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Planning Information System for Rural Transport Planning Agencies

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Abstract: The regional transport policy is an essential factor for planned growth in rural areas of the developing nations. It was found that rural sub-regions were struggling with the problem of transport inaccessibility, which was one of the primary reasons of their physical and socioeconomic retardation. The absence of transport policy could be the reason behind such upset, which erupted because of the nonexistence of information system, essentially needed for the data handling and management. Therefore, the goal of this study is to develop *Planning Information System (PIS)*, compatible for rural planning agencies. The data were taken from the document of "*Hyderabad Master Plan 2001-2015,"* Sindh, Pakistan. The *"Teradata"* and *"Visual Basics"* were selected to design and develop PIS for many of their advantages. The PIS was developed successfully, and research findings revealed that information technologies could assist planning authorities in saving-out their precious data. The study's outcome could support planning agencies to mitigate the accessibility issues with timely implementation of the transport policy proposals.

Keywords: Transport Inaccessibility, Planning Information System, Regional Transport Policies, Local Planning Agencies.

1. INTRODUCTION

The availability of transportation facilities and infrastructure can play a vibrant role in renovating rural communities and regressive rural sub- regions (Baum-Snow, 2010). The transport policies in pastoral sub-regions focus the individual accessibility issues with respect to access amenities, such as health (Guagliardo, 2004); education (Shafique and Mahmood, 2010); employment (Alan 1991; Détang-Dessendre and Gaigné, 2009) and recreation (Neuvonen, *et al.,* 2007). The planning authorities are responsible for making plans and devise them accordingly for urban as well as rural-regional areas. These policy plans are actually prepared by knowing ground facts with the help of concerned experts, like *Planners, Engineers* and *Surveyors*. However, in developing countries, rural authorities failed to launch regional transportation policies, possibly because of the unavailability of a system (Chiang, 1995; Vanthienen and Wets, 1995), which could store or manage a large amount of data (Midgley *et al.,* 2005). This could be the significant factor behind the failure to devise policy proposals in time. Due to this bottleneck, the basic problems are not resolved in time and getting worse with the changing instances. Hence, the objective of this study is to design and develop the PIS for local planning agencies or development authorities (Dutta, 2009). The purpose was to design the dynamic tool or system, which could be implemented effortlessly in a rural environment. Thus, this study can be considered as an attempt further to resolve the data-related problems of rural development authorities, as these could develop and implement policy proposals in time. The transport policy proposals would provide development vision to aloof sub-regions of developing countries. Therefore, this research can be considered as an attempt towards the prosperity of the destitute sub-regions, as these could stand on their feet and share their valued inputs.

2. MATERIAL AND METHODS

The city of Hyderabad was a regional headquarter town, which spread over an area of about 300 square kilometers. The development of PIS required the standardized data, which were taken from the document of "*Hyderabad Master Plan,* 2001-15." The Hyderabad master plan served as a main guide to the industrial and agricultural activities in the sub-region, facilitated an effective coordination of development programs (HDA, 2001).

Hyderabad delivered various services to the people, like health, education, recreation, shopping and so on. Hyderabad is located in southern Pakistan and considered as a second largest settlement of Sindh province. The Hyderabad was found accessible from significant towns as shown in **(Fig.1).**

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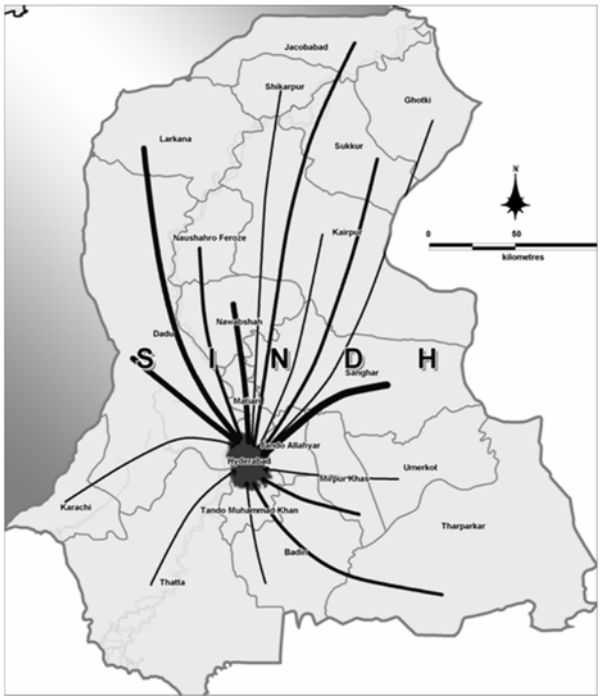

Fig. 1 Hyderabad in a regional context

The first master plan for Hyderabad was prepared in 1954 by the *Town Planning Department, Government of Sindh (TPDGoS)*. The city has manifested itself in the form of spontaneous residential development and other allied uses. In view of this situation and new delimitation of the controlled area of *Hyderabad Development Authority (HDA)*, it was necessary to update the master plan for the period 2001-2015 (HDA, 2001).

