

Application of Business Intelligence in South African Subsidised Bus Companies

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Abstract - The focus of this research is first of all to determine the extent that business intelligence (BI) is applied in South African government-subsidised bus companies. This will be done through a questionnaire survey conducted on a sample of the bus companies. The current perceptions that bus companies have towards BI will also be determined through this survey. A second focus of the research is to determine the feasibility of applying BI principles in a bus company for the first time. For this purpose a bus company will be selected and a prototype data warehouse (data mart) will be implemented for the company. A usability test will be conducted in order to determine how effective and efficient the data mart can be applied. Based on the analysis of the outcome of this usability test, it will be possible to determine the value that BI can add to government-subsidised bus companies in the country.

Index Terms - business intelligence, subsidised bus companies, public transport.

I. INTRODUCTION

The idea behind BI is to turn data into information and then into knowledge (Golfarelli, 2005:15). BI is the information at hand for making strategic decisions in an enterprise (Ponniah, 2001:504). This is achieved through the available BI tools such as online analytical processing (OLAP), data mining and predictive analytics (Eckerson, 2007:5). Since BI is based on data warehousing (DW), the risks involved in DW apply to BI as well (Eckerson, 2003:4; Ocampo, 2007:4). A DW is a repository filled with large amounts of historical data that are directly accessed by the intended users through the multidimensional organisation of the data (Golfarelli, 2005:15).

There are several internationally-recognised transport companies using BI to assist in their strategic manoeuvre. Fujitsu, Sybase, Oracle and Opalis are some of the BI/DW vendors present in the public transport industry across the globe. Fujitsu Consulting implemented a BI/DW solution in the Translink / Coast Mountain Bus Company in Greater Vancouver (Fujitsu, 2006) and for South African Airways in South Africa (Fujitsu, 2008). Sybase IQ (Sybase, 2004) implemented a BI/DW solution for American Airlines in the USA. Oracle Consulting Services was responsible for implementing a BI/DW solution for China Eastern Airlines (Oracle, 2007). Opalis technology was used to house the data for DW purposes for the Dutch railway's Nederlandse Spoorwegen management (Opalis, 2008). All these companies experienced problems of large amounts of

information that affected their business operations thus hindering the decision making process. The BI/DW systems they implemented met their business needs.

“Transport is the lifeblood of cities in most countries” (Gwilliamm, 2002:1). Three modes of transport exist: sea, air and land. Land transport is comprised of rail and road transport. In South Africa, rail services commute about 589 000 passengers daily and bus services commute 850 000 passengers. The taxi industry carries a staggering 2.5 million passengers daily. The rest of South Africans make use of alternative transport such as private cars and travelling on foot (SANDOT, 2003:3).

Disadvantaged people receive financial relief from government that enable them to make use of certain services without paying the full cost themselves. This financial relief is called subsidies. Subsidy funding is “an intervention in the market process by a third party, usually but not exclusively by government, to achieve economic, political, social or environmental goals” (Roger Smith and Associates and Transnomics, 2001:2). Bus companies receive three forms of funding from government, namely, deficit funding, interim contracts and tenders (Roger Smith and Associates and Transnomics, 2001:6-8). Prior to 1997, subsidies were paid according to how many tickets were sold. There were no specifications in place for the operators and as a result operators were unresponsive to passenger needs. This led to the development of the informal taxi transport system to compete with the subsidised public transport system. The consequence was a steep decline in the subsidised public transport industry resulting in increased subsidy costs and declining subsidised transport use (Moore, 2001). In 1997 existing subsidised operating permits were cancelled and new limited term permits were tendered for. The new tendering system allowed subsidies to be paid according to revenue kilometres (i.e. authorised trip distances on the timetable) (Moore, 2001).

An area in the subsidised bus transport industry that must be continuously monitored is the area surrounding trip activity because it can decrease the subsidy received from government. This subsidy can make or break bus companies that depend on it. Therefore, delivering information on this aspect in a meaningful manner is crucial for survival. Currently ad hoc reports, amongst others, systematically supply information but they are time consuming and error prone. All indications are, therefore, that BI can be applied beneficially in the subsidised bus industry.

II. AIM OF THE STUDY

The aim of this study is first of all to determine to what extent have BI solutions been applied in South African subsidised bus companies and what the perceptions of these companies are towards BI. The second aim is to determine the feasibility of implementing a BI solution for analysing bus trips in a subsidised bus company in South Africa.

III. METHODOLOGY

The research makes use of multiple sources to gather information. Literature applicable to BI and the South African bus industry is analysed. Questionnaires have been sent to the sample selected to examine the overall current status of BI among subsidised bus companies from a South African perspective. Face-to-face interviews that assisted in gathering information on procedures involved in subsidised bus companies have been conducted with personnel from the Department of Transport and Public Works in the Free State Province and Interstate Bus Lines. A prototype DW system will be developed for one subsidised bus company. A usability study is to be conducted based on the abovementioned system to measure the success of the system with the intended end users.

IV. CONCLUSION

The literature study has revealed that BI has been successfully applied in certain sectors of the transport industry. The extent to which BI solutions have been applied in subsidised bus companies in South Africa is still unclear. It is the intention of this research to answer the questions in this regard.

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BIOGRAPHY

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