TRIP PREDICTION MODEL FOR FIRST CALSS HOTELS IN AMMAN

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DEDICATION

To

My parents, my brothers and sisters

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ABSTRACT

The purpose of this study is to develop a model to predict the number of vehicle-trips attracted by first class hotels in Amman, the capital of Jordan. A total of twelve hotels were surveyed during the year of 2007. The hotels surveyed represent all first class hotels located within the borders of Greater Amman Municipality. The effects of several explanatory variables on the number of vehicle-trips attracted were investigated, these variables are represented by hotel location, hotel floor area, number of employees, parking area, and price index which is an index developed to describe hotel's room rate.

Data collection process included manual counts to determine the number of vehicles entering and exiting each hotel for a period of two days during the week days excluding Friday and Saturday which represent the weekly vacation of most hotels. Counting process had continued from 7:00 A.M to 7:00 P.M, and the number of vehicles entering and exiting each hotel was observed in every 15-minutes interval. The necessary information about the physical features of hotels was obtained from the relevant departments at the studied hotels.

Regression analysis was conducted to develop a regression equation for estimating the number of vehicle-trips attracted by hotels as a function of the different independent variables. The study found that the number of employees and hotel's floor area are the most significant factors for predicting vehicle-trips attracted by hotel in Amman.

Average trip rates were calculated for hotels to determine the average number of attracted vehicle-trips in terms of the independent variables. Trip rates were found to be 1.49 vehicle-trips per employee, and 1.41 vehicle-trips per 100 m^2 of hotel floor area.

1. INTRODUCTION

The transportation planning process is used to provide information for decision makers regarding future transportation activities and requirements. Most of the conventional planning processes that are quite data intensive and costly were designed for use in large urban areas and metropolitan cities.

The current transportation planning processes rely on urban transportation planning (UTP) models that are typically oriented to provide regional, 24-hour modeling capabilities. In general, these models provide adequate estimates of current and future average daily traffic on a region-wide basis or for major flows such as through freeway interchanges or along principal corridors (Khisty and Rahi, 1990). Traffic volume is the basic factor in determining the deficiency of transportation corridors. Growth in traffic volume and the corresponding need for new or improved facilities may be anticipated by combining a future land use plan along with an understanding of the relationship between land use and transportation. In major planning studies, these relations are usually established from data available from external, internal, and origin-destination (O-D) surveys (Modlin, 1982).

Travel demand forecasting is essential for the design of transportation facilities and services, and also for planning, investment, and policy development. The main purpose of a travel survey is to obtain information on trip attractions to specific categories of land-use activities. Basically, travel demand is considered as being derived from activity demand that is, in turn, spatially dependent on the land-use patterns. The travel choices of individuals are represented by what is referred to as the "four-step process." These four steps are supposed to represent the thought processes of the

individual. The individual makes four travel decisions as follows: the decision that a trip is necessary to fulfill some need or purpose (generation), the decision where that need/purpose is best fulfilled (distribution), the decision of which means is best to get there (mode choice), and the decision of which route to take (trip assignment). The trip generation model is the first of the four primary model components identified as part of the four-step planning process. It is critical that this step produces an accurate value as these values form the basis for the subsequent steps and the errors in this step can propagate in the entire estimation process. The development of travel models for small urban communities is not a new idea. Several methods have been developed to provide forecasts based on specific input assumptions.

Urban transportation covers the movement of both people and goods within an urban area. The functioning of metropolitan cities is highly dependent on the movement of people, goods and information (Muller, 1995) and trip generation studies are a vital part of transportation planning due to the recursive nature of urban transportation modeling procedure (Bruton, 1986; Badoe and Steuart, 1997). At the individual level, urban transportation can be characterized by a trip (Barber, 1995). However, at the metropolitan area level, millions of these individual trips define urban transportation. A trip is as a journey made by an individual between two different points, each trip is performed using one or multiple transportation modes for a defined purpose at a given time. Although a trip may involve more than one purpose, it is usually identified by its principal purpose (Hobbs, 1979).

Trip generation analysis, as Meyer (1974) puts it, seeks to estimate the volume of trips that will be made by individuals to work, shopping, school, and so forth, but not the flows between points within the whole system.

Trip generation models relate trip generation rates to land-use and household characteristics. Trip making is a function of the socio-economic characteristics of the trip makers, and physical and demographic characteristics of the area. The socio-economic characteristics of the trip makers are assumed to be significant determinants of travel behavior (Koppelman, 1984) and include income, age, gender, employment status, auto ownership, and household size. The physical and demographic characteristics of the area include employment, population, and density (Hobbs, 1979).

The trip generation step consists of the processes to estimate trip production and trip attraction of a traffic analysis zone. Trip attraction identifies the number of trips attracted by the various activity centers in the trip attraction zones and trip production identifies the number of trips produced by the households in the trip attraction zones. This study deals with the trip attraction rate (TAR) of the hotels, the number of people coming to the hotel per unit time. The purpose of this study is to collect data about the number of vehicle-trips coming to the first class hotels (five stars) hotels in Amman, the capital of Jordan, and develop a model for estimating the total daily attracted trips by hotels. This model can help engineers and planners in estimating traffic volumes attracted by hotels which in result helps in determining the demand on existing facilities and expected demand on transportation network when change in land use occur.

This study consists of the following major components:

- Surveying twelve hotels during summer 2007 in Amman, Jordan.
- Developing a model for predicting the number of vehicle-trips attracted by first class hotels.
- Determining trip rates for first class hotels in terms of the various explanatory variables.

2. HOTELS SECTOR OVERVIEW

Hospitality and hotels sector in Jordan has grown significantly over the past few years, especially that the tourism sector and investment in hotels witness substantial growth in the Kingdom in terms of numbers of visitors and tourism income. The volume of investment in this sector has increased significantly in the last few years. Many companies and specialized organizations, as well as institutional investors, have diversified their investments in the hotel and hospitality sector, which is considered as one of the important sectors that contribute positively to the provision of employment opportunities and promote economic growth.

The government of Jordan, in its quest to develop this sector and believing that tourism is an industry for the future, has provided all the support and facilities for this vital sector. As a result, this sector was able to attract a chain of international hotels, and the investments in the hotel and tourism sector have grown significantly. These investments are expected to reach $ 5 billion over the next five years.

The hotel and hospitality sector is still facing problems and challenges relating to human resources, due to the reluctance of workers to work in such jobs. However, the hotel started to apply innovative strategies to address this problem. According to Ministry of tourism and antiquities statistics 2006, the number of employees working in classified hotels reached 13,450 employees, of which Jordanian employees form about 91%. The total number of classified hotels in Jordan reached 205 hotels providing more than 15,186 rooms and 28,640 beds. The number of five stars hotels reached 22 hotels scattered in the various governorates of the kingdom. The number of five stars hotels that are located within the borders of Greater Amman Municipality is 12 hotels; these hotels will form the sample for this study.

3. PROBLEM DEFINITION

The fundamental purpose of transportation is to provide efficient access to various activities that satisfy human needs. An efficient transportation system requires a continuous planning function to ensure that the mobility requirements of the community are supplied and maintained at an acceptable level (Wright, 1998). Transportation planning concerns with the provision of transportation facilities and services to meet existing or expected demand for travel. The analytical models that form the core of the strategic planning process are: Trip Generation, Trip distribution, modal split, and traffic assignment.

Trip generation, which is the scope of this study, is the analytical process that provides the relationship between urban activity and travel. The number of trips to and from activities in an area is related to land use and socioeconomic characteristics. Trips that originate or terminate within each zone are known as trip ends from origins and destinations. For the development of transportation models, these trip ends are called productions and attractions (Goodman 1968).

The main aim of the trip generation model is to establish a functional relationship between travel, land use, and socioeconomic characteristics of an area. The rate of trip making within an area depends primarily on land use, which in conjunction with socioeconomic information concerning residential and working population, is related to demands on the transportation system.

Ultimately, the function of trip generation analysis is to establish a meaningful relationship between land use and trip making activities so that changes in land use can

be used to predict subsequent changes in transportation demand. Hotels are the subject land use that this study will focus on in an attempt to determine the rate of trips attracted by hotels in Amman.

Hotels represent an important attraction that exerts a considerable effect on transportation facilities and services in the city of Amman. Currently, there is no locally-developed manual for computing the trip attraction of the different land uses in Amman. This study focus on hotels and represents an initial step for generating a local manual for computing trips attracted by the various land uses.

4. STUDY OBJECTIVES

The purpose of this study is to develop a model for estimating the number of attracted trips by hotels. The model can be used for planning and design of hotels for the design and traffic control schemes on the roadways near the hotels. A series of surveys was conducted to obtain data about the relevant characteristics of hotels. Using this data the model was developed. The model is simply a formula relating the number of the attracted trips to a number of factors affecting trips attraction.

The proposed model can serve as an alternative to the Institute of Transportation Engineers (ITE) Trip Generation Manual, and also it can be used as a local reference. Although the ITE Trip Generation Manual is a concise and easy to use reference, the models for hotels do not consider some of the features of hotels, such as the number of employees, the number of the parking spaces, and the location of the hotel that can have significant influence on the trip attraction rates of the hotels. The proposed model is intended to investigate if these additional variables have a considerable effect on these rates.

The main aim of this study is to develop a prediction model for the trips attracted by first class hotels in Amman based on a number of factors that are expected to have a great influence on trip rates attracted by hotels. These explanatory variables represent the relevant characteristics of hotels. These variables which will be referred to as the independent variables are:

1. Hotel location (West, North, Middle, etc…).
2. Hotel floor area (m^2).
3. Area of parking lots (m^2).

4. Price index.
5. Number of employees (Number).

The general form of the model will be as follows:

Attracted vehicle trips = F (Location, Hotel floor area, Area of parking lots, Price index, Number of employees).

This study will also specify the critical day-time intervals for the trips attracted and generated by hotels and the directional distribution of these trips. Knowing this will be useful for estimating the traffic volume to/from a new hotel which, is being planned and to assess the traffic impact of the hotels on the geometric design of roadways in the surrounding area.

5. LITERATURE REVIEW

1. University of Delaware, July 2004, "Trip Attraction Rates of Shopping Centers in Northern New Castle County, Delaware", Newark, Delaware.

This study presents the trip attraction rates of the shopping centers in Northern New Castle County in Delaware. The study aims to provide an alternative to ITE Trip Generation Manual (1997) for computing the trip attraction of shopping centers in Delaware. As part of this study, a total of eighteen shopping centers were surveyed, for which the number of vehicles entering and leaving the shopping center in every fifteen minutes interval and the number of people visiting each store in the shopping center along with their movement patterns were measured.

The purpose of this study is to collect data about the number of people coming to shopping centers in northern New Castle County in Delaware, and develop models for estimating the trip attraction rates of the shopping centers. The models will be used for planning and design of shopping centers for the geometric design and traffic control schemes on the roadways near the shopping centers. A series of surveys was conducted to obtain data about the trip attractions at many shopping centers. Using these data two models were developed. They are called Microscopic and Macroscopic. The terms microscopic and macroscopic refer to the perspective on which the factors affecting the trip attraction rates are considered. The microscopic approach deals with the relationship between the trip attraction rates of individual stores and the shopping center as a whole, while the macroscopic approach relates the trip attraction of the shopping center as a function of the physical features of the shopping center, e.g. total parking spaces, total floor area, and the number of stores in the shopping center. These models can serve as an alternative to the ITE Trip Generation Manual (1997).

The microscopic approach consists of two parts. The first part deals with obtaining parameters called as weights for each store in the shopping centers, which reflect the trip-chaining phenomenon seen in the shopping centers. The second part deals with the trip attraction of individual stores, which can be obtained either from ITE manual or by inspection of similar stores in different shopping centers. These two parts are combined to obtain the trip attraction rates of the shopping centers, in other words, this approach consider weights in the trip attraction rate of individual store.

The macroscopic model computes the trip attraction rate of the shopping centers using the regression model, where following explanatory variables are used:

- The total floor area of the shopping centers (cumulative floor area of all stores in the shopping centers).
- The total number of parking spaces in the shopping centers.
- The total number of stores in the shopping centers.

Based on the surveyed data and the aerial photographs, the two approaches, microscopic and macroscopic, were developed to compute the trip attraction rate. The study showed that microscopic approach gives a better estimate of trip attraction compared with the macroscopic approach. The proposed models incorporate the factors that have been neglected in ITE Trip Generation Manual. These models should be useful for estimating the traffic volume to/from a new shopping center which, is being planned and to assess the traffic impact of the shopping center on the geometric design of roadways in the surrounding area.

2. Arentze, T.A., H. Oppewal, H.J.P. Timmermans. 2005. "A Multipurpose Shopping Trip Model to Assess Retail Agglomeration Effects", Journal of Marketing Research.

This study introduces a model that captures the effects of retail agglomeration on the choice of shopping trip purpose and destination. A nested-logit model that includes parameters representing between-store attraction and trip purpose-adjustment effects was specified. This model represents an alternative to the single-purpose discrete choice models commonly used in marketing and retailing research.

The model results demonstrate the hypothesized agglomeration effects on multipurpose shopping. It has been found that the location and size of shopping centers have a significant impact on choice of trip purpose. Furthermore, it appears that the perceived purpose-specific utilities of shopping destinations exhibit significant and positive joint-attraction effects. An important finding in this study was that cross-attraction effects are also significant and positive and sometimes even of the same order of magnitude as the joint-attraction effects. Different store types all contribute to destination attractiveness, even if no purchases are made from these stores.

The managerial implications of the findings are, first, that predictions based on single-purpose models can be substantially biased, under predicting the number of trips and, consequently, the market shares of larger centers. Second, these biases differ among product categories. These findings suggest that groceries and other goods benefit more from the presence of clothing and shoe stores than vice versa. Such effects are obscured in single-purpose models. Retail managers should therefore consider using multipurpose models such as the one developed in this study. There is sufficient scope for this given that the retail-supply and shopping trip data required to estimate the

proposed multipurpose model are fairly straightforward to collect. Finally, the proposed model structure provides a framework for modeling consumer choice in a variety of situations in which agglomeration effects occur.

3. Rowe, Curtis D, Kaseko, Mohamed S, Ackeret, Keneth W, may 2002, "Recalibration of Trip Generation Model for Las Vegas Hotels/Casinos, Institute of Transportation Engineers.

This study represents an updated trip generation study for Las Vegas hotels. The study was motivated by the work conducted by Kenneth W. Ackeret and Robert C. Hosea as presented in the May 1992 issue of ITE Journal in "Trip Generation Rates for Las Vegas Area Hotel-Casinos." Ackeret and Hosea calibrated the number of vehicle trips generated by a hotel/casino as a function of casino floor area, number of hotel rooms and employees. The results of their study were the basis for the current method of estimating the number of vehicle trips generated by Las Vegas hotel/casinos. However, the method was based on a relatively limited data set. The data used were collected in and prior to 1990 for 21 hotel/casino counts. Since then, numerous hotel/casinos were constructed that conducted facility driveway trip counts within the Las Vegas metropolitan area. This increased data consisting of 46 hotel/casino vehicle generation counts is expected to provide more statistically significant results in trip-making characteristics. Likewise, it is believed that the independent variable of the number of gaming positions would be a good variable for estimation of trip generation. In other areas of the country, gaming positions have been used as an estimator of hotel/casino trips. However, the number of gaming positions as compared with expected trip generation has not been studied within the Las Vegas area. Therefore, one

hypothesis tested in this feature is that the number of gaming positions is a good estimator of trips generated by hotel/casinos.

The regression analysis was conducted using data obtained from various existing hotel/casinos that had vehicle generation counts conducted during the a.m. and p.m. peak hours to determine the number of vehicles entering and exiting individual casino properties. The following independent variables were used in the analysis:

- Number of gaming positions;
- Number of employees;
- Number of hotel rooms; and
- Casino floor area.

The data needed included the typical a.m. and p.m. adjacent-street peak-hour facility driveway count volumes, number of gaming positions, number of hotel rooms, number of employees and casino floor area of each hotel/casino. The data used by Ackeret and Hosea and the "Trip Generation Analysis Report," conducted by the University of Nevada-Las Vegas, were supplemented with data collected more recently and used for this study.

Regression analysis was conducted to develop regression equations for estimating the number of trips generated by the casinos as a function of several combinations of independent variables. Both linear and nonlinear equations were evaluated. For the nonlinear equations, the natural logarithmic and squared polynomials were used to determine which type of equation would best estimate the trip generation of a hotel/casino. Development of the "best" regression equation was done using the stepwise regression analysis procedure.

From the analysis, it was found that the addition of gamming positions as an independent variable was a significant improvement over previous developed equations.

Also, trip generation equations were developed using data from Las Vegas hotel/casinos, the trip making characteristics of the resort corridor Las Vegas hotels/casinos are unique based on facility size and proximity to each other. Therefore, further studies are recommended to be conducted to compare these equations to other regional gaming facilities for the various independent variables.

4. Saad Ali Abu-Ameerh, may 2007,"Trip attraction model for hospitals in Jordan", University of Jordan.

This study utilized the method detailed in trip attraction for identification of the relationship between the attracted vehicle trips and three proposed independent variables. The independent variables were the working staff, number of beds and gross floor area).the study surveyed fifteen hospitals scattered within six provinces in Jordan. In this study, only general hospitals were included since the number of convalescent hospitals in Jordan is very limited. There were many factors taken under consideration when selecting general hospitals to be included in the sample. Selected hospitals should have the character of having the ability of controlling the number of entered and exited vehicles to the hospital.

The data, on which the study were based, was collected during the year 2006.Two types of data were collected at each hospital, the data included traffic volume counts and specific descriptive information about the site which are defined as the independent variables. Data regarding the above mentioned variables were collected using the hospitals administrative records, and the Annual Statistical Book 2005 issued by the directorate of information studies and research. Data about the dependent variable in this study which was the observed attracted vehicle trips (V_A), was estimated by enumerating the total vehicle trips generated by hospitals under study. The total vehicle

trips for each hospital included the entering and exiting vehicle trips. Manual counting was conducted from 6 a.m. to 6 p.m. to enumerate the total vehicle trips entering and leaving each site. Collected data were limited to four days in the week (Sunday through Wednesday).

Regression analysis was conducted to develop regression equations for estimating the number of vehicle-trips attracted by hospitals as a function of the different independent variables. The study found that linear models are significant in predicting the number of attracted vehicle trips by the hospitals in Jordan. In addition, results of this study showed that the number of staff working at hospitals is the best predictor for estimating the number of attracted vehicle trips by hospitals in Jordan.

The peak hours of the trips generated by Jordanian hospitals were calculated, it has been found that the Jordanian hospitals show highest vehicular movements during a.m. period, which means that A.M periods should be regarded as a critical period during the week-days.

Finally, average trip rates were calculated for hospitals to determine the average number of vehicle trips attracted per each of the independent variables. The attracted vehicle trips per staff were found to be 2.21, compared with 6.46 attracted vehicle trips per bed, and 9.57 attracted vehicle trips per $100m^2$ of gross floor area.

5. K. Mert Cubukcu, (2001),"Factors Affecting Shopping Trip Generation Rates in Metropolitan Areas.

This study attempts to answer two specific questions on trip generation: (1) What are the factors that affect the total number of shopping trips in North American metropolitan areas, and (2) Do the demand for technology related products, and telecommunication technologies, particularly on-line shopping, have any observable

effect on personal shopping trips generated in these areas? The estimated model is linear in the continuous independent variables and linear in the logarithms of the continuous dependent variable. The dependent variable is the total annual number of shopping trips. The explanatory variables include (1) characteristics of the metropolitan areas (population, density, temperature), (2) socio-economic characteristics of the trip makers (age, employment status), and (3) technology related trip maker characteristics (computer ownership, modem ownership). The empirical findings, based on OLS estimation of 1995 data for 49 metropolitan areas with population over 1 million indicate that population size, temperature, the percentage of the population between ages 34-54, and computer ownership are positively related to shopping trip generation rate. Density and modem ownership are negatively related. The relations are statistically significant. The model estimates that the net number of annual shopping trips decrease by between 2.33 and 61.47 millions for the metropolitan areas in the sample, when both computer ownership and modem ownership are increased by one percent. However, the current model does not explain whether these trips are eliminated or replaced with other trips.

6. METHODOLOGY

Regression analysis is the most widely used statistical technique for investigating and modeling the relationship between variables (Montgomery and Peck, 1992). In a statistical problem, if we let the dependent variable (response) to be Y and the independent variable (predictor) to be X, the reasonable form of linear relationship between the two variables is shown in Equation (6.1).

$$Y = \beta_o + \beta_1 X \qquad \text{.....(Equ. 6.1)}$$

The concept of regression analysis deals with finding the best relationship between X and Y, quantifying the strength of that relationship and the use of methods that allow for prediction of the response values given values of predictor X. In the equation, β_o is known as the intercept and β1 as the slope. The statistical error between the observed value of Y and the straight line (β_o + β1 X) is represented by ε. The more plausible regression model is represented as in Equation (6.2).

$$Yi = \beta_o + \beta_1 Xi + \varepsilon_i \qquad \text{.....(Equ. 6.2)}$$

In most applications, as the case with this study, there will be more than one predictor that helps to explain Y. The multiple linear regression equation is used in such situations. It is shown in Equation (6.3).

$$Y = \beta_o + \beta_1 X1 + \beta_2 X2 + \ldots + \beta n\, Xn + \varepsilon \qquad \text{.....(Equ. 6.3)}$$

where Y is the natural dependent variable, and X1, X2,…, Xn are the independent variables. The resulting analysis is termed as multiple linear regression analysis. The term linear is used to indicate that the model is linear in the parameters β_o, β1,...., βn, not because Y is a linear function of X's. The important objective of regression analysis is to estimate the unknown parameters in the regression model. The values of the

coefficients (β's) are derived by the least squares method. The least squares method minimizes the sum of squares of the difference between the observed values and the computed values, mathematically:

$$SSR = \Sigma (y_i - \hat{y}_i)^2 \qquad \text{.....(Equ.6.4)}$$

where SSR is the sum of squared residuals (errors), y_i is the observed value of the attracted trips, and $\hat{y}_i$ is the computed value of the attracted trips.

As with most statistical procedures, the validity of the inferences depends on certain assumptions being satisfied. These assumptions required for a linear regression analysis, made about the random error term in the straight-line probabilistic model, are summarized below:

i. The mean of the probability distribution of the random error is zero, that is, for each setting of the independent variable (*x*), the average of the errors over an infinitely long series of experiments is zero.

ii. Homoscedasticity, that is, the variance of the probability distribution of the random error is constant for all settings of the independent variable (*x*) and is equal to σ^2, i.e., the variance of the random error is equal to σ^2 for all values of (*x*).

iii. Normality, which means the probability distribution of the random error is normal.

iv. The errors associated with any two observations are independent. That is, the error associated with one value of (*y*) has no effect on the errors associated with other y values.

v. Linearity, that is, the relationship between the mean value of y, E(*y*), and the independent variable x is correctly modeled by a straight line. In a real

application, the relationship between E(y) and (x) probably possesses some curvature.

The second phase of regression analysis is called model adequacy checking, in which the appropriateness of the model is studied and the quality of the fit is ascertained. A residual analysis was conducted to check the model adequacy. The outcome of the adequacy checking may indicate either that the model is reasonable or that the original fit must be modified. Thus, the regression analysis is an iterative procedure, in which data lead to model selection, and a fit of the model to the data is produced. The quality of the fit is then investigated, leading either to modification of the model or adoption of the model.

7. SURVEY AND DATA COLLECTION

Data collection was one of the main efforts of this study. The study included all first class hotels which lie within the borders of Greater Amman Municipality. Twelve hotels at different locations were surveyed at different dates to collect the necessary data for the successful completion of this study. This section presents the hotels that were surveyed and their characteristics, data collecting sources and processes, in addition to the definition of variables that will be used to set up the model and achieve the objective of this study.