2.1 PIS Components and Architecture

There are two major components of PIS; specifically, *Teradata* and *Visual Basics (VB)*. *Teradata* is a leading database software, which can store a massive amount of data effortlessly (Teradata® RDBMS SQL Reference - Fundamentals, 2003). This database software was preferred for its various qualities. For example, *Teradata* is an error-less software that gives the utility of saving a large quantity of data. This database software was used at the back-end of PIS.

According to (Cardoza, *et al.,* 2004), VB is a programming language, which is easy to operate, user-friendly, and often used for the development of user interfaces. This language was selected by keeping in view the expertise of the officials working in concerned rural authorities, as they could be able to operate and use the system conveniently. PIS was designed in such a way that it could be easily compatible with the rural-regional development authority's scenario.

PIS architecture is based on a *client-server (two-tier)* structure, where the *client* can directly interact with the *server*. A client is defined as a requester of services, and a server is termed as the provider of services.

2.1.1 Open Database Connectivity (ODBC)

PIS was developed by considering *two-tier* or *client-server architecture*, where clients can directly interact with database servers to retrieve data. ODBC gives utility to regain data from the *Relational Database Management System (RDBMS)*, such as *Teradata*. ODBC by nature can communicate freely with RDBMS (Abdalhakim, 2009). With the help of ODBC, data can be retrieved easily from the relational databases. ODBC is mainly based on the structure query language (Krunlinski, and Wingo, 1999).

The *client-server architecture* was developed to improve usability and flexibility (Fiacco & Rice, 1991). Using relational database management systems, the user's queries could be efficiently answered as seen in **(Fig. 2).** In *client-server architecture*, the structure query language typically used for communication. With *client-server architecture*, the user system interface found in the user's desktop environment, and database management services usually placed on a server, which is a more powerful machine and can serve many clients.

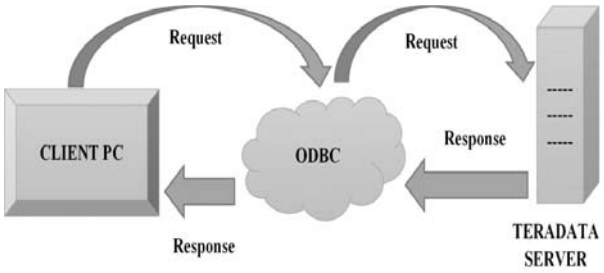

Fig. 2 Message flow *(Two-tier architecture)*

The client's request always first comes to the open database connectivity, and then it transferred automatically to the *Teradata* server. The same hierarchy would be repeated, when the server would respond to the query. The other illustration can be depicted in **(Fig. 3),** which described a combination of client and server workplaces using *two-tier architecture*.

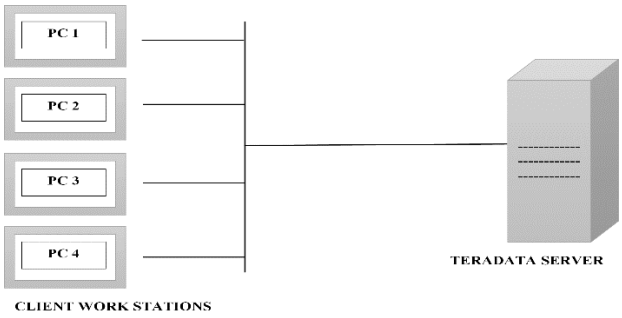

Fig. 3 Real time connectivity *(Two-tier architecture)*

Client-server architecture is an excellent solution for shared computing, when work groups are defined from a dozen to a hundred systems (Hoffer, Prescott, and McFadden, 2007). *Two-tier architecture* can provide better connectivity between database systems and user interfaces, which was utilized in the development of PIS.

PIS can help development authorities in their routine work and report writing. PIS can store enormous amounts of data and provide a detailed description of subject matters quickly. Concerning the development of PIS, the decision-making process could be speed-up with easy retrieval of data and its storage. Furthermore, with the easy retrieval and process of crucial data, rural development authorities could be able to formulate policies timely to resolve accessibility problems.

