time and work. Fig. 7 shows the sociability data of each country.

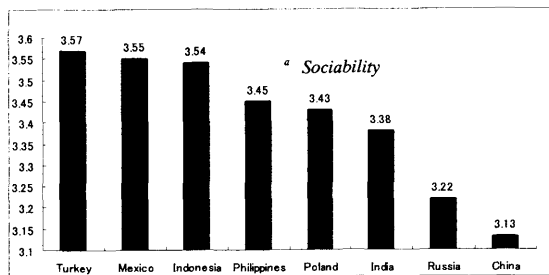


Fig. 7 Comparison of Sociability between 8 Countries.

<sup>a</sup> Sociability is composed of average data of four factors which are family, friend/acquaintance, leisure time and work.

Source: Kachikan Data Book, Dentsu Souken, 2000.

### How is sociability data obtained?

Sociability data is obtained from a questionnaire conducted by Dentsu Souken with the university students living in selected 60 countries. The question that 'how important is family, friend/acquaintance, leisure time and work in your life?' is asked one by one to the students and the answer

sheet has six categories defined as 'very important', 'important', 'do not know', 'a little', 'not important' and 'not answered'. Depending on the importance of answer, a weighted coefficient is assigned to each one. The data of four sociability components concerning to eight countries are shown in the Fig. 8.

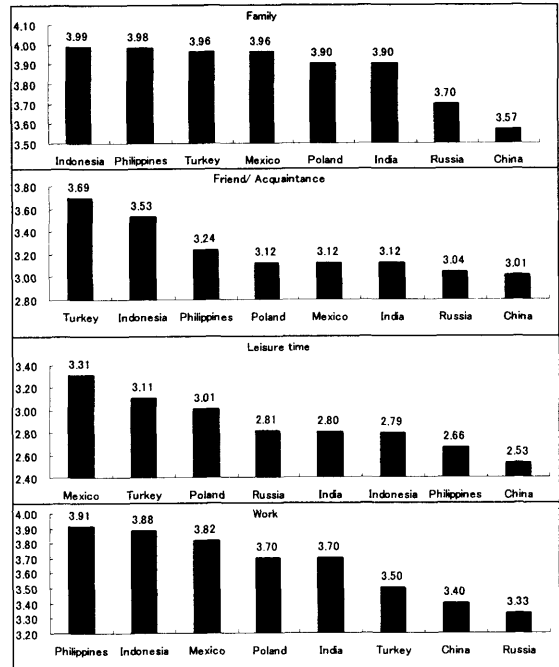


Fig. 8 Comparison of Sociability Components among 8 Developing Countries.

Source: Kachikan Data Book, Dentsu Souken, 2000.

### 1. 3 Strong Correlation between Sociability and M.Phones

It is considered that sociability is the driving force and institutional source lying on the advancement of mobile phones diffusion in Turkey. It is supposed to have correlation between sociability and mobile phones. Fig. 9 and 10 depict the strong correlation between sociability and mobile phones while no correlation with PCs and little with Internet.

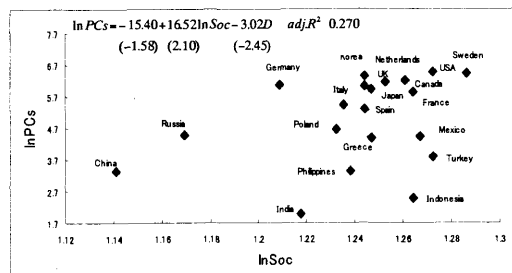


Fig. 9 Correlation between PCs and Sociability in 20 Countries.

Source: World Development Indicators 2004 (World Bank, 2004), Kachikan Data Book, Dentsu Souken, 2000.

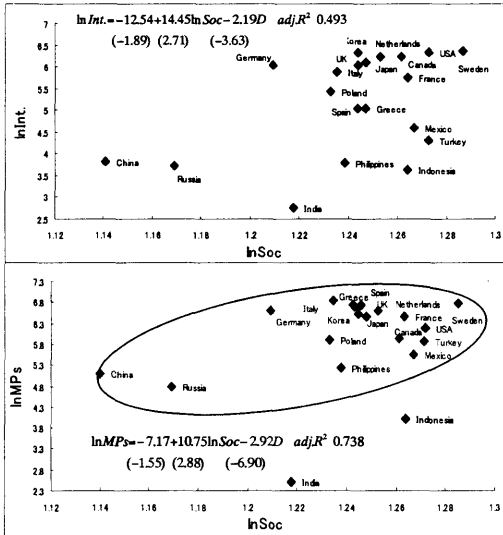


Fig. 10 Correlation between Internet, MP and Sociability in 20 Countries.  
Source: World Development Indicators 2004 (World Bank, 2004), Kachikan Data Book, Dentsu Souken, 2000.