7.1 DATA REQUIRED

The main aim of this study is to develop a prediction model for vehicle-trips attracted by first class hotels in Amman, based on a number of factors that are expected to have a great influence on trip rates attracted by hotels. The information about these factors forms the raw data for this study. Data required for the completion of this study has been divided into two categories:

1. Descriptive data: these data represent the physical features of the hotels. It includes hotel's floor area, area of parking lots, and other necessary information about the hotels, such as location and number of employees.
2. Measured data: these data represent the number of trips generated and attracted by each hotel in terms of the number of vehicles entering and exiting the hotels in 15-minute intervals.

7.2 SOURCE OF DATA

The main source of data about the physical features and other additional data about the studied hotels was the relevant departments at proposed hotel. All necessary

information about the hotel which involve the floor area, number of employees, area of parking lots and room rates of the different rooms types have been obtained from the human resources department, sales department and the engineering department of the proposed hotels, after being informed about the objective and the importance of the study.

7.3 DATA COLLECTION PROCEDURE

Manual counting was the source of data about the number of vehicles entering and exiting each hotel. Manual counting was conducted on different days of the week excluding Friday and Saturday, which represent the weekly vacation of most hotels. The counting process had continued for two consecutive days for each hotel from 7.00 A.M to 7 P.M. Vehicles entering and exiting each hotel were observed and the numbers of entering and exiting vehicles were manually recorded in 15-minute time interval. This interval is chosen because Highway Capacity Manual uses this interval as the base unit for capacity calculation, and also, it enables determining the peak hour for the movements of vehicles entering and exiting hotels, and specifying the arrival and departure pattern of the vehicles. The average of the two-day vehicles counting of a specific time interval was used to determine the number of vehicles entered or exited that hotel during that time interval.

Currently; many techniques are used for collecting transportation data in the field. For manual forms of data collection, methods range from using pencil and paper to, more recently, laptop computers running specialized software programs. The counting technique that was used in this study was the first of those techniques. The survey team

watched all entrances and exits of each hotel, and manually recorded vehicles that entered and exited each hotel in the corresponding time interval.

7.4 PLACE AND TIME

The survey included twelve hotels scattered in different suburbs of Greater Amman Municipality. This survey was completed during the months of July, August and September of the year 2007. Here, it is worth mentioning that the time of this survey is considered as a low-season period for foreign tourists who visit Jordan. Those tourists form a considerable proportion of customers who attend hotels. Therefore, the occupancy rate in these hotels during this period is relatively less than that in other periods of the year. Table (7.1) shows the hotels surveyed and dates of survey for each hotel.

Table (7.1): Hotels Surveyed and Dates of Survey for Each Hotel

Hotel Name	Dates
Crowne Plaza Hotel	21&22/8/2007
Holiday Inn Hotel	13&14/8/2007
Regency Palace Hotel	29&30/7/2007
Marriott Hotel	1&2/8/2007
Radisson Sas Hotel	26&27/8/2007
Four Seasons Hotel	29&30/8/2007
Jordan Intercontinental Hotel	9&10/9/2007
Grand Hyatt Hotel	6&7/8/2007
Kempinski Hotel	12&13/7/2007
Le Royal Hotel	22&23/7/2007
Sheraton Hotel	19&20/8/2007
Le Meridien Hotel	4&5/9/2007

7.5 COLLECTED DATA

The purpose of this study is to collect data about the number of vehicle-trips coming to hotels in Amman in Jordan, and develop a model for predicting the number of vehicle-trips attracted by each hotel, depending on a number of factors that are expected to have a great influence on the number of vehicle-trips attracted by hotels. These factors will be referred to as the independent variables while the number of the attracted trips will be referred to as the dependent variable. The first practical step in the development of the model was the collection of the necessary data related to the dependent and independent variables.

A survey was conducted to obtain the necessary information about the number of vehicle-trips attracted by each hotel. Vehicles entering and exiting each hotel were observed by watching all entrances and exits of each studied hotel. Vehicles counting process continued for twelve hours from 7.00 A.M to 7.00 P.M, during the counting period which lasted for two days for each hotel. Vehicles entering and exiting each hotel were observed and the number of vehicles entering and exiting was manually recorded in 15-minutes time interval. These counts have been then organized in spread sheets to ease calculations. Table (7.2) shows the number of daily vehicle-trips attracted and generated by each hotel. Counts for each study hotel during survey period are provided in Appendix A.

Table (7.2): Number of Daily Vehicle-Trips Attracted & Generated by Each Hotel

Hotel Name	Number of Daily Vehicle-Trips Attracted	Number of Daily Vehicle-Trips Generated
Crowne Plaza Hotel	507	503
Holiday Inn Hotel	393	385
Regency Palace Hotel	314	309
Marriott Hotel	538	543
Radisson Sas Hotel	486	445
Four Seasons Hotel	717	627
Jordan Intercontinental Hotel	892	802
Grand Hyatt Hotel	774	742
Kempinski Hotel	372	340
Le Royal Hotel	936	792
Sheraton Hotel	554	553
Le Meridien Hotel	629	561

Figure (7.1) shows a comparison between the numbers of the observed daily attracted and generated vehicle-trips by each hotel.

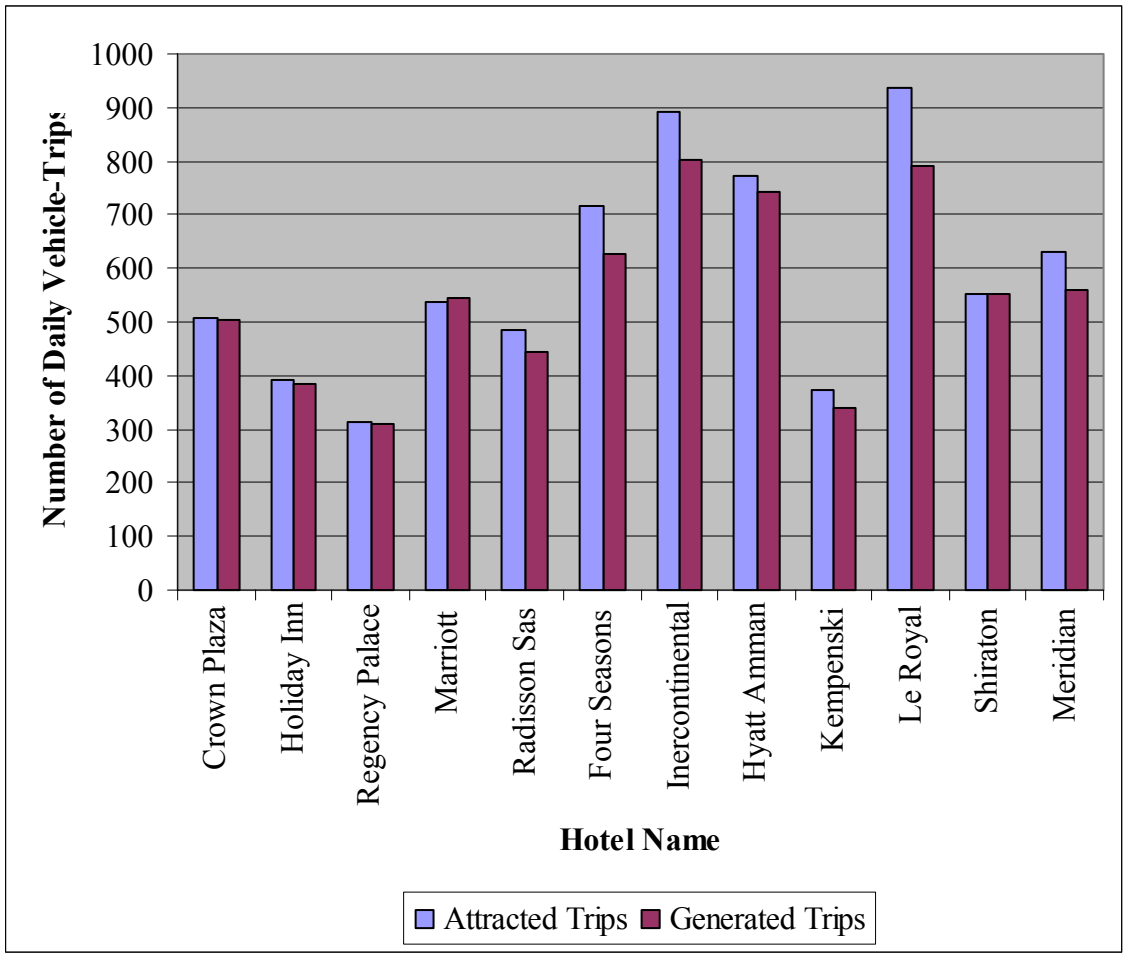

Figure (7-1): Attracted & Generated Vehicle-Trips by Each hotel

The next step in the data collection process was to gather necessary information about the explanatory variables, these information represent the physical features of the studied hotels. These variables are expected to influence the number of vehicle-trips attracted by each hotel. These explanatory variables represent the relevant characteristics of hotels. The explanatory variables associated with each hotel are:

1. Hotel location (West, North, Middle, etc…).
2. Hotel floor area (m^2).
3. Area of parking lots (m^2).
4. Price index.
5. Number of employees (Number).

The previous explanatory variables can be defined as the following:

Hotel Location: The geographical location of the studied hotels within the borders of Greater Amman Municipality (West, North, or Middle).

Hotel Floor Area: Total building area of the hotel excluding parking floor area, expressed in square meters.

Area of Parking: Area of parking spaces available at each hotel including Open-Parking but excluding parking floor area and on-street parking spaces available on the adjacent streets to hotel location. The unit of measurement is square meters.

Price Index: An index that is developed to describe hotel's average room rate in addition to available parking area per room, average bed area and level of service. Price index is calculated using the following equation:

$$\text{Price index} = \frac{\text{Average Room Rate}}{(\text{Parking Area per Room}) \times (\text{Floor Area per Bed}) \times (\text{Level of Service})} \quad \text{....(Equ.7.1)}$$

Where,

Average Room Rate, represents the weighted average room rate of different rooms types (Single, Double and suit), expressed in JD/room. Average Room Rate can be calculated using the following equation:

$$\text{Average Room Rate} = \frac{((\text{No. of single Rooms} \times \text{single room rate}) + (\text{No. of Double Rooms} \times \text{Double room rate}) + (\text{No. of suites} \times \text{suit rate}))}{\text{No. of single rooms} + \text{no. of double rooms} + \text{no. of suites}}$$

$$= (\text{JD/ Room}) \quad \text{.....(Equ.7.2)}$$

Floor Area per Bed, represents the average square meters of a bed in the hotel, expressed in m^2/bed, and can be calculated using the following equation:

$$\text{Floor Area per Bed} = \frac{\text{Hotel Floor Area}}{\text{No. of beds in the hotel}} \quad (m^2/\text{Bed}) \qquad \text{.....(Equ.7.3)}$$

Level of Service, represents the level of service that the hotel offers to its customers, expressed in employee/bed, and can be calculated using the following equation:

$$\text{Level of Service} = \frac{\text{No. of Employees}}{\text{No. of beds}} \quad (\text{Employee/bed}) \qquad \text{.....(Equ.7.4)}$$

Number of Employee: Total number of employees working at a hotel in all working shifts including administrative and operational employees.

It should be remarked that for the calculation of the average room rate at each hotel, rack rates are used instead of current room rates. Rack rates represent the yearly base prices for each room category. Rack-rate is used since room rates vary over the year according to demand, and also because current rates include different discounted rates that are afforded to different parties such as corporations and governmental ministries and others.

The data that are required for the calculation of price index value for each hotel are summarized in table (7.3).

Table (7.3): Data Required for the Calculation of Price Index Value

Hotel Name	No. of Rooms	No. of Beds	Floor Area/Bed (m^2/Bed)	Average Room Rate (JD/Room)
Crowne Plaza Hotel	279	486	56.6	91.9
Holiday Inn Hotel	218	436	60.2	181.5
Regency Palace Hotel	274	470	46.8	162.6
Marriott Hotel	293	522	47.9	150.4
Radisson Sas Hotel	260	477	63.7	103.9
Four Seasons Hotel	192	355	169.0	277.5
Jordan Intercontinental Hotel	440	798	65.2	392.5
Grand Hyatt Hotel	311	547	76.8	254.5
Kempinski Hotel	283	486	90.5	154.4
Le Royal Hotel	281	528	227.3	215.1
Sheraton Hotel	268	478	104.6	195.3
Le Meridien Hotel	430	747	97.7	224.6

As stated above, the main aim of this study is to develop a prediction model relating the number of vehicle-trips attracted by first class hotels in Amman to a number of independent variables. The dependent variable in this model is the total number of daily attracted trips while the independent variables are the location, hotel floor area, area of parking lots, price index and the number of employees. Values of the dependent variables of study hotels have been collected and determined and are summarized in table (7.4).

Table (7.4): Values of Independent Variables for the Studied Hotels

Hotel Name	Location	Hotel Floor Area (m^2)	Area of Parking Lots (m^2)	Price Index(1)	Number of Employees
Crowne Plaza	W	27,500	4,000	0.16	350
Holiday Inn	NW	26,226	800	1.58	227
Regency Palace	M	22,000	3375	0.38	351
Marriott	M	25,000	5,600	0.22	383
Radisson Sas	M	30,400	4,000	0.18	280
Four Seasons	W	60,000	4,200	0.06	475
Jordan Intercontinental	MW	52,000	3,640	0.97	598
Grand Hyatt	MW	42,000	3,500	0.34	480
Kempinski	M	44,000	1,500	0.52	300
Le Royal	MW	120,000	2,500	0.12	480
Sheraton	W	50,000	600	1.14	350
Le Meridien	M	73,000	900	1.75	470

(1): Price index is calculated according to equation 7.1

The dependent variable in the model is the total daily attracted vehicle-trips. The number of total daily attracted vehicle-trips represents the average daily attracted vehicle-trips over the period of survey which continued for two days. Table (7.5) shows the number of the total daily vehicle-trips attracted by each hotel.

Table (7.5): Total Daily Vehicle-Trips Attracted by Each Hotel

Hotel Name	Number of Total Daily Attracted Vehicle-Trips
Crowne Plaza	507
Holiday Inn	393
Regency Palace	314
Marriott	538
Radisson Sas	486
Four Seasons	717
Jordan Intercontinental	892
Grand Hyatt	774
Kempinski	372
Le Royal	936
Sheraton	554
Le Meridien	629

7.6 PROBLEMS ENCOUNTERED

The problems faced during data collecting process were few; the most was observing vehicles entering and exiting the hotels, that was because all the underground parking of hotels were closed due to security reasons. In the year 2005, a terrorist explosion occurred in some hotels in Amman, and because of that the government has decided to close all underground parking in hotels. Some hotels were able to provide the necessary parking for its customers while other hotels were not because of its difficult location. Therefore, many of the customers had to stop on the adjacent streets which were sometimes far from the hotel site. So, it was sometimes hard to observe these vehicles. Additionally, counting process required obtaining security clearance from the competent authorities that led to a delay in the counting process.

8. RESULTS

8.1 DATA SCREENING

Multiple regression is used when it is desired to predict an independent variable from a number of independent variables. The analysis process is completely dependent on the values of these variables. Any considerable error in these values can dramatically affect the prediction ability of the final regressed model .therefore; it is a good initial step to examine the values of all these variables before proceeding in multiple regression. First, visual inspection for unordinary values will be performed, and then data will be checked for outliers.

All analysis based in correlations are very vulnerable to outliers. The existence of an outlier in the observed data can at times affect the performance of a regression model. So, it is necessary to check data for outliers before proceeding in regression. An outlier is defined as a value that is at least three standard deviations above or below the mean. Table (8.1) shows the descriptive statistics of the dependent and independent variables.

Table (8.1): Descriptive Statistics of the Dependent & Independent Variables

Variable	Mean (μ)	Std. Deviation (σ)	Min.	Max.	μ- 3σ	μ + 3σ
Attracted Vehicle-Trips	592.7	201.48	314	936	-11.78	1197.1
Location	2.67	1.155	1	4	-0.797	6.131
Hotel Floor Area	47677	27687.9	22000	120000	-35386.8	130741.1
Area of Parking Lots	2885	1605.4	600	5600	-1931.6	7700.78
Price index	0.6183	0.5929	0.06	1.75	-1.16	2.39
No. of Employees	395.3	106.3	227	598	76.45	714.2

Examining the values shown above in Table (8.1) reveals that the values of dependent variable and the values of the independent variables are less than three standard deviations above or below its means. Therefore, we can conclude that no outliers have been detected in our data.

8.2 MODEL DEVELOPMENT

The purpose of this section is to develop a model for predicting the number of daily vehicle-trips attracted by hotels using the data collected in the previous section. After collecting and analyzing the data related to the dependent and independent variables, regression analysis will be used to develop the model that best reflects attraction pattern. The model expresses the total daily attracted vehicle-trips as a function of several independent variables. These independent variables include location, hotel floor area, price index, area of parking lots and number of the employees. The model development will be conducted by using step-wise regression analysis approach;

this approach is intended to provide the appropriate multivariable equation that contains the most significant independent variables. Stepwise multiple regression is a way of computing ordinary least squares in stages. In the first stage, the independent variable that best correlated with the dependent variable is included in the equation. In the second stage, the remaining independent variables with the highest partial correlation, controlling for the first independent, is entered. This process is repeated, at each stage partialling for the previously-entered independents, until the addition of a remaining independent does not increase R^2 by a significant amount, or until all variables are entered, of course. After developing the appropriate model, assumptions required for regression analysis will be checked to ensure none of these assumptions has been violated. Finally, a residual analysis will be conducted to check the model adequacy, in which the appropriateness of the model is studied and the quality of the fit is ascertained. The residual analysis will provide information that can lead to modifications and improvements in the regression model.

In this Study, reference is made to the dependent and independent variables as follows:

V_A: Attracted vehicle-trips;

HL: Hotel Location;

HA: Hotel floor Area (m^2);

PA: Area of Parking Lots (m^2);

PI: Price Index; and

EMP: Number of Employees.

8.3 MULTIVARIABLE MODEL:

The objective of this section is to generate a multivariable model in which attracted vehicle-trips represent the dependent variable, and hotel location, hotel floor area, number of employees, area of parking lots, and price index represent the independent variables. The resulting model will indicate many things. First, it will tell us how much of the variance of attracted vehicle-trips was accounted for by knowing the values of the independent variables stated above. This value is denoted by the coefficient of multiple determination "R^2". The output will also tell us if the model allows us to predict the hotel's attracted vehicle-trips at a rate better than chance. This is denoted by the significance level of the overall "F" value of the model. A significance level of 0.05 will be used to asses the model. In addition, the model will tell us how well each independent variable predicts the dependent variable.

Stepwise regression analysis was conducted using the five independent variables. The final regression model equation is given by Equation (8.1).

$$V_A = -32.264 + 1.261\ (EMP) + 0.002651\ (HA) \qquad \text{.....(Equ.8.1)}$$

Where,

V_A: Attracted vehicle-trips;

EMP: Number of Employees; and

HA: Hotel floor area (m^2)

The prediction equation above shows that the number of employees and the hotel's floor area are the significant variables among all other independent variables that are expected to affect the number of attracted vehicle-trips. Figure (8.1) shows the multiple regression model summary. As noted in the model summary table, R^2 value for the model was 83.8%, this value indicates that 83.8% of the variability in the number of attracted vehicle-trips can be explained by number of employees and hotel's floor area.

Adjusting for the number of predictors in the model, and the sample size employed, "R^2" will be 80.3%. The standard error of estimate is 89.5; this means that at the 0.05 significance level, the estimate is the one from the previous equation plus or minus (1.96*89.5).

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	EMP	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	HA	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: VTRIPS

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.863[a]	.745	.719	106.74576
2	.916[b]	.838	.803	89.52295

a. Predictors: (Constant), EMP

b. Predictors: (Constant), EMP, HA

Figure (8-1): Multiple Regression Model Summary

Figure (8.2) shows the multiple regression analysis results. The ANOVA table shows that the "F" value is 23.36 (P=0.000) which indicates that the model appears to be useful for predicting the number of attracted vehicle-trips.

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	332608.094	1	332608.094	29.190	0.000[a]
	Residual	113946.573	10	11394.657		
	Total	446554.667	11			
2	Regression	374425.439	2	187212.720	23.360	0.000[b]
	Residual	72129.227	9	8014.359		
	Total	446554.667	11			

a. Predictors: (Constant), EMP

b. Predictors: (Constant), EMP, HA

c. Dependent Variable: VTRIPS

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-54.055	123.605		-0.437	0.671	-329.464	221.353
	EMP	1.636	0.303	0.863	5.403	0.000	0.961	2.311
2	(Constant)	-32.264	104.100		-0.310	0.764	-267.754	203.227
	EMP	1.261	0.302	0.665	4.171	0.002	0.577	1.945
	HA	0.003	0.001	0.364	2.284	0.048	0.000	0.005

a. Dependent Variable: VTRIPS

Figure (8-2): Multiple Regression Analysis Results

The regression coefficients (B) in coefficients table represent the amount the dependent variable increases when the independent variable increases one unit while other independents are held constant. Both the number of employees and hotel's floor area has been found to be statistically significant, this means that they should be kept in the regression equation, since they have statistically significant relationship with the dependent variable. The beta coefficients, which are the standardized regression coefficients, indicate that number of employees is shown to be much more important

than hotel's floor area. For the previous model, one can interpret that attracted vehicle-trips is expected to increase by 1.26 vehicle-trips per day for every increase of one in the number of employees working in the hotel, for any given value of the hotel floor area (that is, with hotel's floor area held constant).Alternatively, attracted vehicle-trips is expected to increase by 2.65 vehicle-trips per day for every increase of one thousand m^2 in the hotel's floor area, with the number of employees held constant.

According to the regression equation proposed, the predicted attracted vehicle-trips have been calculated for the studied hotels. The results are shown in table (8.2).

Table (8.2): Observed and Predicted Vehicle-Trips of the Studied Hotels.

Hotel Name	Hotel Floor Area (m^2)	Number of Employees	Observed Number of Total Daily Attracted Vehicle-Trips	Predicted Number of Total Daily Attracted Vehicle-Trips
Crowne Plaza	27,500	350	507	482
Holiday Inn	26,226	227	393	324
Regency Palace	22,000	351	314	469
Marriott	25,000	383	538	517
Radisson Sas	30,400	280	486	401
Four Seasons	60,000	475	717	726
Jordan Intercontinental	52,000	598	892	860
Grand Hyatt	42,000	480	774	684
Kempinski	44,000	300	372	463
Le Royal	120,000	480	936	891
Sheraton	50,000	350	554	542
Le Meridien	73,000	470	629	754
Mean (μ)			**592.67**	**592.75**
Standard Deviation (σ)			**201.48**	**184.44**

Table (8.2) shows that none of the predicted values is more than 3 standard deviations from the mean value of the dependent. Therefore, no outliers are detected and none of the cases should be dropped. Figure (8.3) shows the observed and predicted attracted vehicle-trips for the studied hotels.

