

# Adoptability Issues of GPS in Public Sector in Pakistan

Asim Tanvir, Numera Rafaqat

**Abstract**—This study discusses the stumbling blocks stifling the adoption of GPS technology in the public sector of Pakistan. This study has been carried out in order to describe the value of GPS technology and its adoption at various public sector organisations in Pakistan. Sample size for the research conducted was 200; personnel working in public sector having age above 29 years were surveyed. Data collected for this research has been quantitatively analysed with the help of SPSS. Regression analysis, correlation and cross tabulation were the techniques used to determine the strength of relationship between key variables. Findings of this research indicate that main hurdles in GPS adoption in the public sector of Pakistan are lack of awareness about GPS among masses in general and the stakeholders in particular, lack of initiative on part of government in promoting new technologies, unavailability of GPS infrastructure in Pakistan and prohibitions on map availability because of security reasons.

**Keywords**—Adoptability issues, Growth of GPS, GPS infrastructure, Public sectors in Pakistan

## I. INTRODUCTION

LOCATION based applications are considered to be one of the fastest growing services nowadays. These services are aimed to utilise individual's location by meshing physical location with other local searches. User's physical location can be obtained through GPS device [7]. Moreover, navigation satellites systems cover geographical locations all over the world. These systems have been designed to determine the location of GPS devices [3]. This research has been conducted to illustrate the importance of GPS technology in public sector of Pakistan. After discussing the significance of this study, the aims and objectives of this research have been discussed. Key findings have been discussed and analysed in the light of literature being review. Conclusions have been drawn at the end of research paper.

## II. SIGNIFICANCE OF STUDY

Maintenance of tracking infrastructure in a country requires cost effective techniques that help in data gathering for mapping and locating something [4]. GPS installation in government sector requires mapping features to coordinate with geographic information system (McNamara, 2004). This research has laid out major issues that revolve around GPS

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adoption in Public sector of country. Findings of this research have proved that numerous advantages can be gained as GPS device not only captures geographical data but also facilitates analysis of the captured data to monitor and control illegal activities. The findings of this study suggest that it might be possible to control rapidly increasing crime rate through adequate and apt use of GPS technology (Davison, 2005).

## III. AIM AND OBJECTIVES OF RESEARCH

The main focus of this research was to examine main hindrances in the adoption of GPS technology in public sector of Pakistan. Objectives of this study were to underline the factors affecting adoption and growth of GPS in our public sector.

## IV. HYPOTHESIS OF RESEARCH

Lack of awareness and ill planned government policies pertaining to GPS adoptability create obstacles in adoption of GPS technology in Pakistan's public sector.

## V. LITERATURE REVIEW

Literature being reviewed was related to the Global Positioning System (GPS) and its application. Leading factors that are responsible for creating hindrance in the adoption of new technologies, for example 3G mobile in Ghana, China, etc have also been reviewed. Keeping in mind the theoretical background of this study, it can be derived that this research conforms to the studies conducted by [6, 9; 11, 13, 14]. Findings done in this research in general conform to the findings of the reviewed literature. Success story of 3G mobile markets in China (Yan, 2001), [1] and Sweden [2] was reviewed to relate with the GPS market in Pakistan. The rationale for relating the stories of the above mentioned countries is the fact that these countries had also faced similar problems initially.

## VI. RESEARCH METHODOLOGY

Main focus of this study was to highlight the key issues revolving around the GPS technology adoption in public sector of Pakistan, a pool of 200 survey respondents from public sector above the age of 29 years were collected in order to determine influence of these issues on GPS adoptability.

Personnel in public sector were surveyed only because they were highly capable of demonstrating the major key issues arise in adoption of new technologies like GPS at their work places. This study has catered the views of middle and senior level management in public organizations. According to [12],

in positivist approach, an existing theory can be used for hypothesis formulation. This study follows the same approach as the existing theories about GPS adaptability were used for collection of data, analysis and development of hypothesis [12]. It is a descriptive and quantitative research, the researcher has used deductive approach and conducted self administered questionnaires as quantitative paradigm is considered to be more positivistic, deductive and outcome oriented [8]. Both primary and secondary data have been gathered and survey technique has been used for collection of primary data (Vizard, 1996).5 point Likert scale was selected by researcher for this study, in that scale 1 depicted strongly agree and 5 depicted strongly disagree. This scaling was reversed for negative questions. Detail scoring has been done as 1 was allocated for Strongly Agree, 2 for Agree, 3 for Neutral, 4 for Disagree and 5 for Strongly Disagree. SPSS was selected as a research analysis tool, where as; results were displayed in the form of column charts, graphs and tables. Correlation and regression analysis was carried for the investigation of measurements between two variables.