#### 1. 4 Sharp Decline in Mobile Phones in 2001-2002

However, Turkey's conspicuous mobile phones diffusion changes to dramatic decline and sharp decrease after 2000. Fig. 11 depicts the average growth rate (% p.a.) of mobile phones in Turkey in different time trends.

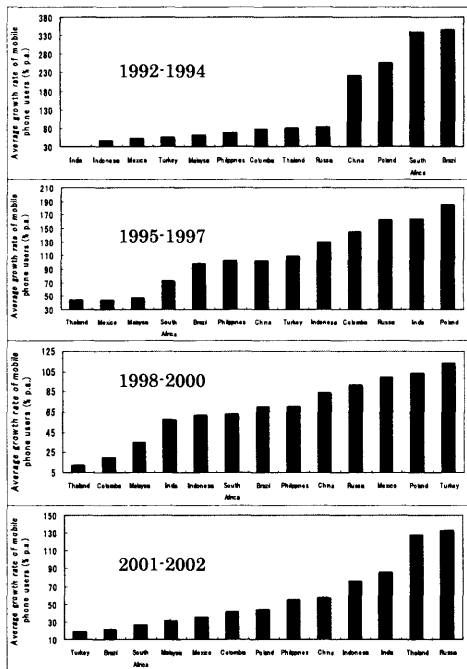


Fig. 11. Comparison of Average Growth Rate of Mobile Phone Users in 13 Developing Countries in Different Time Trends: % p.a.  
Source: World Development Indicators 2004 (World Bank, 2004).

#### 1. 5 Fragile ICT Structure to External Changes in Turkey

What could be the reasons for this dramatic decline in mobile phones after 2000? Turkey underwent a lot of suffers after 1999 which affected its economy seriously. It experienced a very huge earthquake on 17<sup>th</sup> august of 1999. The thing making this earthquake so terrible for Turkey was the wideness of damage in an important region called as Marmara including Istanbul, Kocaeli, Sakarya and Yalova cities which are the locomotive of the Turkish economy. Therefore, this big earthquake caused a huge damage on Turkish economy. The other big damage to economy was the serious political crisis occurred in July of 2001. These two serious incidents led to decrease in GDP per capita resulting in collapse of Turkish economy. Fig. 12 depicts the sensitive institutional structure of Turkey depending on the GDP per capita change after the external effects such as the earthquake in 1999 and a serious political crisis in 2001.

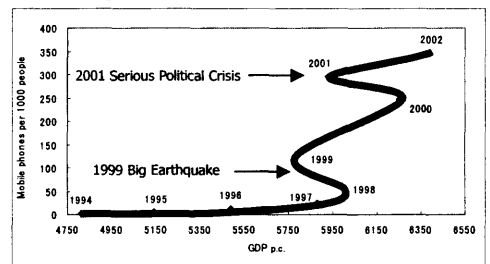


Fig. 12 Comparison of Mobile Phone Users and GDP per capita.  
Source: World Development Indicators 2004 (World Bank, 2004).

#### 2. Hypothetical View

The following three hypothetical views are postulated:

- (i) Turkey's mobile phones diffusion is conspicuous which can be largely attributed to its highest sociability,
- (ii) Turkey's ICT incorporates institutional fragility against external changes resulting in dramatic decrease after external crisis, and
- (iii) Fragility could destruct sociability.

#### 3. Analytical Framework

The economical methods utilized in this research could be summarized as follows:

- (i) Analysis of high sociability is conducted by principle components analysis (PCA) and multiple regression analysis (MRA),
- (ii) Analysis of fragile structure is attempted by PCA and MRA,
- (iii) Analysis of destruction of sociability by fragility is sampled by Russian example.

#### 4. Empirical Analysis

In the empirical analysis, PCA is attempted for five sociability items to find the principle sociability components in which each of five sociability items has different contribution. Tab. 1 and 2 show the result of PCA.