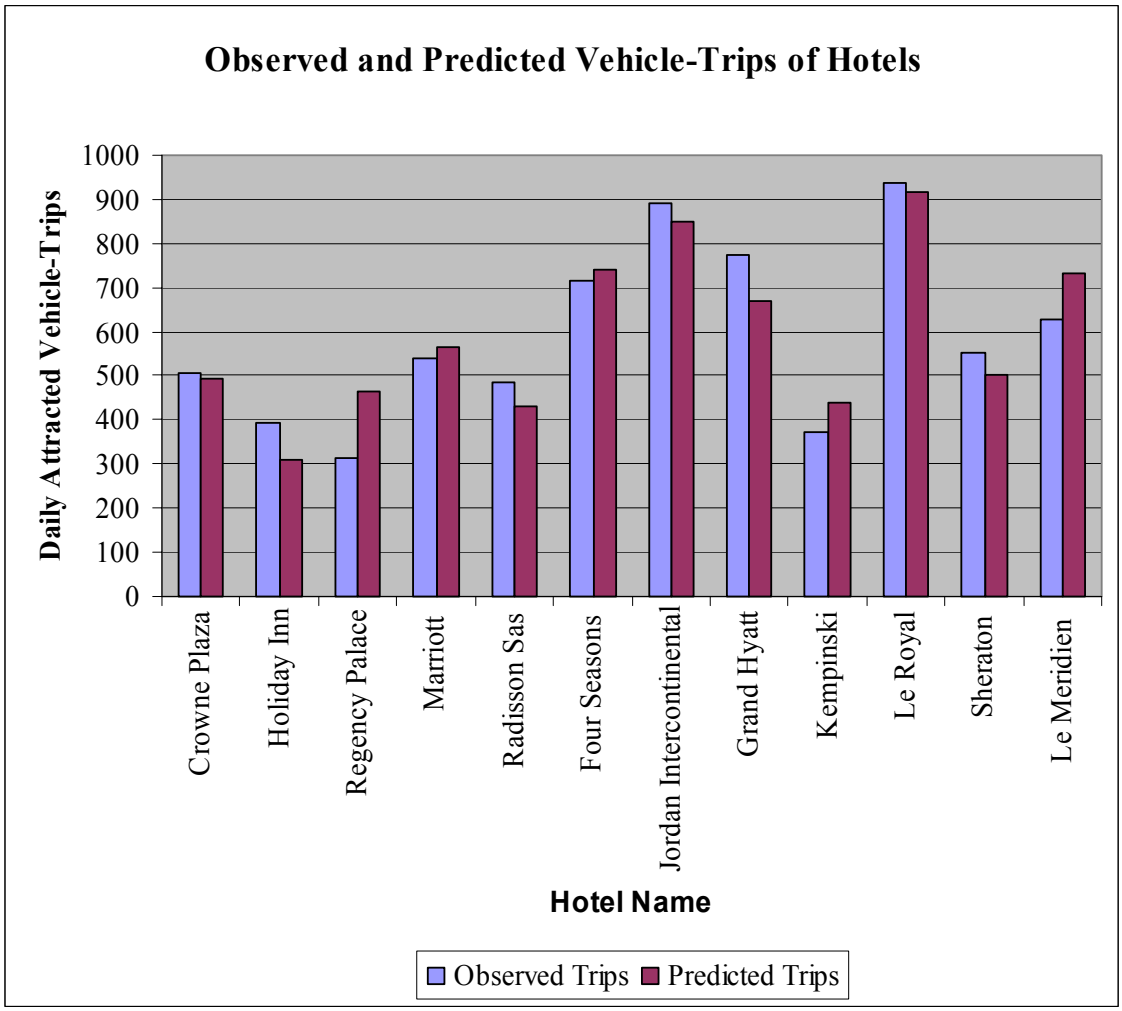

Figure (8-3): Observed and Predicted Vehicle-Trips of the Studied Hotels.

8.4 CHECKING ASSUMPTIONS OF REGRESSION

Nature is rarely (if ever) perfectly predictable. Quantitative models always rest on assumptions about the way the world works, and regression models are no exception. The equation for fitting the regression line can be applied to any data set. However, that doesn't mean that the results of the regression are actually meaningful. In order to trust the results of a regression analysis the five assumptions about the errors (ε) need to hold.

There are five principal assumptions which justify the use of linear regression models for purposes of prediction:

vi. Linearity, that is, the relationship between the mean value of y, E(y), and the independent variable x is correctly modeled by a straight line. In a real application, the relationship between E(y) and (x) probably possesses some curvature.

vii. The mean of the probability distribution of the random error is zero, that is, for each setting of the independent variable (x), the average of the errors over an infinitely long series of experiments is zero.

viii. Homoscedasticity, that is, the variance of the probability distribution of the random error is constant for all settings of the independent variable (x) and is equal to σ^2, i.e., the variance of the random error is equal to σ^2 for all values of (x).

ix. Normality, which means that the probability distribution of the random error is normal.

x. The errors associated with any two observations are independent. That is, the error associated with one value of (y) has no effect on the errors associated with other y values.

8.4.1 Linearity

Multiple regression assumes that there is a linear (straight line) relationship between the independent variables and the dependent variable. To the extent non-linear relationships are present, conventional regression analysis will underestimate the relationship. If the true relationship between the independent variables and the dependent variable is curvilinear, the R^2 value will be underestimate. That is, R^2 will underestimate the variance explained overall and the betas will underestimate the importance of the variables involved in the non-linear relationship. Substantial violation of linearity thus means regression results may be more or less unusable.

Partial regression plots are often used to assess nonlinearity. These are simply plots of each independent variable on the X-axis against the dependent variable on the Y-axis. Curvature in the pattern of points in a partial regression plot sows if there is a non-linear relationship between the dependent variable and any of the independent variables taken individually. Figures (8.4) and (8.5) show partial regression plots for the number of employees and hotel floor area, respectively.

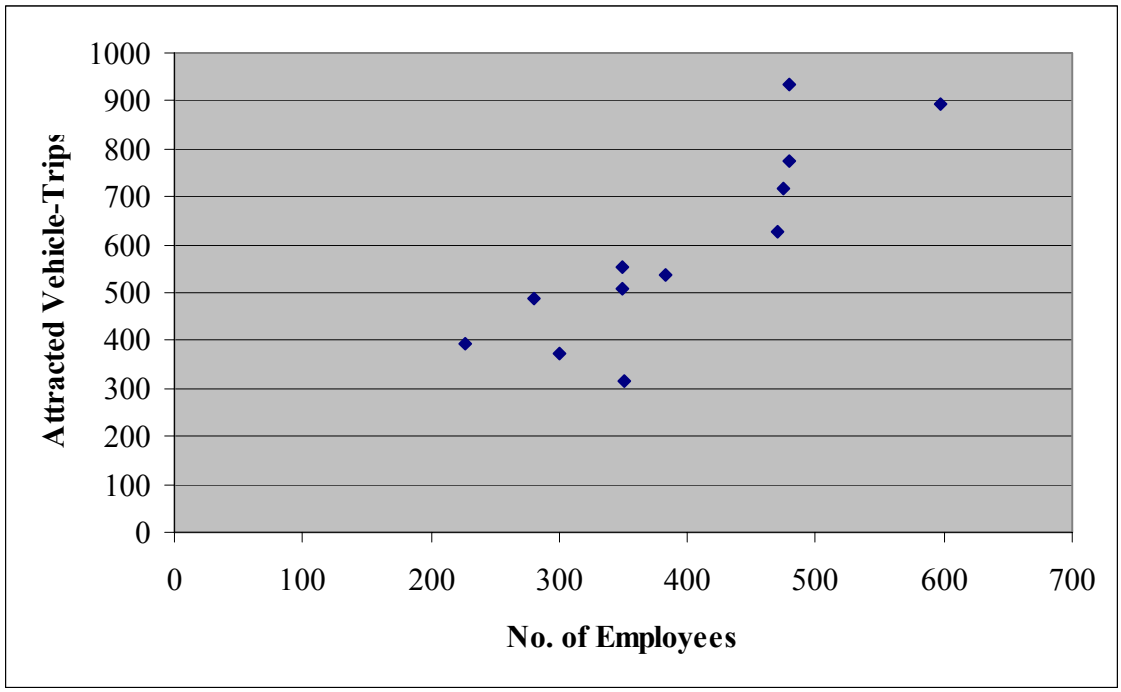

Figure (8-4): Partial Regression Plot of no. of Employees

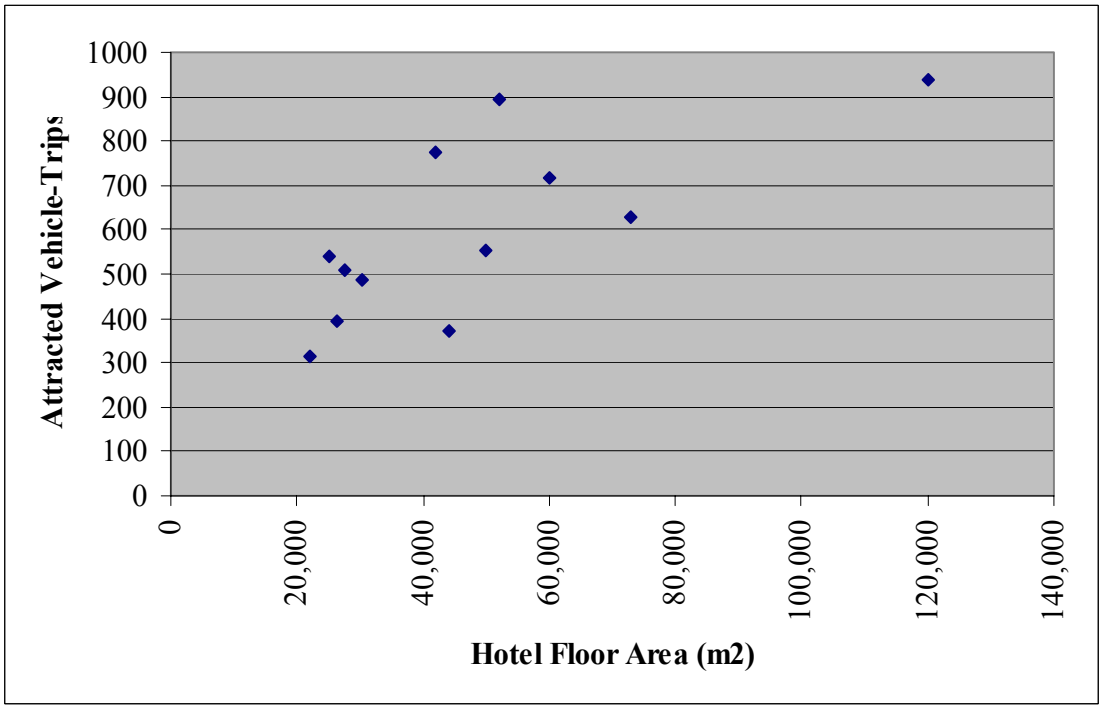

Figure (8-5): Partial Regression Plot of Hotel Floor Area

From the partial regression plots shown above in figures (8.4) and (8.5), we can observe that no curvilinear relationship is denoted between the dependent variable and any of the independent variables. Therefore, the assumption of linearity has not been violated.

8.4.2 Homoscedasticity

The assumption of homoscedasticity is that the variance of residual error should be constant for all values of the independent variables. Lack of homoscedasticity may mean that there is an interaction effect between a measured independent variable and an unmeasured independent variable not in the model, or that some independent variables are skewed while others are not.

Nonconstant error variance can be observed by constructing simple residual plots (a plot of unstandardized residuals on the Y-axis against unstandardized predicted values on the X-axis). Unstandardized residual is simply the difference between the observed and predicted values of total daily attracted vehicle-trips V_O and V_P, respectively.

$$\text{Residual} = V_O - V_P \qquad \text{.....(Equ.8.2)}$$

A homoscedastic model will display a cloud of dots, whereas lack of homoscedasticity will be characterized by a pattern such as a funnel shape, indicating greater error as the dependent increases. Nonconstant error variance can indicate the need to respecify the model to include omitted independent variables.

The values of the independent variables, observed and predicted attracted-vehicle trips, and residuals are shown below in Table (8.3).

Table (8.3): Residuals, Observed and Predicted Attracted Vehicle-Trips

Hotel Floor Area (m^2)	Number of Employees	Observed Number of Total Daily Attracted Vehicle-Trips (V_O)	Predicted Number of Total Daily Attracted Vehicle-Trips (V_P)	Unstandardized Residual ($V_O - V_P$)
27,500	350	507	482	25
26,226	227	393	324	69
22,000	351	314	469	-155
25,000	383	538	517	21
30,400	280	486	401	85
60,000	475	717	726	-9
52,000	598	892	860	32
42,000	480	774	684	90
44,000	300	372	463	-91
120,000	480	936	891	45
50,000	350	554	542	12
73,000	470	629	754	-125
Mean (μ)	395.3	592.7	592.7	0.08
Standard Deviation (σ)	106.3	201.5	184.4	81.1

Figure (8.6) shows a scatter plot of unstandardized residual vs. unstandardized predicted value. As long as the scatter of the points shows no clear pattern, then we can conclude that the variance is constant and the assumption of homoscedasticity is satisfied. In addition, the random pattern in the plot ensures that the linearity assumption is satisfied also.

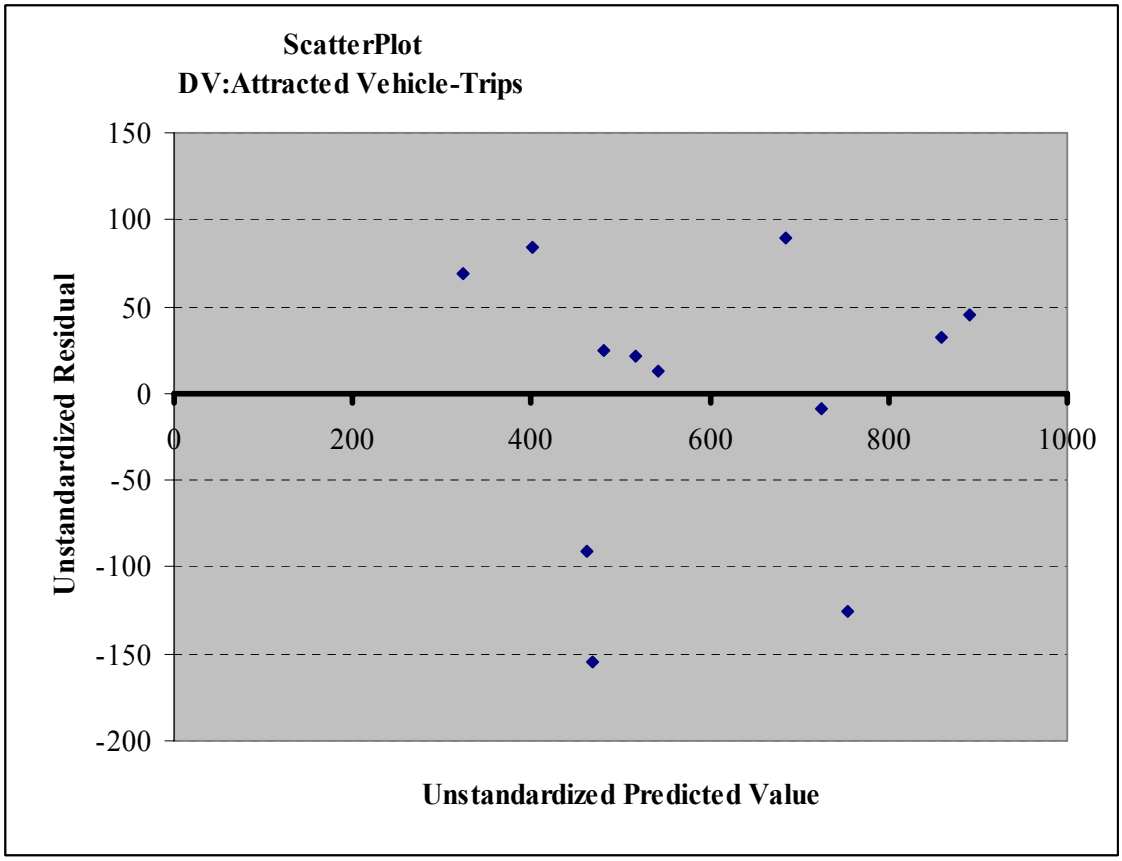

Figure (8-6): Scatter Plot of Unstandardized Residual vs. Unstandardized Predicted Value

Residuals must be also checked for outliers. Our interest is to make sure that residuals are at most three standard deviations above or below the mean. Table (8.4) shows the descriptive statistics of the residuals.

Table (8.4): Descriptive Statistics of Residuals

Minimum	Maximum	Mean (μ)	Std. Deviation (σ)	μ + 3 σ	μ - 3 σ
-155	90	0.083	80.98	243.3	-243.3

From the values shown above in Table (8.4), we conclude that we don't have any outliers within residuals, since residuals are less than three standard deviations above or below its mean.

8.4.3 Normally Distributed Residual Error

Random error, represented by the residuals, should be normally distributed and the mean of the probability distribution should be zero. To check normality, a histogram will be constructed to show what the distribution of the residuals looks like. Figure (8.7) shows that the error is normally distributed about the mean which is approximately zero. Therefore, the assumptions that the probability distribution and of the random error is normal, and that the mean of this distribution is zero have not been violated.

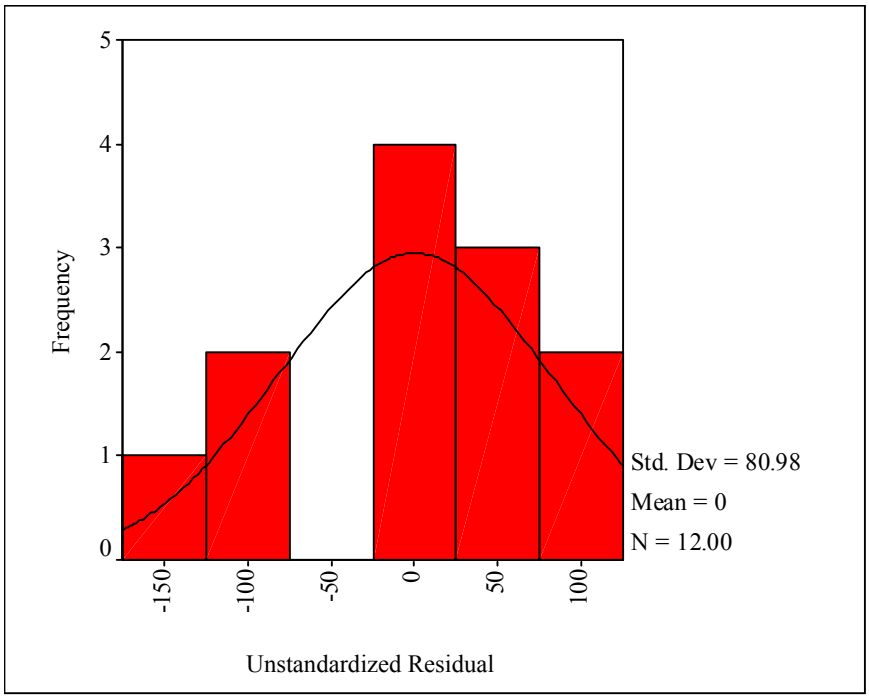

Figure (8.7): Histogram of Unstandrdized Resiuals

Alternatively, a normal probability plot was constructed to check that residuals are normally distributed. Figure (8.8) shows the normal probability plot of residuals. It can be observed that the residuals are almost normally distributed, as the points lie approximately on a straight line. Therefore the assumption of normality is satisfied.

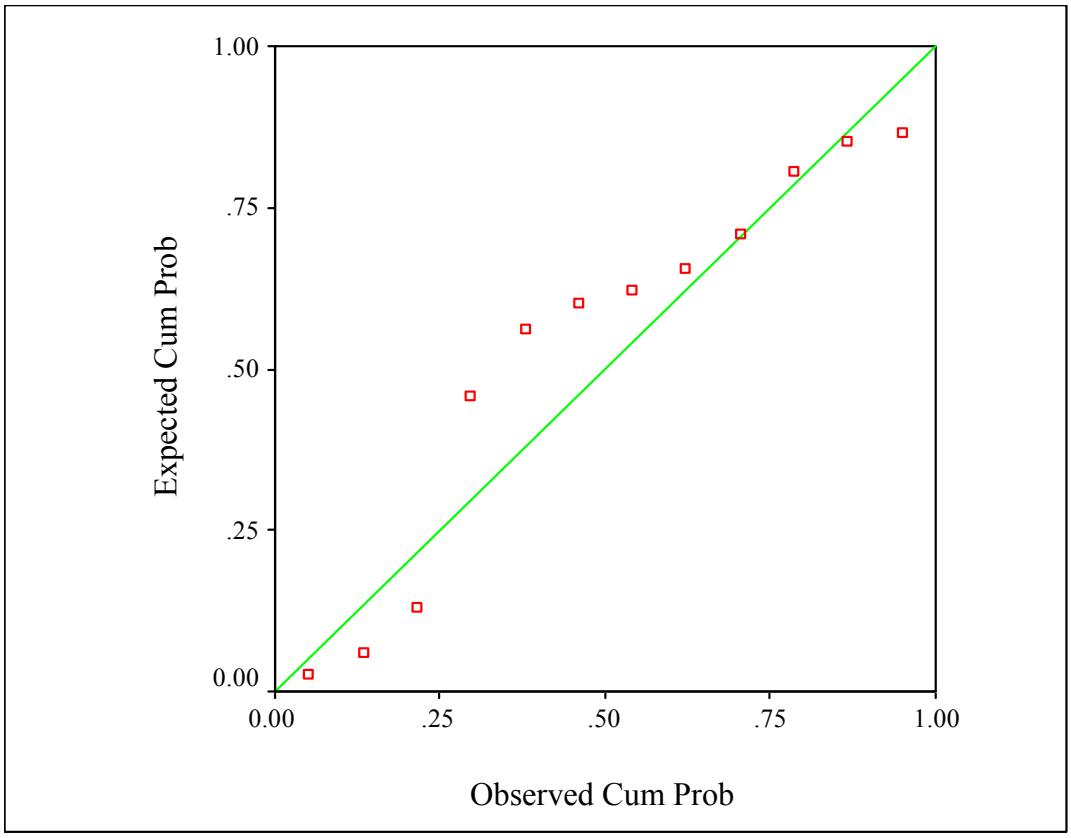

Figure (8-8): Normal Probability Plot of Residuals

8.5 INTERACTION

Interaction between the two independent variables included in the regression model has also been studied to test if the first order model developed is appropriate for predicting attracted vehicle-trips. Attracted vehicle-trips are plotted against number of employees for fixed values of hotel floor area as shown in figure (8.9).

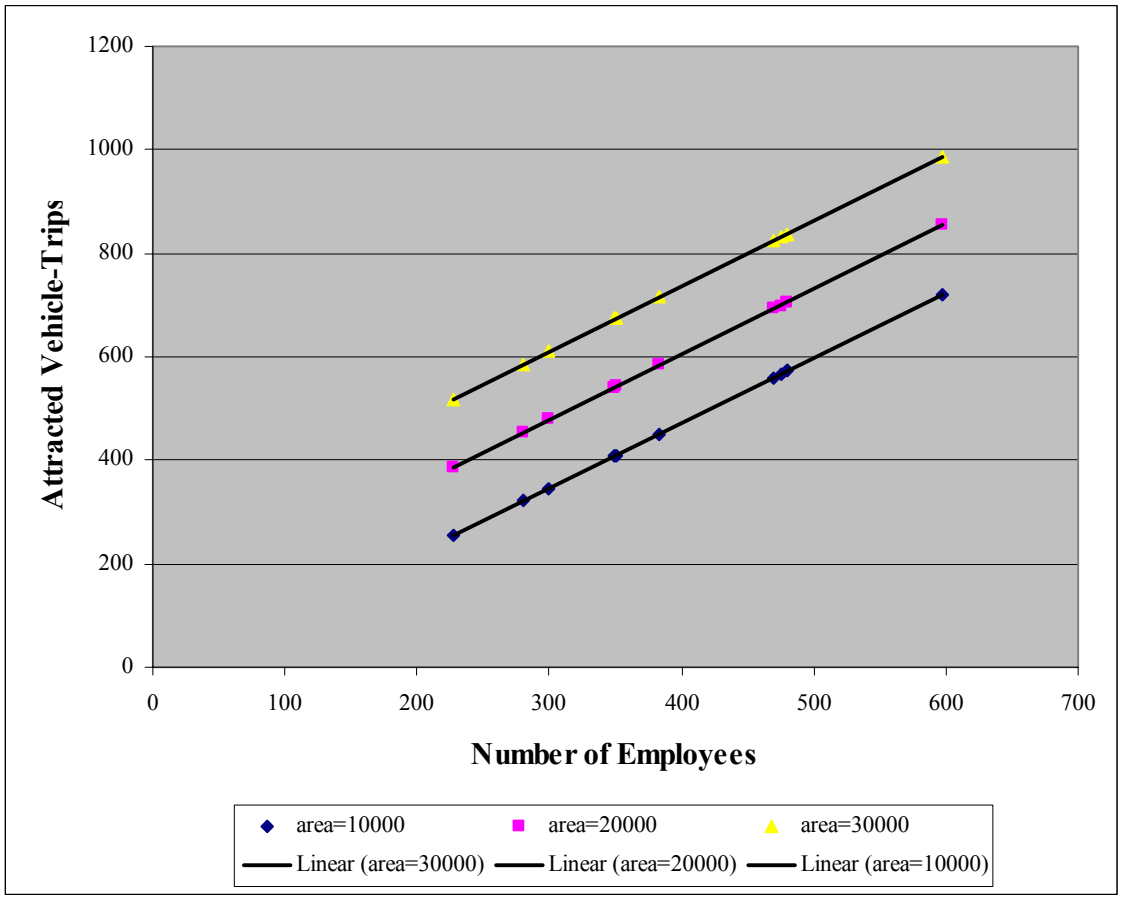

Figure (8-9): Predicted Vehicle-Trips vs. Number of employees for Fixed Value of Hotel Floor Area.