VII. KEY FINDINGS

Political and economic factors, unfavourable government policies and lack of acceptance among masses due to limited awareness are the leading factors that affect the market penetration of GPS in Pakistan.

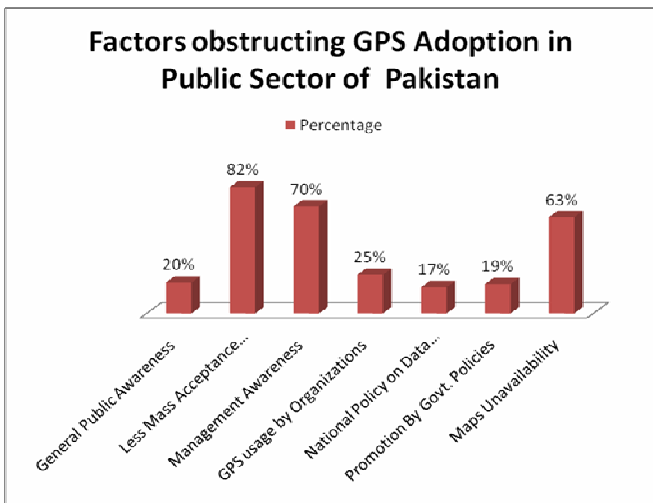


Fig. 1 Factors obstructing GPS Adoption in Public Sector of Pakistan

Fig 1 summarizes major findings that have been concluded through this research. Analysis of questionnaires depicts that; 20% of the respondents were of the view that general public in Pakistan is aware of GPS technology, 82% said that acceptance in masses is less due to lack of awareness about GPS, only 25% of public organizations are using this technology, 19% of the respondents agreed that Government policies are promoting growth of this technology, 63% gave response that unavailability of infrastructural maps at municipal level hinders the adoption of GPS technology, The most surprising fact revealed during survey phase was the 70% response of the managerial level respondents that there is

some awareness about GPS technology in public sector organizations. In view of this finding, the future of GPS adoption in the public sector of Pakistan appears to be promising if the decision makers and the management is provided adequate training and awareness in this regard.

VIII. CORRELATION ANALYSIS

Correlation analysis was conducted to determine the impact of factors (issues) influencing on the growth of GPS technology in public sector's organization of Pakistan.

TABLE I  
CORRELATIONS

		Factors	Growth
factors	Pearson Correlation	1	.607(**)
	Sig. (2-tailed)		.000
	N	200	200
Growth	Pearson Correlation	.607(**)	1
	Sig. (2-tailed)	.000	
	N	200	200

\*\* Correlation is significant at the 0.01 level (2-tailed).

Results that have been drawn from the correlation table showed a significant strong and positive relationship exists between two variables, meaning thereby both variables entail considerable impact on each other and deviation in one variable can be best explained by other, in short table showed strong positive influential effect of variables on each other.

IX. CURVE ESTIMATION

Least square regression line for two variables depicted the best fits on the line from data. For finding linear relationship between two key variables that line was very helpful.

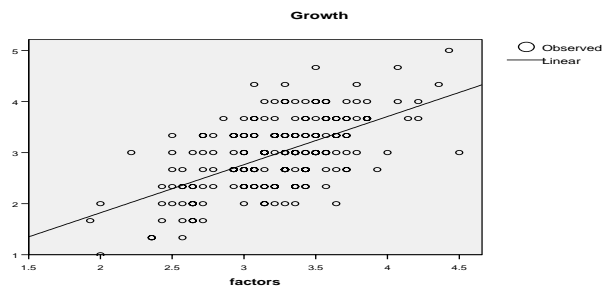


Fig. 2 estimaton cure

Above figure is showing estimation curve, positive slope of line revealed a strong positive relationship between factors (issues) and growth of GPS technology. Regression line is near to 1 and 5 and that suggested perfect relationship between two variables. Consequently, it was concluded that as value of X (factors) will change, value of Y (growth) will also change in positive direction.