3. RESULTS AND DISCUSSION

The PIS was proficiently developed for the rural planning agencies of the developing countries. The system was also equipped with a security feature. The users must have to log-in with official user names and passwords. The security feature can be seen in **(Fig. 4).**

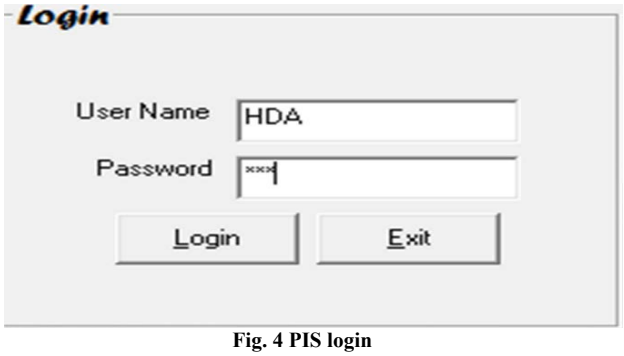

Fig. 4 PIS login

After login, users can enter into the system, named HDA. Twelve different user interfaces were designed, which can be seen by clicking the HDA menu, located at the right corner of the system's window as shown in **(Fig. 5).**

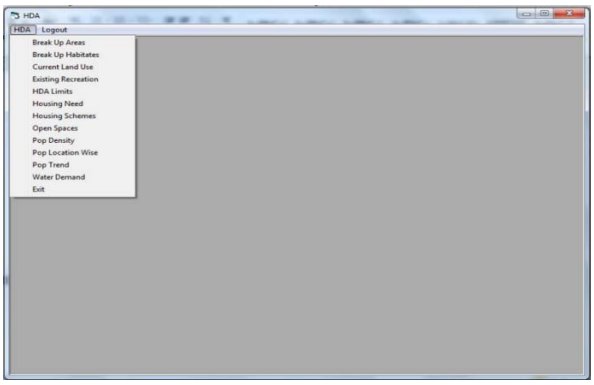

Fig. 5 PIS user interface's list

After clicking the HDA menu, a list of user interfaces will appear. From the list, users can select any one of them to view the relevant information.

The information about the location wise population was selected in the display, which can be seen in **(Fig. 6).** The name of this display is *"Pop_Location_Wise,"* designed to highlight the number of people, according to land-use zoning of the master plan of the study area. The system is equipped with features, i.e. *add new record, show records, append record* and *delete record*. These features are so useful to update the database with changing instances.

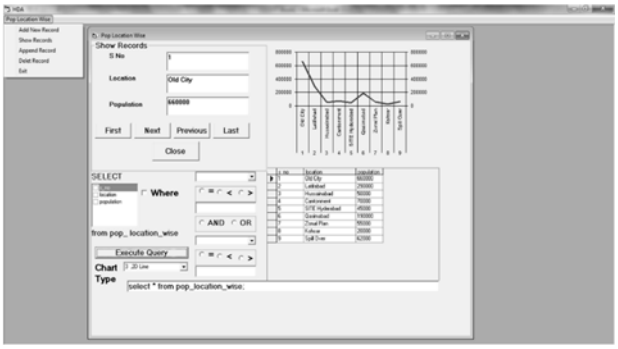

Fig. 6 Demographic information

The demographic information was retrieved in a grid and graphic formats that can be viewed in **(Fig. 6).** A two-dimensional line chart shows the population information for different land-uses of the study area. These included *Old City, Latifabad, Cantonment, SITE Hyderabad, Qasimabad, Zonal Plan, Kohsar,* and *Spill Over*.

4. CONCLUSION

It was procured that regional transportation policy plans are pragmatic in handling the current problems of rural-regional inaccessibility, and offer further suggestions for constant growth. The problem

of rural inaccessibility can be diminished with the timely execution of policy proposals. However, rural planning agencies of most of the developing countries were struggling to launch policy proposals to eradicate the problem of rural inaccessibility. In this regard, this study focused to eliminate the data-related issues of rural planning agencies, which can be considered as one the major obstacles in the process of policy formulation, targeting transport inaccessibility. Therefore, PIS was developed positively to remove the data issues of rural planning agencies, which can be considered as a huge hurdle in the timely execution of policy plans. PIS could assist these authorities to manage their data, which could be helpful to set transportation policy targets, focusing accessibility problems of the rural population. The timely implementation of transportation proposals can overwhelm the issue of rural inaccessibility.

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