As shown in figure 8.9, the resulting parallel lines indicate that the relationship between the number of attracted vehicle-trips and the number of employees does not depend on the value of hotel's floor area. Hence, the two independent variables do not interact.

8.6 MULTICOLLINEARITY:

Multicollinearity refers to the situation in which two of the independent variables are highly correlated with each other. The existence of Multicollinearity inflates the variances of the parameter estimates. That may result, particularly for small and moderate sample sizes, in lack of statistical significance of individual independent variables while the overall model may be strongly significant. Multicollinearity may also result in wrong signs and magnitudes of regression coefficient estimates, and consequently, in incorrect conclusions about relationship between explanatory variables.

Multicollinearity can be detected by examining the correlations between explanatory variables, the higher the value of the coefficient of correlation the higher the possibility the two predictors are collinear. Table (8.5) shows the correlation matrix of the explanatory variables.

Table (8.5): Correlation Matrix of the Explanatory Variables

Independent Variable		Hotel Floor Area	No. of Employees	Area of Parking Lots	Price Index	Location
Hotel Floor Area	Pearson Correlation	1.000	0.543	-0.273	0.010	0.294
	Sig. (2-tailed)	0.000	0.068	0.390	0.976	0.353
No. of Employees	Pearson Correlation	0.543	1.000	0.256	-0.063	0.417
	Sig. (2-tailed)	0.068	0.000	0.421	0.845	0.178
Area of Parking Lots	Pearson Correlation	-0.273	0.256	1.000	-0.760	0.136
	Sig. (2-tailed)	0.390	0.421	0.000	0.004	0.673
Price Index	Pearson Correlation	0.010	-0.063	-0.760	1.000	-0.053
	Sig. (2-tailed)	0.976	0.845	0.004	0.000	0.871
Location	Pearson Correlation	0.294	0.417	0.136	-0.053	1.000
	Sig. (2-tailed)	0.353	0.178	0.673	0.871	0.000

The correlation matrix above shows that at r = -0.76, there may be multicollinearity between price index and area of parking lots. However, since these two independent variables were excluded from the proposed regression equation, then there is no need to check multicollinearity between these variables. The correlation between the two significant variables, the number of employees and the hotel floor area is moderately low which indicates a low potential of multicollinearity.

8.7 SINGLE VARIABLE MODELS

The purpose of this section is to provide alternative single-variable models for predicting the number of attracted vehicle-trips, using the explanatory variables that have been found to be significant in the multi-variable model developed previously. Two single-variable models will be generated, the first to predict the number of attracted vehicle-trips knowing the number of employees working in a hotel, and the second to predict the number of attracted vehicle-trips knowing the hotel's floor area. Different models have been used to identify the best relationship between the independent variables and the dependent variable, of which linear, quadratic, cubic, logarithmic, etc., have been tested. Models were compared according to R^2 value, the higher the value of R^2, the more the model is favorable. The results of the different functions that have been tested are provided in appendix C.

In our trials to reach the best fit model, we will always start by plotting the data and use information drawn from the scatter plots to guide us toward the selection of the appropriate mode.

8.7.1 Attracted Vehicle-Trips vs. Number of Employees

The number of employees working in a hotel has been found to be the most significant variable in the multivariable model developed in the previous section. Attracted vehicle-trips according to the regression equation is expected to increase by 1.26 vehicle-trips per day for every increase of one in the number of employees working in the hotel, with hotel's floor area held constant. Now, we will fit a model that best predicts the attracted vehicle-trips knowing the number of the employees. Scatter plot of the attracted vehicle-trips vs. no. of employees is shown below in figure (8.10).

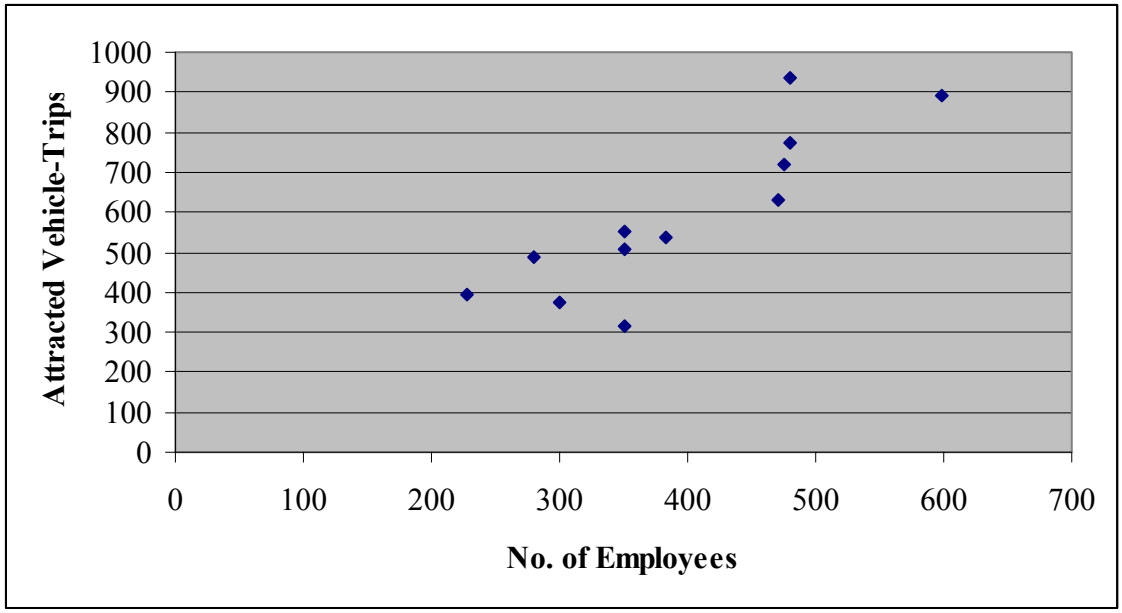

Figure (8-10): Scatter Plot of Attracted Vehicle-Trips vs. No. of Employees

The scatter plot above indicates that a straight-line model is likely to fit the data. However, different models have been tested to reach the best fit models. Model trials results are provided in appendix C. It has been found that the best three models are the linear, quadratic, cubic models. The results of these three models are summarized below.

Model	R^2- value	F- value
Linear	0.745	29.19
Quadratic	0.752	13.63
Cubic	0.804	10.91

As shown above, the R^2 values of the best three models are very close. The R^2 value of the linear model is not so far from that of the cubic model. The two models are considered good for estimating the attracted vehicle-trips. Linear model will be selected for several reasons. Firstly, linear model is simpler; secondly, complex models often confuse interpretations of the results from the analysis; thirdly, the larger the model, the less precise the parameter estimates will be; and finally, if the model is very large, analyzing the data can take a very long time-and not necessarily lead to more useful results. The final model can be presented by the following equation:

V_A= -54.055 + 1.636 (EMP.) …..(Equ.8.3)

Where,

V_A: Attracted vehicle-trips; and

EMP.: Number of employees

According to equation (8.3), predicted attracted vehicle-trips have been computed; the results are shown in table (8.6). Residuals are also computed to check if outliers are detected in data that has been used to generate the model represented by equation (8.3).

Table (8.6): Observed and Predicted Attracted Vehicle-Trips for the Studied Hotels, According to Number of employees Model.

Hotel Name	Number of Employees	Observed Number of Total Daily Attracted Vehicle-Trips (V_O)	Predicted Number of Total Daily Attracted Vehicle-Trips (V_P)	Risudual (V_O-V_P)
Crowne Plaza	350	507	519	-12
Holiday Inn	227	393	317	76
Regency Palace	351	314	520	-206
Marriott	383	538	573	-35
Radisson Sas	280	486	404	82
Four Seasons	475	717	723	-6
Jordan Intercontinental	598	892	924	-32
Grand Hyatt	480	774	731	43
Kempinski	300	372	437	-65
Le Royal	480	936	731	205
Sheraton	350	554	519	35
Le Meridien	470	629	715	-86
Mean (μ)		592.67	592.75	0.08
Standard Deviation (σ)		201.48	173.82	101.84

As shown in table (8.6), all residuals are less than three standard deviations above or below its mean. So, no outliers are detected in data that has been used to generate the model represented by equation (8.3).

Residuals are plotted versus the number of employees, as shown in figure (8.11), to detect whether the model has been misspecified. The random behavior of the residuals assures that our model has not been misspecified.

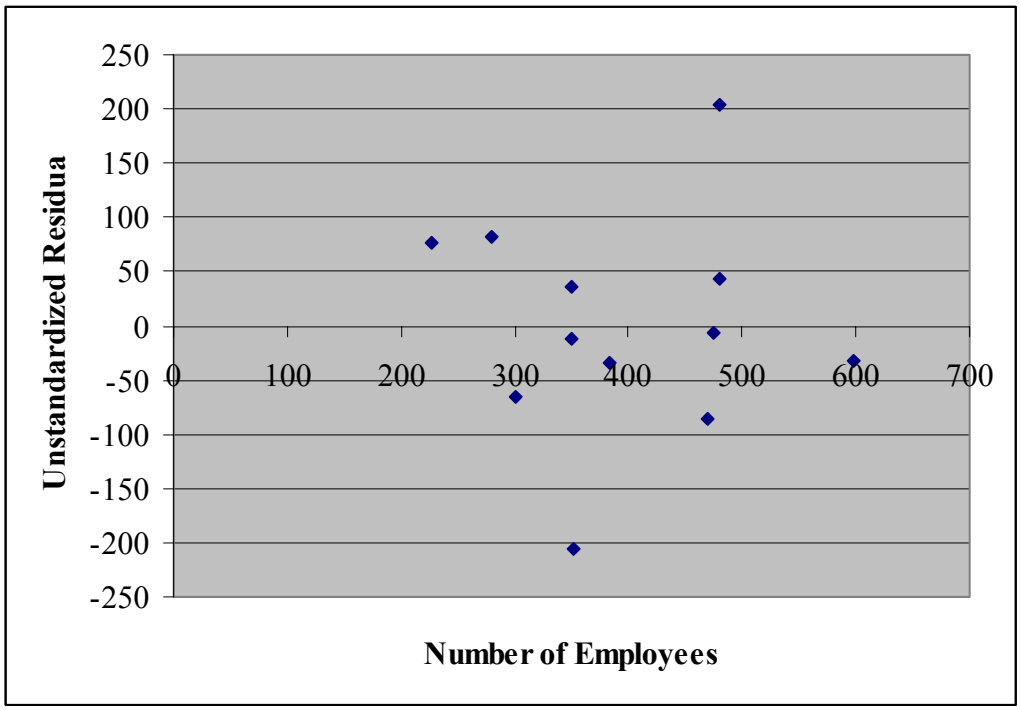

Figure (8-11): Scatter Plot of Unstandardized Residual vs. Number of Employees

8.7.2 Attracted Vehicle-Trips vs. Hotel Floor Area

The hotel floor area has been found to be the second significant variable in the multivariable model developed in the previous section. Attracted vehicle-trips according to the regression equation is expected to increase by 2.65 vehicle-trips per day for every increase of 1000 m^2 in the in the hotel's floor area, with number of employees held constant. Now, we will fit a model that best predicts the attracted vehicle-trips knowing the hotel floor area. Scatter plot of the Attracted Vehicle-Trips vs. hotel floor area is shown below in figure (8.12).

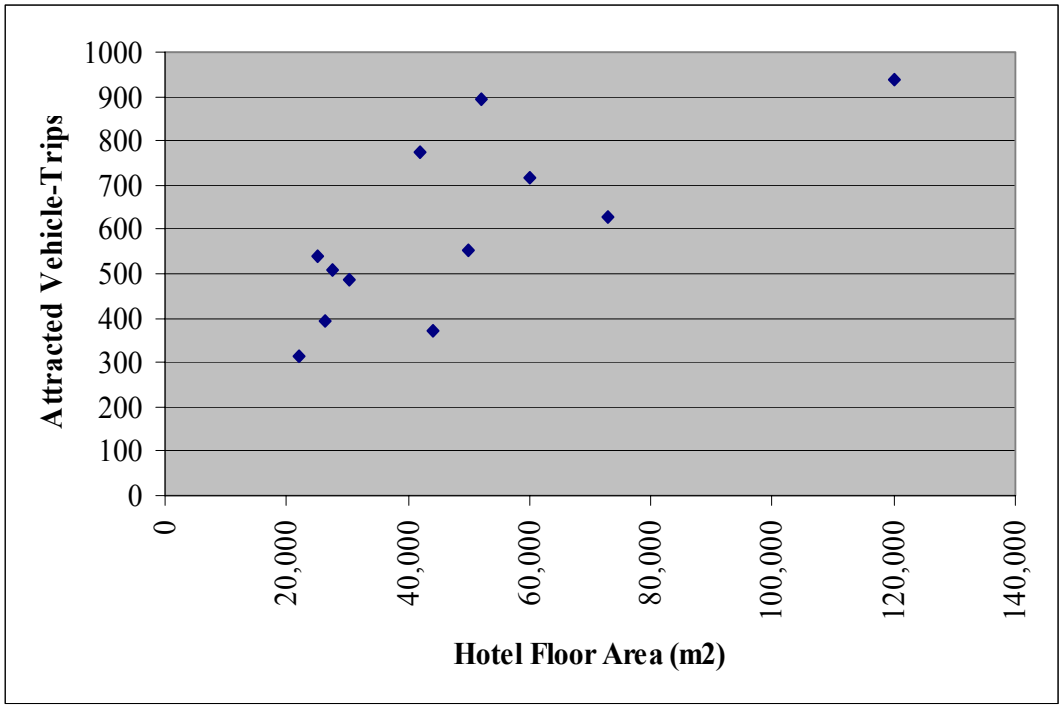

Figure (8-12): Scatter Plot of Attracted Vehicle-Trips vs. Hotel floor Area

The scatter plot above shows that the relation is not so clear. Different models have been tested to reach the best fit models, model trials results are provided in appendix C. It has been found that the cubic model has the highest R^2 value of 0.601; therefore, it will be considered as the best fit model. The final model can be presented by the following equation:

$$V_A = 2.9x10^{-12} (HA)^3 - 6x10^{-7} (HA)^2 + 0.0442 (HA) - 332.07 \quad \text{.....(Equ.8.4)}$$

The observed and predicted numbers of the attracted vehicle-trips according to the proposed model represented by equation (8.4) is summarized below in Table (8.7).

Table (8.7): Observed and Predicted Attracted Vehicle-Trips for the Studied Hotels, According to Hotel Floor Area Model.

Hotel Name	Hotel Floor Area (m^2)	Observed Number of Total Daily Attracted Vehicle-Trips (V_O)	Predicted Number of Total Daily Attracted Vehicle-Trips (V_P)
Crowne Plaza	27,500	507	490
Holiday Inn	26,226	393	467
Regency Palace	22,000	314	381
Marriott	25,000	538	443
Radisson Sas	30,400	486	539
Four Seasons	60,000	717	786
Jordan Intercontinental	52,000	892	752
Grand Hyatt	42,000	774	681
Kempinski	44,000	372	698
Le Royal	120,000	936	1343
Sheraton	50,000	554	740
Le Meridien	73,000	629	825

9. CONCLUSIONS

9.1 PEAK HOURS

The purpose of this study is to develop a model for estimating the number of attracted Vehicle-trips by hotels. The model can be used for planning and design of hotels for the geometric design and traffic control schemes on the roadways near the hotels. This study will also specify the critical day-time intervals for the trips attracted and generated by hotels and the directional distribution of these trips. Knowing this will be useful for estimating the traffic volume to/from a new hotel which, is being planned and to assess the traffic impact of the hotels on the geometric design of roadways in the surrounding area.

In this section critical time intervals for the vehicular movements attracted and generated by hotels will be investigated, in order to determine peak hours for both A.M and P.M periods. Traffic counts are compiled to determine daily and peak hour trip generation rates for each of the independent variables. Additionally, the proportion of trips made in the morning and afternoon peak periods and the proportion of peak trips that are generated and attracted by hotels will be determined. Attraction and generation patterns for the studied hotels are provided in Appendix (D).

Peak hour is the one hour of the day that has the highest number of trip ends or the hour that has the highest traffic volume counts. A trip end is a one-directional vehicle movement whether it is generated or attracted by hotels. In order to determine peak hour for A.M period, the hourly traffic counts for trips attracted and generated by hotels during the A.M period will be compared, then the hour that has the highest traffic volume will be considered as the peak hour for A.M period. The same procedure can be

applied to determine the peak hour for P.M period for each hotel. Hourly traffic counts for vehicle trips attracted and generated by each hotel are provided in Appendix B.

Tables (9.1) and (9.2) show the peak hours during A.M and P.M periods and the observed numbers of attracted and generated vehicle-trips during A.M and P.M periods in addition to peak hour ratios for the studied hotels.

Table (9.1): A.M Peak Hours and Peak Hour Ratios for Studied Hotels

Hotel Name	Peak Hour	No. of Observed Vehicle-Trips		Peak Hour Ratio (Attracted / Generated)
		Generated	Attracted	
Crowne Plaza	11.00-12.00	51	59	1.16
Holiday Inn	11.00-12.00	37	44	1.19
Regency Palace	8.00-9.00	30	45	1.50
Marriott	11.00-12.00	42	47	1.12
Radisson Sas	10.00-11.00	46	50	1.09
4-Seasons	8.45-9.45	51	70	1.37
Inercontinental	11.00-12.00	97	86	0.89
Hyatt	11.00-12.00	84	74	0.88
Kempinski	11.00-12.00	41	41	1.00
Le Royal	11.00-12.00	71	86	1.21
Sheraton	11.00-12.00	55	57	1.04
Meridien	10.30-11.30	52	54	1.04

Examining the values shown above in table (9.1) show that the values of peak hour ratio are often greater than one, which indicates that attracted vehicle-trips during A.M period are slightly more than generated vehicle-trips. The value of peak hour ratio ranges between 0.88 and 1.50 with an average of 1.12, which indicates that during A.M period, attracted vehicle-trips are usually more than generated vehicle-trips by 12%. On the other hand, 53% of the total vehicular movements during A.M period were caused by attracted trips.

Table (9.2): P.M Peak Hours and Peak Hour Ratios for Studied Hotels

Hotel Name	Peak Hour	No. of Observed Vehicle-Trips		Peak Hour Ratio (Attracted / Generated)
		Generated	Attracted	
Crowne Plaza	11.45-12.45	72	58	0.81
Holiday Inn	3.15-4.15	53	37	0.70
Regency Palace	3.15-4.15	43	33	0.77
Marriott	3.30-4.30	74	69	0.93
Radisson Sas	4.30-5.30	72	51	0.71
4-Seasons	12.00-1.00	76	88	1.16
Inercontinental	11.45-12.45	115	105	0.91
Hyatt	11.45-12.45	96	96	1.00
Kempinski	3.15-4.15	50	38	0.76
Le Royal	4.00-5.00	93	100	1.08
Sheraton	4.30-5.30	70	64	0.91
Meridien	4.15-5.15	80	59	0.74

Alternatively, examining the values shown above in table (9.2) show that the values of peak hour ratio are often less than one, which indicates that attracted vehicle-trips during P.M period are less than generated vehicle-trips. The value of peak hour ratio ranges between 0.70 and 1.16 with an average of 0.87, which indicates that during P.M period, attracted vehicle-trips are usually less than generated vehicle-trips by 13%. On the other hand, 46% of the total vehicular movements during P.M period were caused by attracted trips.

It might be good to know how much vehicle-trips are attracted during A.M and P.M peak periods compared with the total daily attracted vehicle-trips. Tables (9.3) and (9.4) show the percentages of A.M and P.M peak hour-attracted vehicle-trips from total daily attracted vehicle-trips.

Table (9.3): Percentages of A.M Peak Hour-Attracted Vehicle-Trips from Total Daily Attracted Vehicle-Trips

Hotel name	Total Daily Attracted Vehicle-Trips	Peak hour	Peak Hour-Attracted Vehicle-Trips	% of Peak Hour Attracted Vehicle-Trips from Total Daily Attracted Vehicle-Trips
Crowne Plaza	507	11.00-12.00	59	12
Holiday Inn	393	11.00-12.00	44	11
Regency Palace	314	8.00-9.00	45	14
Marriott	538	11.00-12.00	47	9
Radisson Sas	486	10.00-11.00	50	10
4-Seasons	717	8.45-9.45	70	10
Inercontinental	892	11.00-12.00	86	10
Hyatt	774	11.00-12.00	74	10
Kempinski	372	11.00-12.00	41	11
Le Royal	936	11.00-12.00	86	9
Sheraton	554	11.00-12.00	57	10
Meridien	629	10.30-11.30	54	9

Tables (9.3) and (9.4) show that about 11% of total daily attracted vehicle-trips are encountered during A.M period, while 10% of total daily attracted vehicle-trips are encountered during P.M period.

Table (9.4): Percentages of P.M Peak Hour-Attracted Vehicle-Trips from Total Daily Attracted Vehicle-Trips

Hotel name	Total Daily Attracted Vehicle-Trips	Peak hour	Peak Hour-Attracted Vehicle-Trips	% of Peak Hour Attracted Vehicle-Trips from Total Daily Attracted Vehicle-Trips
Crowne Plaza	507	11.45-12.45	58	11
Holiday Inn	393	3.15-4.15	37	9
Regency Palace	314	3.15-4.15	33	11
Marriott	538	3.30-4.30	69	13
Radisson Sas	486	4.30-5.30	51	10
4-Seasons	717	12.00-1.00	88	12
Inercontinental	892	11.45-12.45	105	12
Hyatt	774	11.45-12.45	96	12
Kempinski	372	3.15-4.15	38	10
Le Royal	936	4.00-5.00	100	11
Sheraton	554	4.30-5.30	64	12
Meridien	629	4.15-5.15	59	9

Finally, peak hour of generation was calculated for each hotel. Peak hour of generation is defined as the maximum vehicular movements (attracted and generated) observed during a period of one hour within day-time. Table (9.5) shows the values of peak hour of generation for each hotel. It is clear that all hotels have peak hour of generation during the P.M period. Therefore, P.M period should be considered as the critical during the days of the week

Table (9.5): Peak Hour of Generation and Critical Periods for each Hotel

Hotel name	Max. Hourly Vehicle-Trips (Attra.+Gene.)	Peak Hour of Generation	Hourly Attracted Vehicle-Trips	Hourly Generated Vehicle-Trips	Critical Period
Crowne Plaza	130	11.30-12.30	61	69	P.M
Holiday Inn	90	3.15-4.15	37	53	P.M
Regency Palace	76	3.15-4.15	33	43	P.M
Marriott	143	3.30-4.30	69	74	P.M
Radisson Sas	123	4.30-5.30	51	72	P.M
4-Seasons	164	12.00-1.00	88	76	P.M
Inercontinental	220	11.45-12.45	105	115	P.M
Hyatt	192	11.45-12.45	96	96	P.M
Kempinski	88	3.15-4.15	38	50	P.M
Le Royal	193	4.00-5.00	100	93	P.M
Sheraton	134	4.30-5.30	64	70	P.M
Meridien	139	4.15-5.15	59	80	P.M

9.2 DIRECTIONAL DISTRIBUTION

From the previous section, peak hours for the studied hotels and their percentages of the total daily attracted vehicle-trips were determined. Knowing how many vehicle-trips generated and attracted during different periods of the day is also necessary, especially during peak hours, where the movement that has a greater contribution during peak hour can be specified. In this section, directional distribution analysis will be performed to investigate how vehicle-trips are distributed during the day time and also during peak hours. Tables (9.6) and (9.7) show the directional distribution of vehicle-trips during A.M and P.M periods, respectively.