## X. CONCLUSION

The greatest obstacle in the way of GPS adoption in Pakistan is ill planned government policies. Another factor that makes the issue even more complex is the general lack of awareness about the technology in the masses. As a consequence, mass acceptance in favour of this technology is also less. From the findings of this research, it can be deduced that adoptability of GPS technology will have a profound effect on realisation of the goals and aims of the public sector organisations. Nevertheless, analysis and interpretation of data demonstrated that, awareness among organisations and general public can be increased by conducting seminars, programs and focused group discussions.

## XI. RECOMMENDATIONS

1. Employees that were surveyed indicated less information regarding this topic. Awareness about this technology should be increased by conducting awareness programs and narrating its benefits to the heads of the organizations.
2. Government should bring this technology forward to the organizations in public sector so that fraudulent cases can be avoided.
3. Government policies should be supportive as they should address the GPS vendor's issues
4. From findings it has also proved that management in organizations are aware of GPS technology but they are not using it still at their workplace, reason behind this is unavailability of GPS technology. Management can be trained up to the professional level, once this technology becomes in operation in organization.
5. Market related to new technologies in Pakistan contains huge opportunities to local vendors, this market can be exploited by GPS vendors in country. Vendors should make use of this opportunity.

### A. Recommendations for Future Researches

This research may lead to other enhance researches as well. This research provides the basis for other researches. Main boundary in this particular study is that this work is applicable to the consumer market product and not to the military market products, For instance products related to navy and army navigation have not been discussed. Following application has been discussed only in the study.

### B. Survey and Navigation Industry

As this study is conducted only on survey and navigation system other advance research on the use of GPS and GIS applications in army and military of Pakistan can be conducted in future.

## REFERENCES

- [1] Addy-Nayo, C. '3G mobile policy: The case of Ghana', International Telecommunication Union (ITU).

- [2] Björkdahl, J. & Bohlin, E. 2003, '3G Network Investments in Sweden', The Swedish National Post and Telecom Agency, PTS, Report Number PTS-ER-2003, 9.
- [3] Brawn, D. A. 2003, GPS - the easy way, Discovery Walking Guides, Northampton.
- [4] Czerniak, R. J., Reilly, J. P., National Cooperative Highway Research, P., National Research Council . Transportation Research, B., American Association of State, H., Transportation, O. & United States. Federal Highway, A. 1998, Applications of GPS for surveying and other positioning needs in departments of transportation, National Academy Press, Washington, D.C.
- [5] Davison, R. M. 2005, Information systems in developing countries : theory and practice, City University of Hong Kong Press, Hong Kong.
- [6] French, G. T. 1996, Understanding the GPS: An introduction to the global positioning system, GeoResearch.
- [7] Fuller, R. & Melt 2009, 'Mobile entity localization and tracking in GPS less environments second international workshop ; proceedings', Berlin; Heidelberg; New York, NY.
- [8] Hine, D. & Carson, D. 2007, Innovative methodologies in enterprise research, Edward Elgar, Cheltenham.
- [9] Kaplan, E. D. & Hegarty, C. J. 2006, Understanding GPS: principles and applications, Artech House Publishers.
- [10] McNamara, J. 2004, GPS for dummies, Wiley Pub., Hoboken, N.J.
- [11] Proctor, R. W. & Vu, K. P. L. 2005, Handbook of human factors in Web design, CRC.
- [12] Saunders, M., Lewis, P. & Thornhill, A. 2009, Research methods for business students, 5th ed, Financial Times Prentice Hall, Harlow.
- [13] Sweet, R. J. 2003, GPS for Mariners, International Marine/Ragged Mountain Press.
- [14] Vizard, F. 1996, 'New Directions For GPS ', Popular Science, 249 (6), pp. 92-6.
- [15] Yan, X. 2001, 'The impact of the regulatory framework on fixed-mobile interconnection settlements: the case of China and Hong Kong', Telecommunications Policy, 25 (7), pp. 515-32.