Components	Eigenvalue	Contribution	Accumulated
PC1	2.406	48.13 %	48.13 %
PC2	1.892	37.85 %	85.98 %
PC3	0.354	7.09 %	93.06 %

Table 1 Eigenvalue and Contribution of the Principle Components

Component items	PC1	PC2
Family	0.472	0.440
Work	0.589	-0.135
Friend/acquaintance	-0.102	0.651
Leisure time	-0.266	0.582
Religion	0.591	0.158

Table 2 Weighted Coefficients of Principle Components Related to Five Sociability Items

As a result of PCA, two principle components named Soc1 and Soc2 are constructed. Then SOC1 and SOC2 constructed are analyzed by MRA that how much correlation there is between these two sociability components and ICT items (PCs, Internet and mobile phones.) Based on the result of MRA, SOC1 is found no correlation with any item of ICT, and SOC2 is found strong correlation with mobile phones, little with Internet but no correlation with PCs. Then, SOC2 is considered as the proxy of sociability. Based on the items of SOC2, new sociability data of each country is calculated. Turkey becomes the highest again. Figure 13 shows this rank in 8 countries.

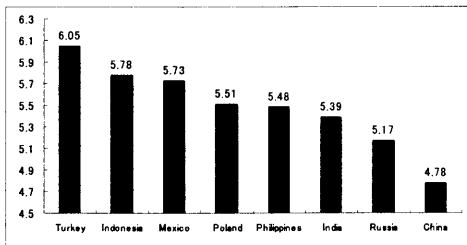


Fig. 13 Comparison of Sociability among 8 Developing Countries.

Source: Author's computation based on Kachikan Data Book, Dentsu Souken, 2002.

Lastly, the institutional sources having effects on Turkey's mobile phones diffusion is examined and enlightened. In order to carry out, PCA is utilized for 15 selected institutional factors as the indicators of institutional system. In the dramatic rise term, Internet has the highest contribution to the diffusion while institutional sources together with Internet are in the decreasing trend in the fall term. Figures 14 and 15

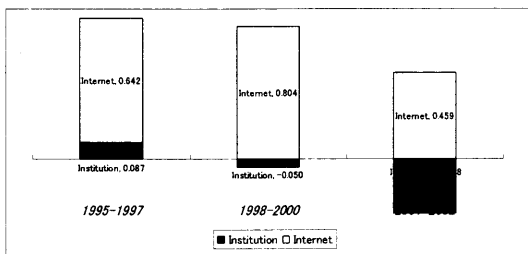


Fig. 14 Comparison of the Contribution of Internet and Institution to Mobile Phones in Different Time Trends in Turkey.

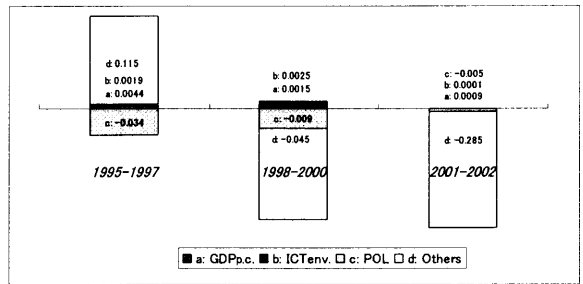


Fig. 15 Comparison of the Contribution of Institutional Factors to Mobile Phones in Different Time Trends in Turkey.

show this institutional change in Turkey. It is fact that external changes such as earthquakes and political crises have bad impacts on Turkish economy. This resulted in decrease of GDP per capita leading to political instability and decrease of Internet. As a result, mobile phones is declined.

## 5. Conclusion

### 5.1 General summary

- (i) Turkey achieved a conspicuous mobile phones increase especially in 1998-2000.
- (ii) This conspicuous increase in mobile phones could be attributed to its high sociability.
- (iii) However, increase in mobile phones was declined sharply after 2000.
- (iv) The decline in mobile phones after 2000 could be attributed its fragile institutional structure to external changes.

### 5.2 Policy Implications

- (i) Turkey's identical institutional structure with respect to sustainable development of ICT can be characterized as the co-existence between sociability and fragility.
- (ii) The sources of Turkey's fragility can be attributed to mobile phones stand alone structure which provides no significant systems link with PCs and Internet.
- (iii) Thus, the strategic focus for Turkey to improve its fragile structure is to strengthen systems link between mobile phones and PCs as well as Internet by constructing a virtuous cycle between the advancement of mobile phones (which are leveraged by sociability) and PCs as well as Internet.

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