It is obvious that trips attracted and trips generated are approximately equal during A.M and P.M periods. As shown in Table (9.6), the average percentage of attracted vehicle-trips during A.M period is 55%, while for generated vehicle-trips is 45%. This can be explained by the fact that hotels usually attract employees at early hours of the day, and release customers before mid-day where they often have to check-out before mid-day.

Table (9.6): Directional Distribution of Vehicle-Trips during A.M Period

Hotel Name	No. of Vehicle-Trips		Total Vehicle-Trips (Attr.+Gen.)	% of Vehicle-Trips	
	Gen.	Attr.		Attr.	Gen.
Crowne Plaza	193	152	345	56	44
Holiday Inn	139	122	261	53	47
Regency Palace	138	120	258	53	47
Marriott	181	176	357	51	49
Radisson Sas	198	160	358	55	45
4-Seasons	286	226	512	56	44
Inercontinental	384	301	685	56	44
Hyatt	326	276	602	54	46
Kempinski	149	113	262	57	43
Le Royal	361	255	616	59	41
Sheraton	196	150	346	57	43
Meridien	221	185	406	54	46
Average				**55**	**45**

Similarly, the average percentages of attracted and generated vehicle-trips during P.M period are exactly the same. During P.M period, employee's work-shifts are usually exchanged, and customers returning back to hotels at early hours of P.M period after finishing works outside hotels leave hotels later for entertainment or else.

Table (9.7): Directional Distribution of Vehicle-Trips during P.M Period

Hotel Name	No. of Vehicle-Trips		Total Vehicle-Trips (Attr.+Gen.)	% of Vehicle-Trips	
	Gen.	Attr.		Attr.	Gen.
Crowne Plaza	314	351	665	47	53
Holiday Inn	254	263	517	49	51
Regency Palace	176	189	365	48	52
Marriott	357	367	724	49	51
Radisson Sas	288	285	573	50	50
4-Seasons	431	401	832	52	48
Inercontinental	508	501	1009	50	50
Hyatt	448	466	914	49	51
Kempinski	223	227	450	50	50
Le Royal	575	537	1112	52	48
Sheraton	358	403	761	47	53
Meridien	408	376	784	52	48
Average				**50**	**50**

Knowing how many vehicle-trips are generated and attracted during different periods of the day is also necessary especially during peak hours. Tables (9.8) and (9.9) show the percentages of Attracted & Generated Vehicle-Trips from the hourly total vehicle-trips during A.M and P.M Peak Hours. It has been found that during A.M peak hours, 53% of the vehicular movements are caused by attracted trips, while 47% is caused by generated trips.

Table (9.8): Percentages of Attracted & Generated Vehicle-Trips during A.M Peak Hours

Hotel Name	Peak Hour	Vehicular movements during Peak Hour	No. of Vehicle-Trips		% of Vehicle-Trips	
			Gen.	Attr.	Gen.	Attr.
Crowne Plaza	11.00-12.00	110	51	59	46	54
Holiday Inn	11.00-12.00	81	37	44	46	54
Regency Palace	8.00-9.00	75	30	45	40	60
Marriott	11.00-12.00	89	42	47	47	53
Radisson Sas	10.00-11.00	96	46	50	48	52
4-Seasons	8.45-9.45	121	51	70	42	58
Inercontinental	11.00-12.00	183	97	86	53	47
Hyatt	11.00-12.00	158	84	74	53	47
Kempinski	11.00-12.00	82	41	41	50	50
Le Royal	11.00-12.00	157	71	86	45	55
Sheraton	11.00-12.00	112	55	57	49	51
Meridien	10.30-11.30	106	52	54	49	51

Similarly, it has been found that during P.M peak hour, attracted vehicle trips forms about 46% of the vehicular movements, while 54% of the vehicular movements are caused by generated trips.

Table (9.9): Percentages of Attracted & Generated Vehicle-Trips during P.M Peak Hours

Hotel Name	Peak Hour	Vehicular movements during Peak Hour	No. of Vehicle-Trips		% of Vehicle-Trips	
			Gen.	Attr.	Gen.	Attr.
Crowne Plaza	11.45-12.45	130	72	58	55	45
Holiday Inn	3.15-4.15	90	53	37	59	41
Regency Palace	3.15-4.15	76	43	33	57	43
Marriott	3.30-4.30	143	74	69	52	48
Radisson Sas	4.30-5.30	123	72	51	59	41
4-Seasons	12.00-1.00	164	76	88	46	54
Inercontinental	11.45-12.45	220	115	105	52	48
Hyatt	11.45-12.45	192	96	96	50	50
Kempinski	3.15-4.15	88	50	38	57	43
Le Royal	4.00-5.00	193	93	100	48	52
Sheraton	4.30-5.30	134	70	64	52	48
Meridien	4.15-5.15	139	80	59	58	42

9.3 TRIP RATES

The purpose of this section is to generate trip attraction rates for hotels in Amman, expressed in terms of different parameters. Trip attraction rate is defined as the number of attracted vehicle-trips per unit time per unit of a specific parameter. The parameters used to generate the trip attraction rates are the independent variables (no. of employees, hotel floor area, and the area of parking lots. knowing trip rates can be used to estimate the transportation impacts of new land development. They can be also used to derive overall urban area trip attraction rates for various trip purposes.

Based on data collected, trip rates were calculated for each hotel in terms of the different independent variables stated above, the results are shown in table (9.10).

Table (9.10): Trip Attraction Rates for the Studies Hotels

Hotel name	Attracted Vehicle-Trips	Attracted V.Trips/Employee	Attracted V.Trips/100 m^2 of Hotel Floor Area	Attracted V.Trips/100 m^2 of Parking Area
Crowne Plaza	507	1.45	1.84	12.68
Holiday Inn	393	1.73	1.50	49.13
Regency Palace	314	0.89	1.43	9.30
Marriott	538	1.40	2.15	9.61
Radisson Sas	486	1.74	1.60	12.15
4-Seasons	717	1.51	1.20	17.07
Inercontinental	892	1.49	1.72	24.51
Hyatt	774	1.61	1.84	22.11
Kempinski	372	1.24	0.85	24.80
Le Royal	936	1.95	0.78	37.44
Sheraton	554	1.58	1.11	92.33
Meridian	629	1.34	0.86	69.89
Average		1.49	1.41	31.75
Standard Deviation (σ)		0.27	0.45	26.30

As shown in table (9.10), average trips rates and standard deviation of trip rates per each of the independent variables were calculated. The results show that more than 91% of trip rates per employee and per $100m^2$ of parking area lie within ($\mu \pm 2s$), while 100% of trip rates per $100m^2$ of hotel area is contained in the interval of ($\mu \pm 2s$). Figures (9.1), (9.2), and (9.3) show the trip rates of hotels expressed in terms of number of employees, hotel area, and area of parking lots, respectively.

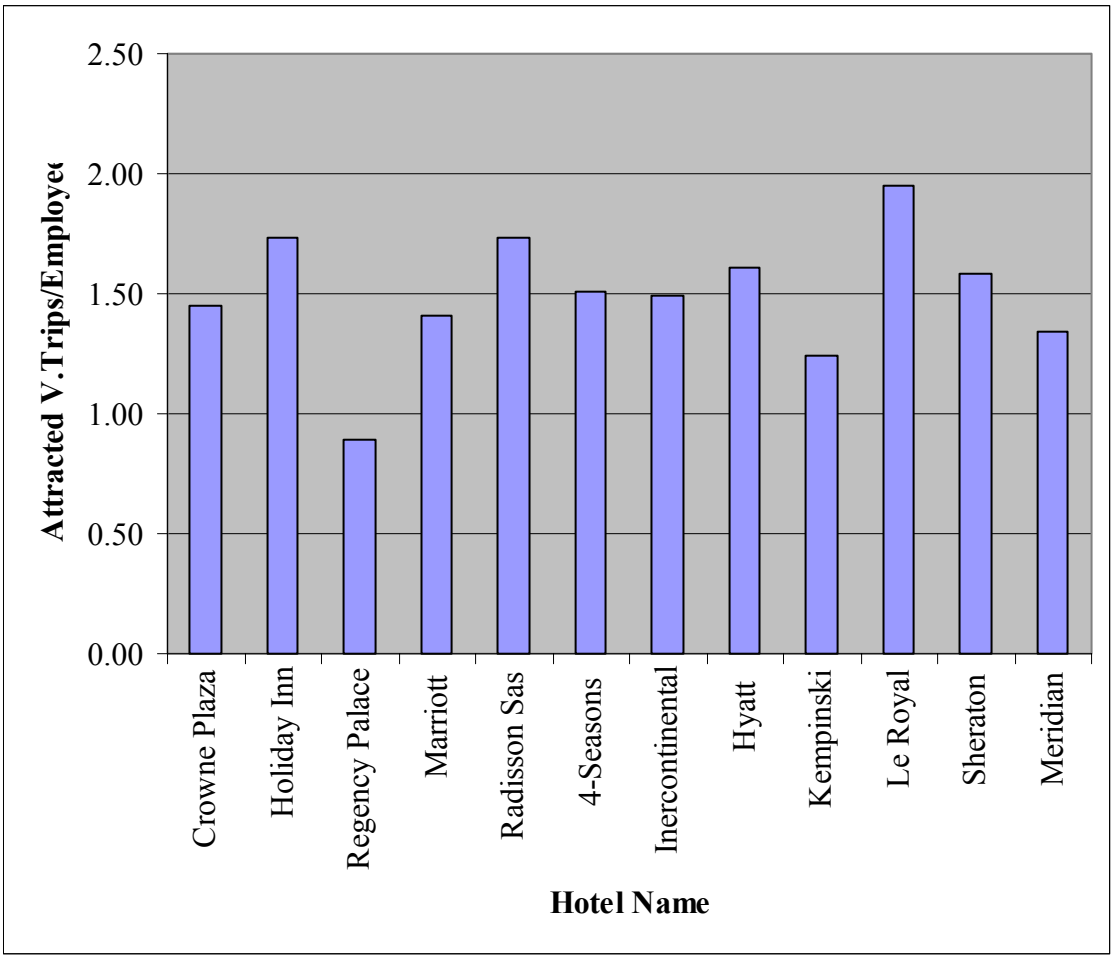

Figure (9-1): Trip Rates of Hotels expressed in terms of No. of Employees

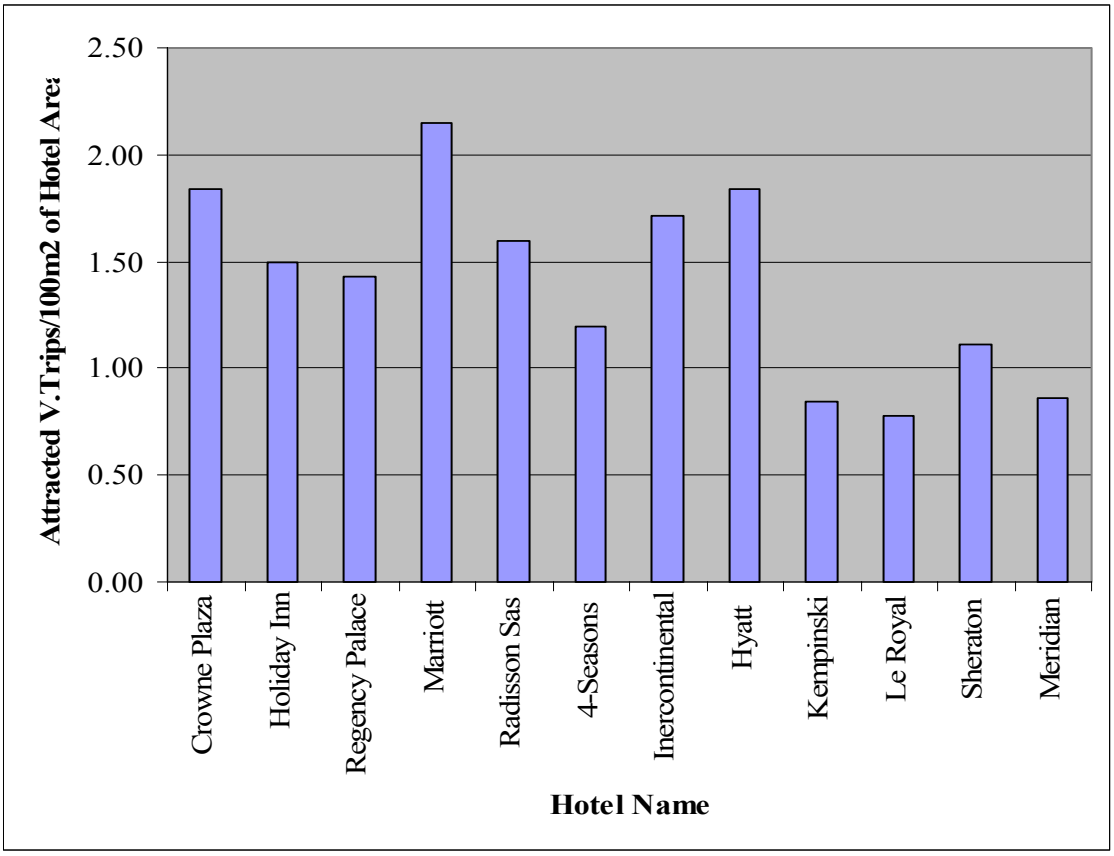

Figure (9-2): Trip Rates of Hotels expressed in terms of 100m^2 of Hotel Area

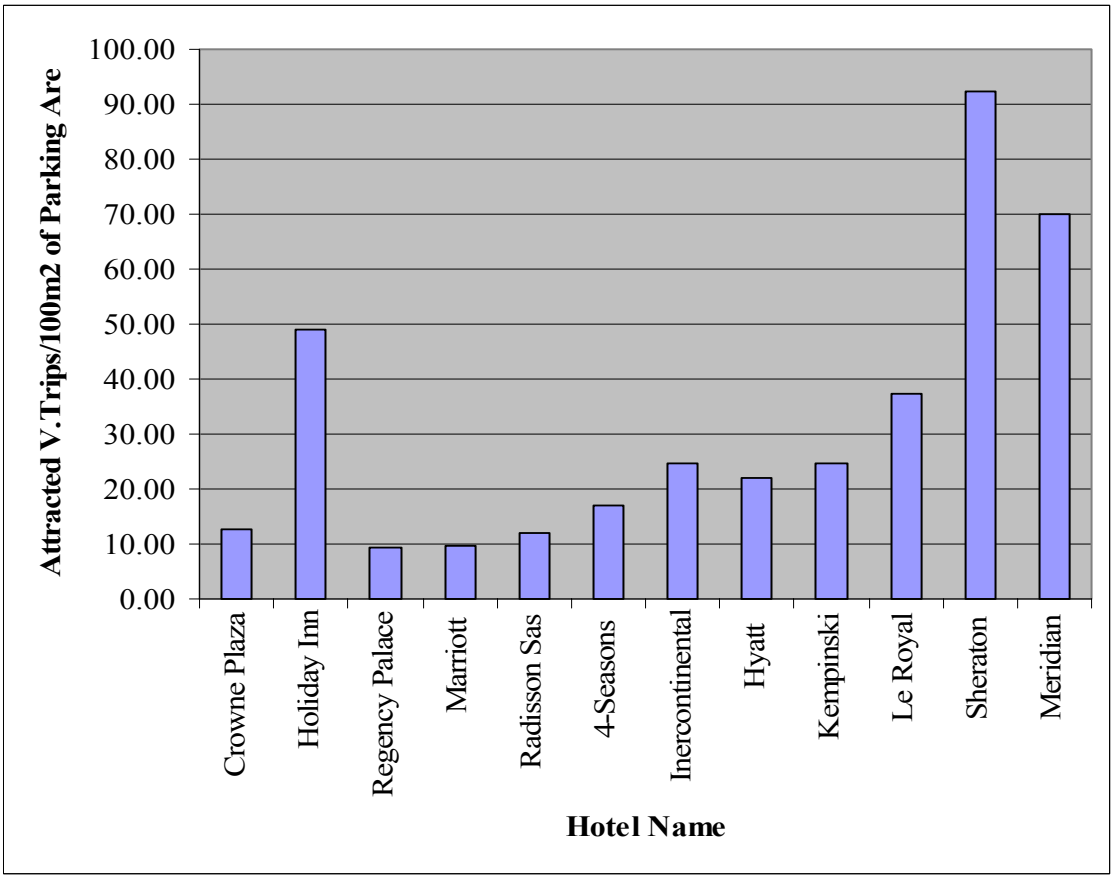

Figure (9-3): Trip Rates of Hotels expressed in terms of 100m^2 of Parking Area

10. RECOMMENDATIONS

1. This study was conducted to develop a prediction model for vehicle-trips attracted by first class hotels in Amman. Because of lack of financing sources, vehicles entering and leaving hotels were observed from 7 A.M to 7 P.M for two days only. For more precise results about the number of attracted vehicle-trips, and consequently a more reliable model, longer durations of counting up to seven days are recommended.
2. This study was limited to first class hotels located in Amman due to financing problems, therefore, it is highly recommended to calibrate the results obtained by this study for hotels located outside the borders of Greater Amman Municipality, especially hotels located at the different tourism locations in Jordan.
3. Further studies about the functional relationship between travel and land use can be studied. Schools, universities and commercial centers represent attraction areas that worth study.
4. Trip Attraction rates are fundamental in planning of transportation facilities. Model developed and trip attraction rates computed in this study should be used in assessing the traffic impacts of hotels on surrounding areas, and also the region wide traffic volume impacts.
5. This study was limited to first class hotels in Amman. Further studies can be conducted to involve all hotels of different classes considering hotel class as an independent variable.

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APPENDICES

APPENDIX A: TRAFFIC COUNTS

APPENDIX B: HOURLY TRAFFIC COUNTS & PEAK HOURS

APPENDIX C: REGRESSION MODELS TRIALS

APPENDIX D: ATTRACTION& GENERATION PATTERNS

APPENDIX A: TRAFFIC COUNTS

APPENDIX A
TRAFFIC COUNTS

Table A-1: Traffic Counts of Crown Plaza Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	2	2	1	1	1	1
7.15-7.30	2	5	3	4	2	4
7.30-7.45	4	6	6	5	5	5
7.45-8.00	10	9	9	4	9	6
8.00-8.15	17	11	12	8	14	9
8.15-8.30	11	7	11	12	11	9
8.30-8.45	7	4	6	9	6	6
8.45-9.00	14	3	11	5	12	4
9.00-9.15	12	8	9	5	10	6
9.15-9.30	10	9	6	7	8	8
9.30-9.45	7	6	7	7	7	6
9.45-10.00	6	5	8	6	7	5
10.00-10.15	8	7	13	7	10	7
10.15-10.30	11	9	9	8	10	8
10.30-10.45	12	10	9	9	10	9
10.45-11.00	14	8	10	8	12	8
11.00-11.15	17	8	14	12	15	10
11.15-11.30	15	13	10	9	12	11
11.30-11.45	16	14	15	15	15	14
11.45-12.00	14	15	20	17	17	16
12.00-12.15	15	16	15	22	15	19
12.15-12.30	19	20	10	20	14	20
12.30-12.45	14	17	11	17	12	17
12.45-1.00	10	15	9	15	9	15
1.00-1.15	12	13	12	11	12	12
1.15-1.30	7	9	9	6	8	7

Table A-1(conti.):Traffic Counts of Crowne Plaza Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
1.30-1.45	8	8	10	7	9	7
1.45-2.00	8	9	7	9	7	9
2.00-2.15	6	7	7	5	6	6
2.15-2.30	4	5	9	6	6	5
2.30-2.45	5	6	12	4	8	5
2.45-3.00	8	10	15	7	11	8
3.00-3.15	13	17	18	20	15	18
3.15-3.30	12	24	6	17	9	20
3.30-3.45	7	23	8	20	7	21
3.45-4.00	8	19	14	19	11	19
4.00-4.15	6	16	19	18	12	17
4.15-4.30	13	12	12	12	12	12
4.30-4.45	15	10	11	14	13	12
4.45-5.00	11	13	9	8	10	10
5.00-5.15	9	16	11	11	10	13
5.15-5.30	12	15	9	14	10	14
5.30-5.45	10	11	9	15	9	13
5.45-6.00	11	8	10	14	10	11
6.00-6.15	13	12	12	10	12	11
6.15-6.30	20	10	16	9	18	9
6.30-6.45	19	13	17	12	18	12
6.45-7.00	24	10	19	9	21	9
Total	***528***	***523***	***515***	***509***	***507***	***503***

Table A-2: Traffic Counts of Holiday Inn Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	1	0	0	1	0	0
7.15-7.30	0	3	2	6	1	4
7.30-7.45	5	7	6	7	5	7
7.45-8.00	9	4	5	11	7	7
8.00-8.15	10	1	12	5	11	3
8.15-8.30	12	5	13	2	12	3
8.30-8.45	6	4	7	4	6	4
8.45-9.00	5	9	3	5	4	7
9.00-9.15	9	3	6	6	7	4
9.15-9.30	10	6	5	5	7	5
9.30-9.45	4	10	6	8	5	9
9.45-10.00	6	7	3	4	4	5
10.00-10.15	7	10	5	7	6	8
10.15-10.30	8	5	7	5	7	5
10.30-10.45	5	5	5	7	5	6
10.45-11.00	10	7	6	9	8	8
11.00-11.15	12	6	8	4	10	5
11.15-11.30	13	11	9	7	11	9
11.30-11.45	8	9	11	13	9	11
11.45-12.00	15	15	13	9	14	12
12.00-12.15	12	6	9	12	10	9
12.15-12.30	10	12	12	15	11	13
12.30-12.45	8	9	14	6	11	7
12.45-1.00	8	6	8	6	8	6
1.00-1.15	10	8	5	9	7	8
1.15-1.30	9	9	3	3	6	6
1.30-1.45	10	9	5	6	7	7
1.45-2.00	6	9	4	4	5	6

Table A-2(conti.):Traffic Counts of Holiday Inn Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	4	9	6	6	5	7
2.15-2.30	5	7	5	6	5	6
2.30-2.45	6	9	7	7	6	8
2.45-3.00	9	12	7	5	8	8
3.00-3.15	13	13	11	8	12	10
3.15-3.30	11	11	14	11	12	11
3.30-3.45	8	15	7	12	7	13
3.45-4.00	12	18	8	10	10	14
4.00-4.15	9	20	8	10	8	15
4.15-4.30	10	18	10	7	10	12
4.30-4.45	7	14	10	7	8	10
4.45-5.00	8	9	12	11	10	10
5.00-5.15	11	17	15	8	13	12
5.15-5.30	9	17	13	15	11	16
5.30-5.45	9	8	7	12	8	10
5.45-6.00	11	12	6	7	8	9
6.00-6.15	8	11	9	5	8	8
6.15-6.30	8	11	14	6	11	8
6.30-6.45	12	6	15	9	13	7
6.45-7.00	14	4	19	10	16	7
Total	***412***	***436***	***395***	***358***	***393***	***385***

Table A-3: Traffic Counts of Regency Palace Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	1	0	1	1	1	0
7.15-7.30	2	0	0	2	1	1
7.30-7.45	4	1	5	6	4	3
7.45-8.00	6	5	8	6	7	5
8.00-8.15	8	7	13	5	10	6
8.15-8.30	11	7	12	8	11	7
8.30-8.45	12	10	13	11	12	10
8.45-9.00	13	7	11	7	12	7
9.00-9.15	10	6	9	5	9	5
9.15-9.30	11	8	7	4	9	6
9.30-9.45	8	4	5	3	6	3
9.45-10.00	6	7	7	2	6	4
10.00-10.15	5	5	5	8	5	6
10.15-10.30	4	5	4	7	4	6
10.30-10.45	7	6	3	1	5	3
10.45-11.00	5	9	6	7	5	8
11.00-11.15	8	11	5	9	6	10
11.15-11.30	9	10	7	8	8	9
11.30-11.45	8	14	9	9	8	11
11.45-12.00	10	9	8	11	9	10
12.00-12.15	8	13	8	8	8	10
12.15-12.30	11	7	10	7	10	7
12.30-12.45	7	12	10	6	8	9
12.45-1.00	5	8	8	5	6	6
1.00-1.15	7	5	4	1	5	3
1.15-1.30	4	2	1	0	2	1
1.30-1.45	2	2	2	2	2	2
1.45-2.00	3	4	3	0	3	2

Table A-3(conti.):Traffic Counts of Regency Palace Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	2	2	1	1	1	1
2.15-2.30	3	3	2	2	2	2
2.30-2.45	3	4	2	5	2	4
2.45-3.00	3	7	3	6	3	6
3.00-3.15	6	7	4	8	5	7
3.15-3.30	7	13	9	10	8	11
3.30-3.45	10	15	8	12	9	13
3.45-4.00	11	9	9	9	10	9
4.00-4.15	8	8	5	13	6	10
4.15-4.30	6	10	3	10	4	10
4.30-4.45	9	10	4	9	6	9
4.45-5.00	9	11	10	12	9	11
5.00-5.15	10	13	7	16	8	14
5.15-5.30	12	9	4	13	8	11
5.30-5.45	9	11	5	6	7	8
5.45-6.00	7	6	8	3	7	4
6.00-6.15	8	5	12	5	10	5
6.15-6.30	5	8	13	4	9	6
6.30-6.45	9	3	13	6	11	4
6.45-7.00	8	7	7	2	7	4
Total	***340***	***345***	***313***	***301***	***314***	***309***

Table A-4: Traffic Counts of Marriott Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	0	3	1	2	0	2
7.15-7.30	3	4	3	4	3	4
7.30-7.45	9	6	6	6	7	6
7.45-8.00	14	5	9	10	11	7
8.00-8.15	15	10	14	14	14	12
8.15-8.30	12	9	13	12	12	10
8.30-8.45	8	10	12	10	10	10
8.45-9.00	8	9	9	11	8	10
9.00-9.15	7	8	13	15	10	11
9.15-9.30	10	11	11	16	10	13
9.30-9.45	11	10	10	9	10	9
9.45-10.00	9	9	7	7	8	8
10.00-10.15	6	7	9	4	7	5
10.15-10.30	7	7	6	8	6	7
10.30-10.45	8	11	8	9	8	10
10.45-11.00	9	10	11	11	10	10
11.00-11.15	8	13	12	9	10	11
11.15-11.30	15	11	10	8	12	9
11.30-11.45	10	10	13	9	11	9
11.45-12.00	14	14	14	12	14	13
12.00-12.15	17	17	18	20	17	18
12.15-12.30	22	16	14	11	18	13
12.30-12.45	15	19	11	17	13	18
12.45-1.00	16	13	9	10	12	11
1.00-1.15	13	15	10	6	11	10
1.15-1.30	12	12	9	5	10	8
1.30-1.45	11	14	7	5	9	9
1.45-2.00	8	8	3	5	5	6

Table A-4(conti.):Traffic Counts of Marriott Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	7	10	1	6	4	8
2.15-2.30	5	7	6	6	5	6
2.30-2.45	7	5	9	8	8	6
2.45-3.00	10	9	8	7	9	8
3.00-3.15	11	9	15	10	13	9
3.15-3.30	15	12	19	19	17	15
3.30-3.45	20	17	14	21	17	19
3.45-4.00	16	18	18	26	17	22
4.00-4.15	19	16	15	18	17	17
4.15-4.30	17	19	20	14	18	16
4.30-4.45	16	18	12	13	14	15
4.45-5.00	13	14	16	26	14	20
5.00-5.15	14	20	11	31	12	25
5.15-5.30	15	21	9	12	12	16
5.30-5.45	11	12	12	14	11	13
5.45-6.00	12	13	9	15	10	14
6.00-6.15	13	15	11	11	12	13
6.15-6.30	15	11	13	10	14	10
6.30-6.45	28	8	12	10	20	9
6.45-7.00	23	16	14	11	18	13
Total	***584***	***561***	***516***	***553***	***538***	***543***

Table A-5: Traffic Counts of Radisson Sas Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	2	0	2	1	2	0
7.15-7.30	4	1	1	0	2	0
7.30-7.45	4	3	2	4	3	3
7.45-8.00	8	5	8	6	8	5
8.00-8.15	7	5	14	10	10	7
8.15-8.30	10	7	13	8	11	7
8.30-8.45	9	6	10	6	9	6
8.45-9.00	11	8	9	6	10	7
9.00-9.15	15	10	12	9	13	9
9.15-9.30	12	9	11	8	11	8
9.30-9.45	14	8	13	11	13	9
9.45-10.00	13	14	9	9	11	11
10.00-10.15	15	17	11	10	13	13
10.15-10.30	12	11	13	8	12	9
10.30-10.45	12	16	10	7	11	11
10.45-11.00	14	14	15	12	14	13
11.00-11.15	14	16	11	12	12	14
11.15-11.30	8	14	9	11	8	12
11.30-11.45	12	6	15	9	13	7
11.45-12.00	14	8	10	11	12	9
12.00-12.15	11	10	14	17	12	13
12.15-12.30	10	10	12	10	11	10
12.30-12.45	13	10	9	10	11	10
12.45-1.00	8	5	17	10	12	7
1.00-1.15	13	8	10	9	11	8
1.15-1.30	15	8	8	6	11	7
1.30-1.45	11	10	5	3	8	6
1.45-2.00	9	7	7	4	8	5

Table A-5(conti.):Traffic Counts of Radisson Sas Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	12	8	8	6	10	7
2.15-2.30	10	9	6	7	8	8
2.30-2.45	13	9	8	5	10	7
2.45-3.00	10	9	13	6	11	7
3.00-3.15	13	10	15	12	14	11
3.15-3.30	15	6	10	16	12	11
3.30-3.45	16	13	8	11	12	12
3.45-4.00	16	12	8	7	12	9
4.00-4.15	9	12	11	9	10	10
4.15-4.30	7	16	7	12	7	14
4.30-4.45	15	23	8	11	11	17
4.45-5.00	15	24	14	20	14	22
5.00-5.15	19	27	10	14	14	20
5.15-5.30	15	15	9	11	12	13
5.30-5.45	9	13	6	11	7	12
5.45-6.00	8	12	5	5	6	8
6.00-6.15	7	11	7	10	7	10
6.15-6.30	6	3	6	3	6	3
6.30-6.45	10	11	10	9	10	10
6.45-7.00	7	6	15	10	11	8
Total	***532***	***495***	***464***	***422***	***486***	***445***

Table A-6: Traffic Counts of Four Seasons Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	2	2	4	3	3	2
7.15-7.30	3	1	2	7	2	4
7.30-7.45	12	5	7	12	9	8
7.45-8.00	16	7	15	12	15	9
8.00-8.15	22	8	19	14	20	11
8.15-8.30	24	6	16	16	20	11
8.30-8.45	14	10	12	19	13	14
8.45-9.00	16	9	13	18	14	13
9.00-9.15	19	12	17	14	18	13
9.15-9.30	21	9	24	12	22	10
9.30-9.45	18	18	15	13	16	15
9.45-10.00	13	13	18	9	15	11
10.00-10.15	11	12	12	11	11	11
10.15-10.30	14	11	14	11	14	11
10.30-10.45	12	4	14	12	13	8
10.45-11.00	16	24	16	15	16	19
11.00-11.15	12	13	11	16	11	14
11.15-11.30	17	12	12	13	14	12
11.30-11.45	20	16	16	14	18	15
11.45-12.00	24	13	20	18	22	15
12.00-12.15	21	19	17	23	19	21
12.15-12.30	22	17	21	26	21	21
12.30-12.45	21	18	23	20	22	19
12.45-1.00	28	13	24	17	26	15
1.00-1.15	19	16	17	14	18	15
1.15-1.30	15	14	12	14	13	14
1.30-1.45	10	10	9	13	9	11
1.45-2.00	9	8	10	13	9	10

Table A-6(conti.):Traffic Counts of Four Seasons Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	7	7	11	10	9	8
2.15-2.30	6	11	8	10	7	10
2.30-2.45	7	17	11	9	9	13
2.45-3.00	12	16	17	11	14	13
3.00-3.15	19	13	16	15	17	14
3.15-3.30	22	17	19	17	20	17
3.30-3.45	13	13	16	16	14	14
3.45-4.00	11	8	11	15	11	11
4.00-4.15	14	16	12	14	13	15
4.15-4.30	16	15	14	16	15	15
4.30-4.45	19	19	12	20	15	19
4.45-5.00	22	25	17	19	19	22
5.00-5.15	17	23	11	22	14	22
5.15-5.30	14	18	13	21	13	19
5.30-5.45	16	12	15	15	15	13
5.45-6.00	12	6	12	13	12	9
6.00-6.15	14	15	13	9	13	12
6.15-6.30	23	9	17	11	20	10
6.30-6.45	18	10	24	11	21	10
6.45-7.00	19	10	27	8	23	9
Total	***752***	***600***	***706***	***681***	***717***	***627***

Table A-7: Traffic Counts of Jordan Intercontinental Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	2	2	3	3	2	2
7.15-7.30	3	5	5	7	4	6
7.30-7.45	8	9	6	12	7	10
7.45-8.00	16	13	14	14	15	13
8.00-8.15	23	15	27	12	25	13
8.15-8.30	27	16	25	15	26	15
8.30-8.45	26	21	23	16	24	18
8.45-9.00	25	17	19	13	22	15
9.00-9.15	23	16	24	12	23	14
9.15-9.30	22	15	37	14	29	14
9.30-9.45	16	11	30	11	23	11
9.45-10.00	16	8	22	9	19	8
10.00-10.15	19	12	23	10	21	11
10.15-10.30	21	15	21	18	21	16
10.30-10.45	17	19	20	17	18	18
10.45-11.00	18	21	20	20	19	20
11.00-11.15	17	17	18	19	17	18
11.15-11.30	22	25	24	26	23	25
11.30-11.45	19	28	26	31	22	29
11.45-12.00	20	23	29	28	24	25
12.00-12.15	25	27	28	33	26	30
12.15-12.30	24	24	39	36	31	30
12.30-12.45	23	33	26	27	24	30
12.45-1.00	29	18	17	19	23	18
1.00-1.15	18	15	25	14	21	14
1.15-1.30	21	8	21	18	21	13
1.30-1.45	16	9	17	12	16	10
1.45-2.00	15	8	10	11	12	9

Table A-7(conti.):Traffic Counts of Jordan Intercontinental Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	13	10	12	10	12	10
2.15-2.30	10	8	9	15	9	11
2.30-2.45	11	11	8	11	9	11
2.45-3.00	12	9	12	10	12	9
3.00-3.15	17	14	11	15	14	14
3.15-3.30	19	22	13	16	16	19
3.30-3.45	20	21	23	23	21	22
3.45-4.00	18	25	16	28	17	26
4.00-4.15	17	22	14	14	15	18
4.15-4.30	19	28	13	12	16	20
4.30-4.45	22	22	16	20	19	21
4.45-5.00	25	24	23	17	24	20
5.00-5.15	22	34	16	16	19	25
5.15-5.30	21	23	21	11	21	17
5.30-5.45	16	14	19	15	17	14
5.45-6.00	17	15	14	14	15	14
6.00-6.15	16	25	20	19	18	22
6.15-6.30	24	20	15	22	19	21
6.30-6.45	22	18	19	15	20	16
6.45-7.00	31	16	12	19	21	17
Total	***903***	***831***	***905***	***799***	***892***	***802***

Table A-8: Traffic Counts of Hyatt Amman Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	2	0	3	4	2	2
7.15-7.30	4	3	2	3	3	3
7.30-7.45	6	8	5	4	5	6
7.45-8.00	14	11	12	9	13	10
8.00-8.15	21	17	23	11	22	14
8.15-8.30	27	19	21	14	24	16
8.30-8.45	24	23	19	17	21	20
8.45-9.00	23	16	15	16	19	16
9.00-9.15	21	14	20	16	20	15
9.15-9.30	20	10	25	12	22	11
9.30-9.45	15	12	23	9	19	10
9.45-10.00	14	12	18	9	16	10
10.00-10.15	17	11	19	10	18	10
10.15-10.30	15	15	17	11	16	13
10.30-10.45	16	20	16	14	16	17
10.45-11.00	16	24	16	15	16	19
11.00-11.15	15	19	14	12	14	15
11.15-11.30	20	26	20	17	20	21
11.30-11.45	17	27	22	19	19	23
11.45-12.00	18	34	25	16	21	25
12.00-12.15	23	32	24	23	23	27
12.15-12.30	22	25	35	25	28	25
12.30-12.45	27	17	22	21	24	19
12.45-1.00	20	21	13	14	16	17
1.00-1.15	18	16	21	11	19	13
1.15-1.30	19	16	17	9	18	12
1.30-1.45	15	11	13	13	14	12
1.45-2.00	13	8	7	8	10	8

Table A-8(conti.):Traffic Counts of Hyatt Amman Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	11	11	8	9	9	10
2.15-2.30	9	10	5	7	7	8
2.30-2.45	9	12	7	11	8	11
2.45-3.00	10	15	8	13	9	14
3.00-3.15	15	19	7	19	11	19
3.15-3.30	17	22	9	17	13	19
3.30-3.45	18	17	19	21	18	19
3.45-4.00	16	14	12	24	14	19
4.00-4.15	15	24	10	15	12	19
4.15-4.30	17	27	10	13	13	20
4.30-4.45	20	25	13	11	16	18
4.45-5.00	25	24	19	27	22	25
5.00-5.15	20	16	25	34	22	25
5.15-5.30	19	23	17	18	18	20
5.30-5.45	21	18	15	15	18	16
5.45-6.00	19	16	17	21	18	18
6.00-6.15	14	15	16	16	15	15
6.15-6.30	26	15	15	12	20	13
6.30-6.45	20	11	15	12	17	11
6.45-7.00	25	14	8	14	16	14
Total	***828***	***815***	***742***	***691***	***774***	***742***

Table A-9: Traffic Counts of Kempinski Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	2	0	3	1	2	0
7.15-7.30	2	3	0	0	1	1
7.30-7.45	5	4	6	3	5	3
7.45-8.00	9	3	5	4	7	3
8.00-8.15	10	2	9	6	9	4
8.15-8.30	12	5	10	7	11	6
8.30-8.45	8	4	6	3	7	3
8.45-9.00	9	7	5	5	7	6
9.00-9.15	13	6	11	6	12	6
9.15-9.30	11	6	13	5	12	5
9.30-9.45	7	8	8	9	7	8
9.45-10.00	6	3	7	4	6	3
10.00-10.15	5	5	5	7	5	6
10.15-10.30	6	5	6	5	6	5
10.30-10.45	4	4	7	7	5	5
10.45-11.00	7	7	5	9	6	8
11.00-11.15	10	9	8	12	9	10
11.15-11.30	9	11	11	10	10	10
11.30-11.45	10	9	13	13	11	11
11.45-12.00	13	10	10	11	11	10
12.00-12.15	12	6	11	12	11	9
12.15-12.30	14	8	10	9	12	8
12.30-12.45	11	7	8	10	9	8
12.45-1.00	9	6	10	6	9	6
1.00-1.15	7	6	9	9	8	7
1.15-1.30	9	4	9	7	9	5
1.30-1.45	5	5	4	6	4	5
1.45-2.00	7	3	2	3	4	3

Table A-9(conti.):Traffic Counts of Kempinski Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	3	4	5	4	4	4
2.15-2.30	4	5	6	6	5	5
2.30-2.45	8	7	11	5	9	6
2.45-3.00	9	8	6	5	7	6
3.00-3.15	12	13	7	8	9	10
3.15-3.30	10	11	12	13	11	12
3.30-3.45	11	12	9	12	10	12
3.45-4.00	9	18	8	11	8	14
4.00-4.15	9	14	10	10	9	12
4.15-4.30	8	15	7	9	7	12
4.30-4.45	7	13	8	8	7	10
4.45-5.00	8	9	6	12	7	10
5.00-5.15	11	17	10	10	10	13
5.15-5.30	6	17	11	11	8	14
5.30-5.45	6	8	9	10	7	9
5.45-6.00	9	10	6	7	7	8
6.00-6.15	8	7	8	5	8	6
6.15-6.30	12	9	9	6	10	7
6.30-6.45	8	3	9	4	8	3
6.45-7.00	5	4	8	3	6	3
Total	***395***	***360***	***376***	***348***	***372***	***340***

Table A-10: Traffic Counts of Le Royal Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	4	3	5	4	4	3
7.15-7.30	4	5	7	3	5	4
7.30-7.45	17	9	14	11	15	10
7.45-8.00	22	11	17	11	19	11
8.00-8.15	27	14	25	12	26	13
8.15-8.30	24	16	17	10	20	13
8.30-8.45	19	13	17	12	18	12
8.45-9.00	17	12	26	10	21	11
9.00-9.15	23	11	32	13	27	12
9.15-9.30	26	12	24	15	25	13
9.30-9.45	15	11	16	13	15	12
9.45-10.00	18	14	15	12	16	13
10.00-10.15	14	13	23	16	18	14
10.15-10.30	14	11	17	19	15	15
10.30-10.45	18	10	13	17	15	13
10.45-11.00	17	12	16	18	16	15
11.00-11.15	17	15	21	16	19	15
11.15-11.30	19	20	19	19	19	19
11.30-11.45	22	15	22	19	22	17
11.45-12.00	25	20	27	20	26	20
12.00-12.15	28	16	35	24	31	20
12.15-12.30	26	17	22	22	24	19
12.30-12.45	31	20	21	17	26	18
12.45-1.00	22	25	29	15	25	20
1.00-1.15	17	22	21	19	19	20
1.15-1.30	16	19	20	14	18	16
1.30-1.45	15	13	13	11	14	12
1.45-2.00	12	12	17	10	14	11

Table A-10(conti.):Traffic Counts of Le Royal Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	11	15	14	10	12	12
2.15-2.30	13	12	13	23	13	17
2.30-2.45	11	16	14	17	12	16
2.45-3.00	15	17	15	19	15	18
3.00-3.15	15	27	17	31	16	29
3.15-3.30	19	34	18	38	18	36
3.30-3.45	20	27	16	24	18	25
3.45-4.00	22	21	17	19	19	20
4.00-4.15	23	22	21	23	22	22
4.15-4.30	27	19	27	27	27	23
4.30-4.45	24	18	30	30	27	24
4.45-5.00	22	24	26	25	24	24
5.00-5.15	18	22	19	18	18	20
5.15-5.30	21	17	22	17	21	17
5.30-5.45	20	14	18	19	19	16
5.45-6.00	15	12	20	12	17	12
6.00-6.15	28	15	22	13	25	14
6.15-6.30	25	20	26	19	25	19
6.30-6.45	27	16	24	25	25	20
6.45-7.00	31	15	31	20	31	17
Total	***936***	***774***	***961***	***831***	***936***	***792***

Table A-11: Traffic Counts of Sheraton Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	0	0	1	1	0	0
7.15-7.30	2	2	4	1	3	1
7.30-7.45	3	3	6	2	4	2
7.45-8.00	8	7	10	4	9	5
8.00-8.15	13	11	11	5	12	8
8.15-8.30	9	8	9	3	9	5
8.30-8.45	5	6	6	6	5	6
8.45-9.00	4	11	9	5	6	8
9.00-9.15	9	12	8	2	8	7
9.15-9.30	18	7	11	6	14	6
9.30-9.45	14	6	8	4	11	5
9.45-10.00	6	5	9	3	7	4
10.00-10.15	10	12	9	4	9	8
10.15-10.30	16	14	8	5	12	9
10.30-10.45	19	11	20	13	19	12
10.45-11.00	12	12	10	6	11	9
11.00-11.15	16	20	12	12	14	16
11.15-11.30	14	15	5	15	9	15
11.30-11.45	20	23	16	6	18	14
11.45-12.00	14	14	19	7	16	10
12.00-12.15	12	19	11	13	11	16
12.15-12.30	21	10	7	15	14	12
12.30-12.45	14	9	19	14	16	11
12.45-1.00	13	12	11	15	12	13
1.00-1.15	18	17	10	12	14	14
1.15-1.30	14	21	17	13	15	17
1.30-1.45	10	13	11	9	10	11
1.45-2.00	11	10	12	6	11	8

Table A-11(conti.):Traffic Counts of Sheraton Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	6	8	8	22	7	15
2.15-2.30	7	7	11	23	9	15
2.30-2.45	8	14	9	17	8	15
2.45-3.00	13	13	10	15	11	14
3.00-3.15	16	25	18	20	17	22
3.15-3.30	22	17	17	24	19	20
3.30-3.45	7	15	6	21	6	18
3.45-4.00	9	10	15	20	12	15
4.00-4.15	6	10	15	16	10	13
4.15-4.30	16	14	10	17	13	15
4.30-4.45	21	17	12	15	16	16
4.45-5.00	13	22	16	5	14	13
5.00-5.15	16	25	23	16	19	20
5.15-5.30	21	29	10	14	15	21
5.30-5.45	15	16	9	15	12	15
5.45-6.00	16	8	13	11	14	9
6.00-6.15	17	15	14	10	15	12
6.15-6.30	14	11	10	11	12	11
6.30-6.45	12	5	14	13	13	9
6.45-7.00	15	14	11	12	13	13
Total	***595***	***605***	***540***	***524***	***554***	***553***

Table A-12: Traffic Counts of Meridien Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
7.00-7.15	4	0	3	2	3	1
7.15-7.30	5	0	1	3	3	1
7.30-7.45	6	3	4	3	5	3
7.45-8.00	10	7	12	7	11	7
8.00-8.15	14	11	16	10	15	10
8.15-8.30	15	9	17	8	16	8
8.30-8.45	9	7	11	9	10	8
8.45-9.00	9	11	8	11	8	11
9.00-9.15	15	10	15	13	15	11
9.15-9.30	14	7	11	11	12	9
9.30-9.45	10	4	8	14	9	9
9.45-10.00	12	5	14	12	13	8
10.00-10.15	11	9	15	10	13	9
10.15-10.30	10	11	12	12	11	11
10.30-10.45	10	8	14	15	12	11
10.45-11.00	11	10	21	17	16	13
11.00-11.15	12	11	16	18	14	14
11.15-11.30	6	15	18	14	12	14
11.30-11.45	5	13	8	14	6	13
11.45-12.00	12	14	22	15	17	14
12.00-12.15	19	19	25	22	22	20
12.15-12.30	17	10	17	17	17	13
12.30-12.45	14	8	13	20	13	14
12.45-1.00	12	12	22	10	17	11
1.00-1.15	11	17	11	14	11	15
1.15-1.30	10	9	14	11	12	10
1.30-1.45	9	13	11	9	10	11
1.45-2.00	6	12	10	10	8	11

Table A-12(conti.):Traffic Counts of Meridien Hotel

Time Interval	first day		Second day		Average No. of Attr. V.Trips	Average No. of Gen. V.Trips
	No. of Attr. V.Trips	No. of Gen. V.Trips	No. of Attr. V.Trips	No. of Gen. V.Trips		
2.00-2.15	5	8	12	9	8	8
2.15-2.30	8	7	14	8	11	7
2.30-2.45	11	12	16	15	13	13
2.45-3.00	9	13	15	18	12	15
3.00-3.15	10	21	16	20	13	20
3.15-3.30	12	17	24	21	18	19
3.30-3.45	14	17	23	17	18	17
3.45-4.00	13	12	12	13	12	12
4.00-4.15	9	10	21	18	15	14
4.15-4.30	10	14	21	22	15	18
4.30-4.45	12	21	14	21	13	21
4.45-5.00	10	22	16	27	13	24
5.00-5.15	15	17	22	17	18	17
5.15-5.30	12	14	19	21	15	17
5.30-5.45	10	12	16	9	13	10
5.45-6.00	10	8	15	8	12	8
6.00-6.15	14	6	19	12	16	9
6.15-6.30	17	9	11	7	14	8
6.30-6.45	26	5	16	8	21	6
6.45-7.00	25	6	32	10	28	8
Total	***550***	***516***	***723***	***632***	***629***	***561***

APPENDIX B: HOURLY TRAFFIC COUNTS

&

PEAK HOURS

APPENDIX B

HOURLY TRAFFIC COUNTS & PEAK HOURS

Table B-1: Hourly Traffic Counts for Crown Plaza Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	1	1			
7.15-7.30	2	4			
7.30-7.45	5	5			
7.45-8.00	9	6	17	16	33
8.00-8.15	14	9	30	24	54
8.15-8.30	11	9	39	29	68
8.30-8.45	6	6	40	30	70
8.45-9.00	12	4	43	28	71
9.00-9.15	10	6	39	25	64
9.15-9.30	8	8	36	24	60
9.30-9.45	7	6	37	24	61
9.45-10.00	7	5	32	25	57
10.00-10.15	10	7	32	26	58
10.15-10.30	10	8	34	26	60
10.30-10.45	10	9	37	29	66
10.45-11.00	12	8	42	32	74
11.00-11.15	15	10	47	35	82
11.15-11.30	12	11	49	38	87
11.30-11.45	15	14	54	43	97
11.45-12.00	17	16	59	51	110
12.00-12.15	15	19	59	60	119
12.15-12.30	14	20	61	69	130
12.30-12.45	12	17	58	72	130
12.45-1.00	9	15	50	71	121
1.00-1.15	12	12	47	64	111
1.15-1.30	8	7	41	51	92
1.30-1.45	9	7	38	41	79

Table B-1(Conti.):Hourly Traffic Counts for Crown Plaza Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
1.45-2.00	7	9	36	35	71
2.00-2.15	6	6	30	29	59
2.15-2.30	6	5	28	27	55
2.30-2.45	8	5	27	25	52
2.45-3.00	11	8	31	24	55
3.00-3.15	15	18	40	36	76
3.15-3.30	9	20	43	51	94
3.30-3.45	7	21	42	67	109
3.45-4.00	11	19	42	78	120
4.00-4.15	12	17	39	77	116
4.15-4.30	12	12	42	69	111
4.30-4.45	13	12	48	60	108
4.45-5.00	10	10	47	51	98
5.00-5.15	10	13	45	47	92
5.15-5.30	10	14	43	49	92
5.30-5.45	9	13	39	50	89
5.45-6.00	10	11	39	51	90
6.00-6.15	12	11	41	49	90
6.15-6.30	18	9	49	44	93
6.30-6.45	18	12	58	43	101
6.45-7.00	21	9	69	41	110

Trip Type	A.M Peak Hour (11.00-12.00)	P.M Peak Hour (11.45-12.45)
	No. of Trips	No. of Trips
Attracted	59	58
Generated	51	72

Table B-2: Hourly Traffic Counts for Holiday Inn Hotel

Time Interval	Average No. of Attracted VTrips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	0	0			
7.15-7.30	1	4			
7.30-7.45	5	7			
7.45-8.00	7	7	13	18	31
8.00-8.15	11	3	24	21	45
8.15-8.30	12	3	35	20	55
8.30-8.45	6	4	36	17	53
8.45-9.00	4	7	33	17	50
9.00-9.15	7	4	29	18	47
9.15-9.30	7	5	24	20	44
9.30-9.45	5	9	23	25	48
9.45-10.00	4	5	23	23	46
10.00-10.15	6	8	22	27	49
10.15-10.30	7	5	22	27	49
10.30-10.45	5	6	22	24	46
10.45-11.00	8	8	26	27	53
11.00-11.15	10	5	30	24	54
11.15-11.30	11	9	34	28	62
11.30-11.45	9	11	38	33	71
11.45-12.00	14	12	44	37	81
12.00-12.15	10	9	44	41	85
12.15-12.30	11	13	44	45	89
12.30-12.45	11	7	46	41	87
12.45-1.00	8	6	40	35	75
1.00-1.15	7	8	37	34	71
1.15-1.30	6	6	32	27	59
1.30-1.45	7	7	28	27	55
1.45-2.00	5	6	25	27	52
2.00-2.15	5	7	23	26	49
2.15-2.30	5	6	22	26	48

Table B-2 (Conti.):Hourly Traffic Counts for Holiday Inn Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	6	8	21	27	48
2.45-3.00	8	8	24	29	53
3.00-3.15	12	10	31	32	63
3.15-3.30	12	11	38	37	75
3.30-3.45	7	13	39	42	81
3.45-4.00	10	14	41	48	89
4.00-4.15	8	15	37	53	90
4.15-4.30	10	12	35	54	89
4.30-4.45	8	10	36	51	87
4.45-5.00	10	10	36	47	83
5.00-5.15	13	12	41	44	85
5.15-5.30	11	16	42	48	90
5.30-5.45	8	10	42	48	90
5.45-6.00	8	9	40	47	87
6.00-6.15	8	8	35	43	78
6.15-6.30	11	8	35	35	70
6.30-6.45	13	7	40	32	72
6.45-7.00	16	7	48	30	78

Trip Type	A.M Peak Hour (11.00-12.00)	P.M Peak Hour (3.15-4.15)
	No. of Trips	No. of Trips
Attracted	44	37
Generated	37	53

Table B-3: Hourly Traffic Counts for Regency Palace Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	1	0			
7.15-7.30	1	1			
7.30-7.45	4	3			
7.45-8.00	7	5	13	9	22
8.00-8.15	10	6	22	15	37
8.15-8.30	11	7	32	21	53
8.30-8.45	12	10	40	28	68
8.45-9.00	12	7	45	30	75
9.00-9.15	9	5	44	29	73
9.15-9.30	9	6	42	28	70
9.30-9.45	6	3	36	21	57
9.45-10.00	6	4	30	18	48
10.00-10.15	5	6	26	19	45
10.15-10.30	4	6	21	19	40
10.30-10.45	5	3	20	19	39
10.45-11.00	5	8	19	23	42
11.00-11.15	6	10	20	27	47
11.15-11.30	8	9	24	30	54
11.30-11.45	8	11	27	38	65
11.45-12.00	9	10	31	40	71
12.00-12.15	8	10	33	40	73
12.15-12.30	10	7	35	38	73
12.30-12.45	8	9	35	36	71
12.45-1.00	6	6	32	32	64
1.00-1.15	5	3	29	25	54
1.15-1.30	2	1	21	19	40
1.30-1.45	2	2	15	12	27
1.45-2.00	3	2	12	8	20
2.00-2.15	1	1	8	6	14
2.15-2.30	2	2	8	7	15

Table B-3 (Conti.):Hourly Traffic Counts for Regency Palace Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	2	4	8	9	17
2.45-3.00	3	6	8	13	21
3.00-3.15	5	7	12	19	31
3.15-3.30	8	11	18	28	46
3.30-3.45	9	13	25	37	62
3.45-4.00	10	9	32	40	72
4.00-4.15	6	10	33	43	76
4.15-4.30	4	10	29	42	71
4.30-4.45	6	9	26	38	64
4.45-5.00	9	11	25	40	65
5.00-5.15	8	14	27	44	71
5.15-5.30	8	11	31	45	76
5.30-5.45	7	8	32	44	76
5.45-6.00	7	4	30	37	67
6.00-6.15	10	5	32	28	60
6.15-6.30	9	6	33	23	56
6.30-6.45	11	4	37	19	56
6.45-7.00	7	4	37	19	56

Trip Type	A.M Peak Hour (08.00-09.00)	P.M Peak Hour (3.15-4.15)
	No. of Trips	No. of Trips
Attracted	45	33
Generated	30	43

Table B-4: Hourly Traffic Counts for Marriott Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	0	2			
7.15-7.30	3	4			
7.30-7.45	7	6			
7.45-8.00	11	7	21	19	40
8.00-8.15	14	12	35	29	64
8.15-8.30	12	10	44	35	79
8.30-8.45	10	10	47	39	86
8.45-9.00	8	10	44	42	86
9.00-9.15	10	11	40	41	81
9.15-9.30	10	13	38	44	82
9.30-9.45	10	9	38	43	81
9.45-10.00	8	8	38	41	79
10.00-10.15	7	5	35	35	70
10.15-10.30	6	7	31	29	60
10.30-10.45	8	10	29	30	59
10.45-11.00	10	10	31	32	63
11.00-11.15	10	11	34	38	72
11.15-11.30	12	9	40	40	80
11.30-11.45	11	9	43	39	82
11.45-12.00	14	13	47	42	89
12.00-12.15	17	18	54	49	103
12.15-12.30	18	13	60	53	113
12.30-12.45	13	18	62	62	124
12.45-1.00	12	11	60	60	120
1.00-1.15	11	10	54	52	106
1.15-1.30	10	8	46	47	93
1.30-1.45	9	9	42	38	80
1.45-2.00	5	6	35	33	68
2.00-2.15	4	8	28	31	59
2.15-2.30	5	6	23	29	52

Table B-4 (Conti.):Hourly Traffic Counts for Marriott Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	8	6	22	26	48
2.45-3.00	9	8	26	28	54
3.00-3.15	13	9	35	29	64
3.15-3.30	17	15	47	38	85
3.30-3.45	17	19	56	51	107
3.45-4.00	17	22	64	65	129
4.00-4.15	17	17	68	73	141
4.15-4.30	18	16	69	74	143
4.30-4.45	14	15	66	70	136
4.45-5.00	14	20	63	68	131
5.00-5.15	12	25	58	76	134
5.15-5.30	12	16	52	76	128
5.30-5.45	11	13	49	74	123
5.45-6.00	10	14	45	68	113
6.00-6.15	12	13	45	56	101
6.15-6.30	14	10	47	50	97
6.30-6.45	20	9	56	46	102
6.45-7.00	18	13	64	45	109

Trip Type	A.M Peak Hour (11.00-12.00)	P.M Peak Hour (3.30-4.30)
	No. of Trips	No. of Trips
Attracted	47	69
Generated	42	74

Table B-5: Hourly Traffic Counts for Radisson Sas Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	2	0			
7.15-7.30	2	0			
7.30-7.45	3	3			
7.45-8.00	8	5	15	8	23
8.00-8.15	10	7	23	15	38
8.15-8.30	11	7	32	22	54
8.30-8.45	9	6	38	25	63
8.45-9.00	10	7	40	27	67
9.00-9.15	13	9	43	29	72
9.15-9.30	11	8	43	30	73
9.30-9.45	13	9	47	33	80
9.45-10.00	11	11	48	37	85
10.00-10.15	13	13	48	41	89
10.15-10.30	12	9	49	42	91
10.30-10.45	11	11	47	44	91
10.45-11.00	14	13	50	46	96
11.00-11.15	12	14	49	47	96
11.15-11.30	8	12	45	50	95
11.30-11.45	13	7	47	46	93
11.45-12.00	12	9	45	42	87
12.00-12.15	12	13	45	41	86
12.15-12.30	11	10	48	39	87
12.30-12.45	11	10	46	42	88
12.45-1.00	12	7	46	40	86
1.00-1.15	11	8	45	35	80
1.15-1.30	11	7	45	32	77
1.30-1.45	8	6	42	28	70
1.45-2.00	8	5	38	26	64
2.00-2.15	10	7	37	25	62
2.15-2.30	8	8	34	26	60

Table B-5 (Conti.):Hourly Traffic Counts for Radisson Sas Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	10	7	36	27	63
2.45-3.00	11	7	39	29	68
3.00-3.15	14	11	43	33	76
3.15-3.30	12	11	47	36	83
3.30-3.45	12	12	49	41	90
3.45-4.00	12	9	50	43	93
4.00-4.15	10	10	46	42	88
4.15-4.30	7	14	41	45	86
4.30-4.45	11	17	40	50	90
4.45-5.00	14	22	42	63	105
5.00-5.15	14	20	46	73	119
5.15-5.30	12	13	51	72	123
5.30-5.45	7	12	47	67	114
5.45-6.00	6	8	39	53	92
6.00-6.15	7	10	32	43	75
6.15-6.30	6	3	26	33	59
6.30-6.45	10	10	29	31	60
6.45-7.00	11	8	34	31	65

Trip Type	A.M Peak Hour (10.00-11.00)	P.M Peak Hour (4.30-5.30)
	No. of Trips	No. of Trips
Attracted	50	51
Generated	46	72

Table B-6: Hourly Traffic Counts for Four Seasons Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	3	2			
7.15-7.30	2	4			
7.30-7.45	9	8			
7.45-8.00	15	9	29	23	52
8.00-8.15	20	11	46	32	78
8.15-8.30	20	11	64	39	103
8.30-8.45	13	14	68	45	113
8.45-9.00	14	13	67	49	116
9.00-9.15	18	13	65	51	116
9.15-9.30	22	10	67	50	117
9.30-9.45	16	15	70	51	121
9.45-10.00	15	11	71	49	120
10.00-10.15	11	11	64	47	111
10.15-10.30	14	11	56	48	104
10.30-10.45	13	8	53	41	94
10.45-11.00	16	19	54	49	103
11.00-11.15	11	14	54	52	106
11.15-11.30	14	12	54	53	107
11.30-11.45	18	15	59	60	119
11.45-12.00	22	15	65	56	121
12.00-12.15	19	21	73	63	136
12.15-12.30	21	21	80	72	152
12.30-12.45	22	19	84	76	160
12.45-1.00	26	15	88	76	164
1.00-1.15	18	15	87	70	157
1.15-1.30	13	14	79	63	142
1.30-1.45	9	11	66	55	121
1.45-2.00	9	10	49	50	99
2.00-2.15	9	8	40	43	83
2.15-2.30	7	10	34	39	73

Table B-6 (Conti.):Hourly Traffic Counts for Four Seasons Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	9	13	34	41	75
2.45-3.00	14	13	39	44	83
3.00-3.15	17	14	47	50	97
3.15-3.30	20	17	60	57	117
3.30-3.45	14	14	65	58	123
3.45-4.00	11	11	62	56	118
4.00-4.15	13	15	58	57	115
4.15-4.30	15	15	53	55	108
4.30-4.45	15	19	54	60	114
4.45-5.00	19	22	62	71	133
5.00-5.15	14	22	63	78	141
5.15-5.30	13	19	61	82	143
5.30-5.45	15	13	61	76	137
5.45-6.00	12	9	54	63	117
6.00-6.15	13	12	53	53	106
6.15-6.30	20	10	60	44	104
6.30-6.45	21	10	66	41	107
6.45-7.00	23	9	77	41	118

Trip Type	A.M Peak Hour (08.45-09.45)	P.M Peak Hour (12.00-1.00)
	No. of V.Trips	No. of V.Trips
Attracted	70	88
Generated	51	76

Table B-7: Hourly Traffic Counts for Jordan Intercontinental Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	2	2			
7.15-7.30	4	6			
7.30-7.45	7	10			
7.45-8.00	15	13	28	31	59
8.00-8.15	25	13	51	42	93
8.15-8.30	26	15	73	51	124
8.30-8.45	24	18	90	59	149
8.45-9.00	22	15	97	61	158
9.00-9.15	23	14	95	62	157
9.15-9.30	29	14	98	61	159
9.30-9.45	23	11	97	54	151
9.45-10.00	19	8	94	47	141
10.00-10.15	21	11	92	44	136
10.15-10.30	21	16	84	46	130
10.30-10.45	18	18	79	53	132
10.45-11.00	19	20	79	65	144
11.00-11.15	17	18	75	72	147
11.15-11.30	23	25	77	81	158
11.30-11.45	22	29	81	92	173
11.45-12.00	24	25	86	97	183
12.00-12.15	26	30	95	109	204
12.15-12.30	31	30	103	114	217
12.30-12.45	24	30	105	115	220
12.45-1.00	23	18	104	108	212
1.00-1.15	21	14	99	92	191
1.15-1.30	21	13	89	75	164
1.30-1.45	16	10	81	55	136
1.45-2.00	12	9	70	46	116
2.00-2.15	12	10	61	42	103
2.15-2.30	9	11	49	40	89

Table B-7 (Conti.):Hourly Traffic Counts for Jordan Intercontinental Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	9	11	42	41	83
2.45-3.00	12	9	42	41	83
3.00-3.15	14	14	44	45	89
3.15-3.30	16	19	51	53	104
3.30-3.45	21	22	63	64	127
3.45-4.00	17	26	68	81	149
4.00-4.15	15	18	69	85	154
4.15-4.30	16	20	69	86	155
4.30-4.45	19	21	67	85	152
4.45-5.00	24	20	74	79	153
5.00-5.15	19	25	78	86	164
5.15-5.30	21	17	83	83	166
5.30-5.45	17	14	81	76	157
5.45-6.00	15	14	72	70	142
6.00-6.15	18	22	71	67	138
6.15-6.30	19	21	69	71	140
6.30-6.45	20	16	72	73	145
6.45-7.00	21	17	78	76	154

Trip Type	A.M Peak Hour (11.00-12.00)	P.M Peak Hour (11.45-12.45)
	No. of V.Trips	No. of V.Trips
Attracted	86	105
Generated	97	115

Table B-8: Hourly Traffic Counts for Hyatt Amman Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	2	2			
7.15-7.30	3	3			
7.30-7.45	5	6			
7.45-8.00	13	10	23	21	44
8.00-8.15	22	14	43	33	76
8.15-8.30	24	16	64	46	110
8.30-8.45	21	20	80	60	140
8.45-9.00	19	16	86	66	152
9.00-9.15	20	15	84	67	151
9.15-9.30	22	11	82	62	144
9.30-9.45	19	10	80	52	132
9.45-10.00	16	10	77	46	123
10.00-10.15	18	10	75	41	116
10.15-10.30	16	13	69	43	112
10.30-10.45	16	17	66	50	116
10.45-11.00	16	19	66	59	125
11.00-11.15	14	15	62	64	126
11.15-11.30	20	21	66	72	138
11.30-11.45	19	23	69	78	147
11.45-12.00	21	25	74	84	158
12.00-12.15	23	27	83	96	179
12.15-12.30	28	25	91	100	191
12.30-12.45	24	19	96	96	192
12.45-1.00	16	17	91	88	179
1.00-1.15	19	13	87	74	161
1.15-1.30	18	12	77	61	138
1.30-1.45	14	12	67	54	121
1.45-2.00	10	8	61	45	106
2.00-2.15	9	10	51	42	93
2.15-2.30	7	8	40	38	78

Table B-8 (Conti.):Hourly Traffic Counts for Hyatt Amman Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	8	11	34	37	71
2.45-3.00	9	14	33	43	76
3.00-3.15	11	19	35	52	87
3.15-3.30	13	19	41	63	104
3.30-3.45	18	19	51	71	122
3.45-4.00	14	19	56	76	132
4.00-4.15	12	19	57	76	133
4.15-4.30	13	20	57	77	134
4.30-4.45	16	18	55	76	131
4.45-5.00	22	25	63	82	145
5.00-5.15	22	25	73	88	161
5.15-5.30	18	20	78	88	166
5.30-5.45	18	16	80	86	166
5.45-6.00	18	18	76	79	155
6.00-6.15	15	15	69	69	138
6.15-6.30	20	13	71	62	133
6.30-6.45	17	11	70	57	127
6.45-7.00	16	14	68	53	121

Trip Type	A.M Peak Hour (11.00-12.00)	P.M Peak Hour (11.45-12.45)
	No. of V.Trips	No. of V.Trips
Attracted	74	96
Generated	84	96

Table B-9: Hourly Traffic Counts for Kempinski Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	2	0			
7.15-7.30	1	1			
7.30-7.45	5	3			
7.45-8.00	7	3	15	7	22
8.00-8.15	9	4	22	11	33
8.15-8.30	11	6	32	16	48
8.30-8.45	7	3	34	16	50
8.45-9.00	7	6	34	19	53
9.00-9.15	12	6	37	21	58
9.15-9.30	12	5	38	20	58
9.30-9.45	7	8	38	25	63
9.45-10.00	6	3	37	22	59
10.00-10.15	5	6	30	22	52
10.15-10.30	6	5	24	22	46
10.30-10.45	5	5	22	19	41
10.45-11.00	6	8	22	24	46
11.00-11.15	9	10	26	28	54
11.15-11.30	10	10	30	33	63
11.30-11.45	11	11	36	39	75
11.45-12.00	11	10	41	41	82
12.00-12.15	11	9	43	40	83
12.15-12.30	12	8	45	38	83
12.30-12.45	9	8	43	35	78
12.45-1.00	9	6	41	31	72
1.00-1.15	8	7	38	29	67
1.15-1.30	9	5	35	26	61
1.30-1.45	4	5	30	23	53
1.45-2.00	4	3	25	20	45
2.00-2.15	4	4	21	17	38
2.15-2.30	5	5	17	17	34

Table B-9 (Conti.):Hourly Traffic Counts for Kempinski Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	9	6	22	18	40
2.45-3.00	7	6	25	21	46
3.00-3.15	9	10	30	27	57
3.15-3.30	11	12	36	34	70
3.30-3.45	10	12	37	40	77
3.45-4.00	8	14	38	48	86
4.00-4.15	9	12	38	50	88
4.15-4.30	7	12	34	50	84
4.30-4.45	7	10	31	48	79
4.45-5.00	7	10	30	44	74
5.00-5.15	10	13	31	45	76
5.15-5.30	8	14	32	47	79
5.30-5.45	7	9	32	46	78
5.45-6.00	7	8	32	44	76
6.00-6.15	8	6	30	37	67
6.15-6.30	10	7	32	30	62
6.30-6.45	8	3	33	24	57
6.45-7.00	6	3	32	19	51

Trip Type	A.M Peak Hour (11.00-12.00)	P.M Peak Hour (3.15-4.15)
	No. of V.Trips	No. of V.Trips
Attracted	41	38
Generated	41	50

Table B-10: Hourly Traffic Counts for Le Royal Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	4	3			
7.15-7.30	5	4			
7.30-7.45	15	10			
7.45-8.00	19	11	43	28	71
8.00-8.15	26	13	65	38	103
8.15-8.30	20	13	80	47	127
8.30-8.45	18	12	83	49	132
8.45-9.00	21	11	85	49	134
9.00-9.15	27	12	86	48	134
9.15-9.30	25	13	91	48	139
9.30-9.45	15	12	88	48	136
9.45-10.00	16	13	83	50	133
10.00-10.15	18	14	74	52	126
10.15-10.30	15	15	64	54	118
10.30-10.45	15	13	64	55	119
10.45-11.00	16	15	64	57	121
11.00-11.15	19	15	65	58	123
11.15-11.30	19	19	69	62	131
11.30-11.45	22	17	76	66	142
11.45-12.00	26	20	86	71	157
12.00-12.15	31	20	98	76	174
12.15-12.30	24	19	103	76	179
12.30-12.45	26	18	107	77	184
12.45-1.00	25	20	106	77	183
1.00-1.15	19	20	94	77	171
1.15-1.30	18	16	88	74	162
1.30-1.45	14	12	76	68	144
1.45-2.00	14	11	65	59	124
2.00-2.15	12	12	58	51	109
2.15-2.30	13	17	53	52	105

Table B-10 (Conti.):Hourly Traffic Counts for Le Royal Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	12	16	51	56	107
2.45-3.00	15	18	52	63	115
3.00-3.15	16	29	56	80	136
3.15-3.30	18	36	61	99	160
3.30-3.45	18	25	67	108	175
3.45-4.00	19	20	71	110	181
4.00-4.15	22	22	77	103	180
4.15-4.30	27	23	86	90	176
4.30-4.45	27	24	95	89	184
4.45-5.00	24	24	100	93	193
5.00-5.15	18	20	96	91	187
5.15-5.30	21	17	90	85	175
5.30-5.45	19	16	82	77	159
5.45-6.00	17	12	75	65	140
6.00-6.15	25	14	82	59	141
6.15-6.30	25	19	86	61	147
6.30-6.45	25	20	92	65	157
6.45-7.00	31	17	106	70	176

Trip Type	A.M Peak Hour (11.00-12.00)	P.M Peak Hour (4.00-5.00)
	No. of V.Trips	No. of V.Trips
Attracted	86	100
Generated	71	93

Table B-11: Hourly Traffic Counts for Sheraton Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	0	0			
7.15-7.30	3	1			
7.30-7.45	4	2			
7.45-8.00	9	5	16	8	24
8.00-8.15	12	8	28	16	44
8.15-8.30	9	5	34	20	54
8.30-8.45	5	6	35	24	59
8.45-9.00	6	8	32	27	59
9.00-9.15	8	7	28	26	54
9.15-9.30	14	6	33	27	60
9.30-9.45	11	5	39	26	65
9.45-10.00	7	4	40	22	62
10.00-10.15	9	8	41	23	64
10.15-10.30	12	9	39	26	65
10.30-10.45	19	12	47	33	80
10.45-11.00	11	9	51	38	89
11.00-11.15	14	16	56	46	102
11.15-11.30	9	15	53	52	105
11.30-11.45	18	14	52	54	106
11.45-12.00	16	10	57	55	112
12.00-12.15	11	16	54	55	109
12.15-12.30	14	12	59	52	111
12.30-12.45	16	11	57	49	106
12.45-1.00	12	13	53	52	105
1.00-1.15	14	14	56	50	106
1.15-1.30	15	17	57	55	112
1.30-1.45	10	11	51	55	106
1.45-2.00	11	8	50	50	100
2.00-2.15	7	15	43	51	94
2.15-2.30	9	15	37	49	86

Table B-11 (Conti.):Hourly Traffic Counts for Sheraton Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	8	15	35	53	88
2.45-3.00	11	14	35	59	94
3.00-3.15	17	22	45	66	111
3.15-3.30	19	20	55	71	126
3.30-3.45	6	18	53	74	127
3.45-4.00	12	15	54	75	129
4.00-4.15	10	13	47	66	113
4.15-4.30	13	15	41	61	102
4.30-4.45	16	16	51	59	110
4.45-5.00	14	13	53	57	110
5.00-5.15	19	20	62	64	126
5.15-5.30	15	21	64	70	134
5.30-5.45	12	15	60	69	129
5.45-6.00	14	9	60	65	125
6.00-6.15	15	12	56	57	113
6.15-6.30	12	11	53	47	100
6.30-6.45	13	9	54	41	95
6.45-7.00	13	13	53	45	98

Trip Type	A.M Peak Hour (11.00-12.00)	P.M Peak Hour (4.30-5.30)
	No. of V.Trips	No. of V.Trips
Attracted	57	64
Generated	55	70

Table B-12: Hourly Traffic Counts for Meridien Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
7.00-7.15	3	1			
7.15-7.30	3	1			
7.30-7.45	5	3			
7.45-8.00	11	7	22	12	34
8.00-8.15	15	10	34	21	55
8.15-8.30	16	8	47	28	75
8.30-8.45	10	8	52	33	85
8.45-9.00	8	11	49	37	86
9.00-9.15	15	11	49	38	87
9.15-9.30	12	9	45	39	84
9.30-9.45	9	9	44	40	84
9.45-10.00	13	8	49	37	86
10.00-10.15	13	9	47	35	82
10.15-10.30	11	11	46	37	83
10.30-10.45	12	11	49	39	88
10.45-11.00	16	13	52	44	96
11.00-11.15	14	14	53	49	102
11.15-11.30	12	14	54	52	106
11.30-11.45	6	13	48	54	102
11.45-12.00	17	14	49	55	104
12.00-12.15	22	20	57	61	118
12.15-12.30	17	13	62	60	122
12.30-12.45	13	14	69	61	130
12.45-1.00	17	11	69	58	127
1.00-1.15	11	15	58	53	111
1.15-1.30	12	10	53	50	103
1.30-1.45	10	11	50	47	97
1.45-2.00	8	11	41	47	88
2.00-2.15	8	8	38	40	78
2.15-2.30	11	7	37	37	74

Table B-12 (Conti.):Hourly Traffic Counts for Meridien Hotel

Time Interval	Average No. of Attracted V.Trips	Average No. of Generated V.Trips	No. of Hourly Attracted V.Trips	No. of Hourly Generated V.Trips	Total Hourly V.Trips (Attracted + Generated)
2.30-2.45	13	13	40	39	79
2.45-3.00	12	15	44	43	87
3.00-3.15	13	20	49	55	104
3.15-3.30	18	19	56	67	123
3.30-3.45	18	17	61	71	132
3.45-4.00	12	12	61	68	129
4.00-4.15	15	14	63	62	125
4.15-4.30	15	18	60	61	121
4.30-4.45	13	21	55	65	120
4.45-5.00	13	24	56	77	133
5.00-5.15	18	17	59	80	139
5.15-5.30	15	17	59	79	138
5.30-5.45	13	10	59	68	127
5.45-6.00	12	8	58	52	110
6.00-6.15	16	9	56	44	100
6.15-6.30	14	8	55	35	90
6.30-6.45	21	6	63	31	94
6.45-7.00	28	8	79	31	110

Trip Type	A.M Peak Hour (10.30-11.30)	P.M Peak Hour (4.15-5.15)
	No. of V.Trips	No. of V.Trips
Attracted	54	59
Generated	52	80

APPENDIX C: REGRESSION MODELS TRIALS

APPENDIX C: REGRESSION MODELS TRIALS

Single Variable Models

1-Attracted Vehicle-Trips versus Number of Employees
Independent: EMP

Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1	b2	b3
TRIPS	LIN	.745	10	29.19	.000	-54.055	1.6359		
TRIPS	LOG	.699	10	23.24	.001	-3023.7	608.260		
TRIPS	INV	.619	10	16.25	.002	1146.09	-203988		
TRIPS	QUA	.752	9	13.63	.002	165.346	.4862	.0014	
TRIPS	CUB	.804	8	10.91	.003	2200.39	-15.768	.0425	-3.E-05
TRIPS	POW	.670	10	20.29	.001	1.2803	1.0232		
TRIPS	S	.601	10	15.07	.003	7.2678	-345.44		
TRIPS	GRO	.704	10	23.78	.001	5.2501	.0027		
TRIPS	EXP	.704	10	23.78	.001	190.591	.0027		

2-Attracted Vehicle-Trips versus Hotel Floor Area
Independent: HA

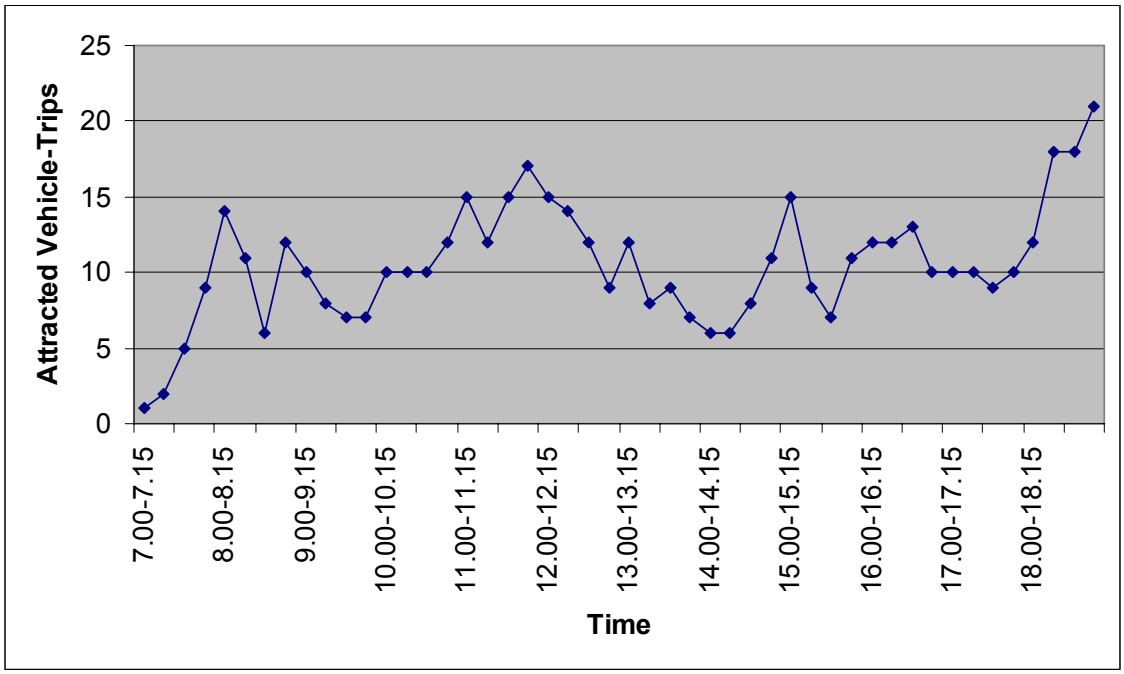
Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1	b2	b3
TRIPS	LIN	.526	10	11.11	.008	340.970	.0053		
TRIPS	LOG	.570	10	13.26	.005	-2613.9	301.193		
TRIPS	INV	.552	10	12.33	.006	929.243	-1.E+07		
TRIPS	QUA	.556	9	5.63	.026	206.620	.0105	-4.E-08	
TRIPS	CUB	.601	8	4.02	.051	-332.07	.0442	-6.E-07	2.9E-12
TRIPS	POW	.545	10	11.96	.006	2.5701	.5060		
TRIPS	S	.556	10	12.51	.005	6.9109	-21945		
TRIPS	GRO	.474	10	9.01	.013	5.9201	8.6E-06		
TRIPS	EXP	.474	10	9.01	.013	372.462	8.6E-06		

APPENDIX D: ATTRACTION& GENERATION PATTERNS

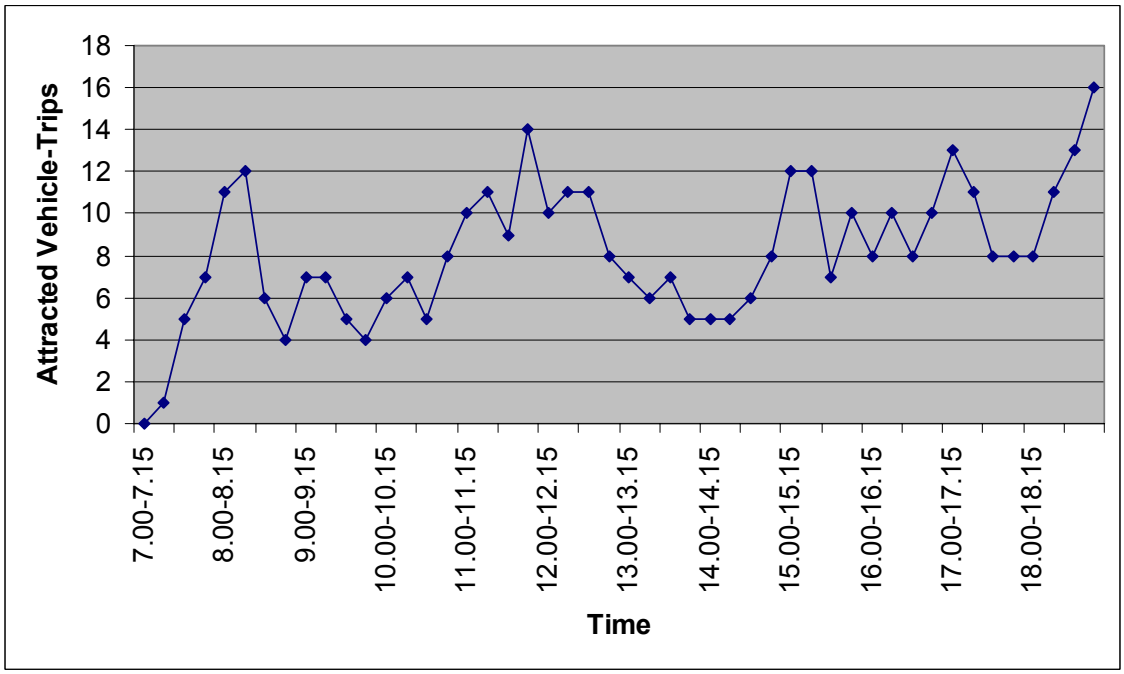
A.ATTRACTION PATTERN FOR THE STUDIED HOTELS

B.GENERATION PATTERN FOR THE STUDIED HOTELS

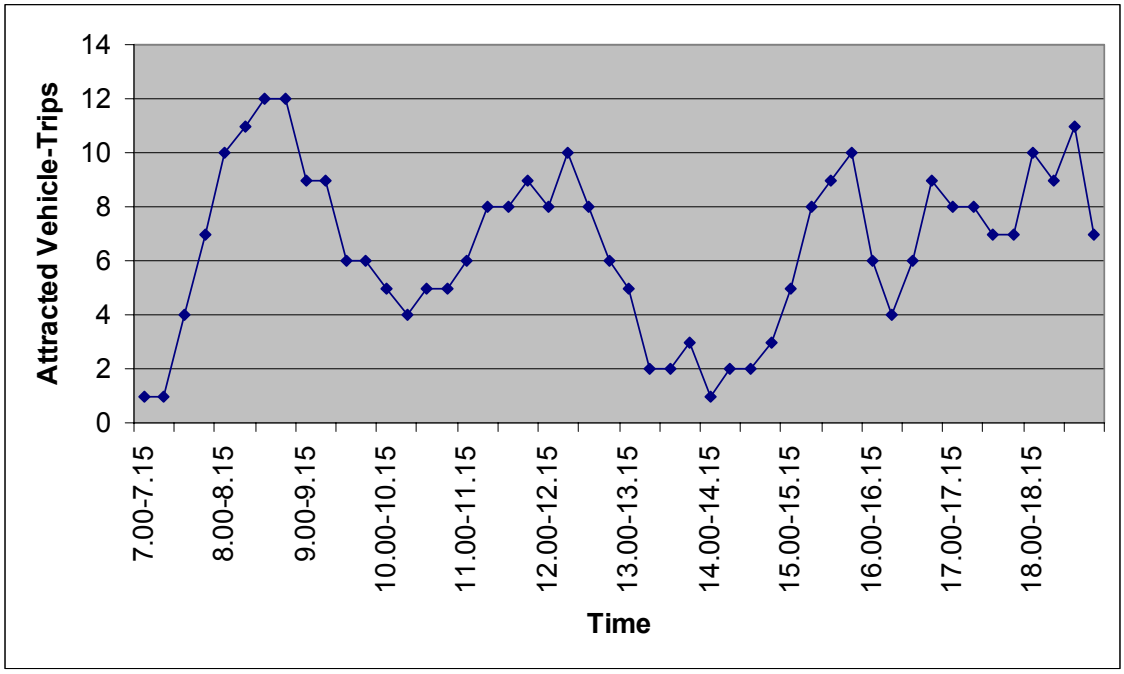
A.ATTRACTION PATTERN FOR THE STUDIED HOTELS



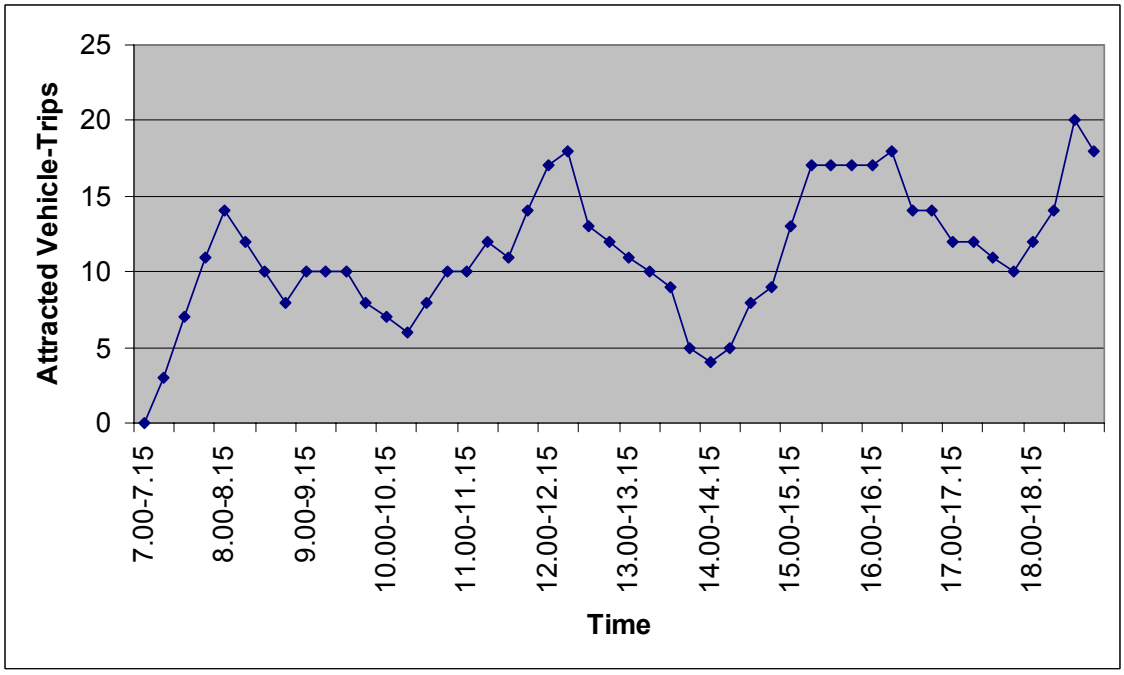
1. Attracted Vehicle Trips vs. Time for Crown Plaza Hotel



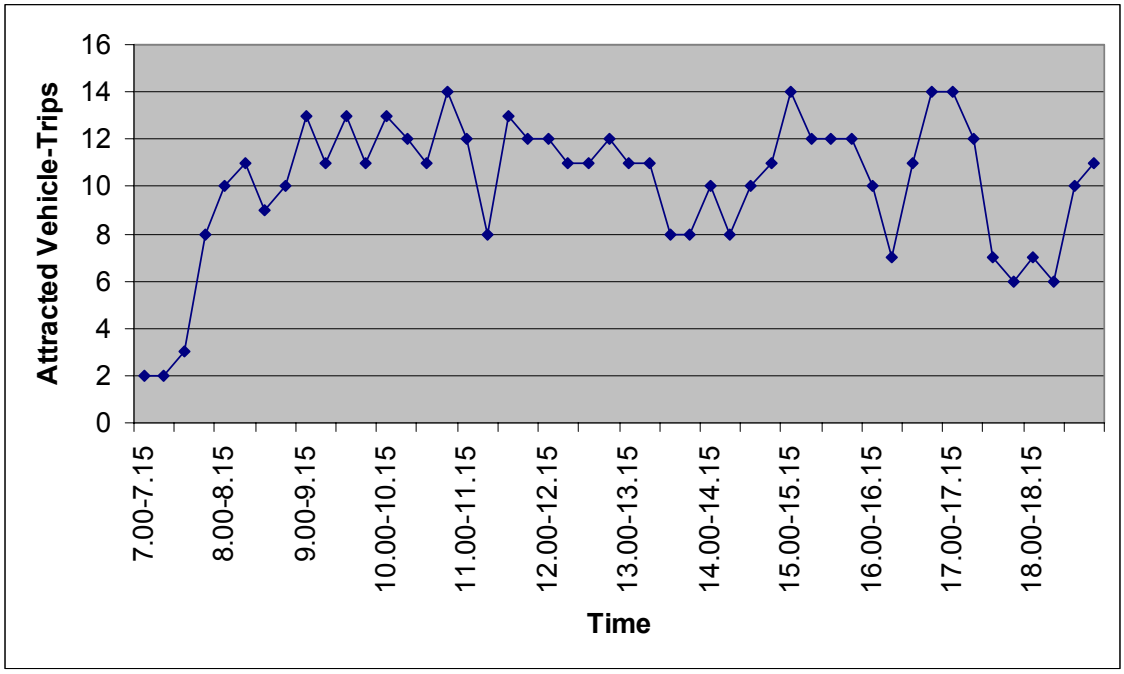
2. Attracted Vehicle Trips vs. Time for Holiday Inn Hotel



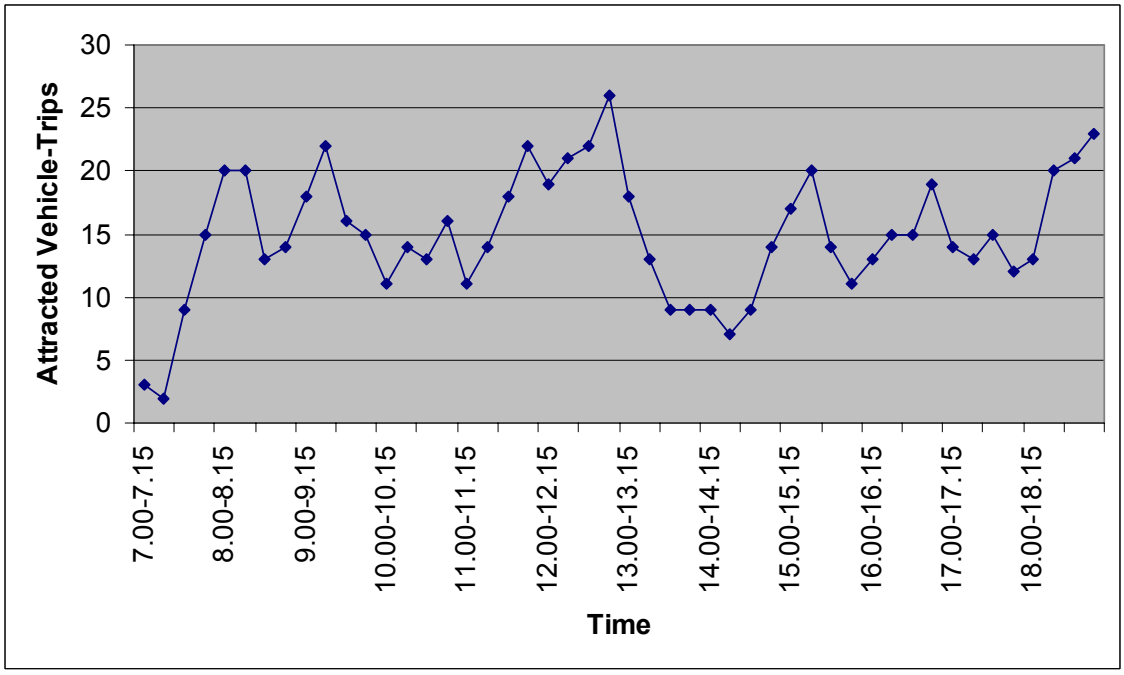
3. Attracted Vehicle Trips vs. Time for Regency Palace Hotel



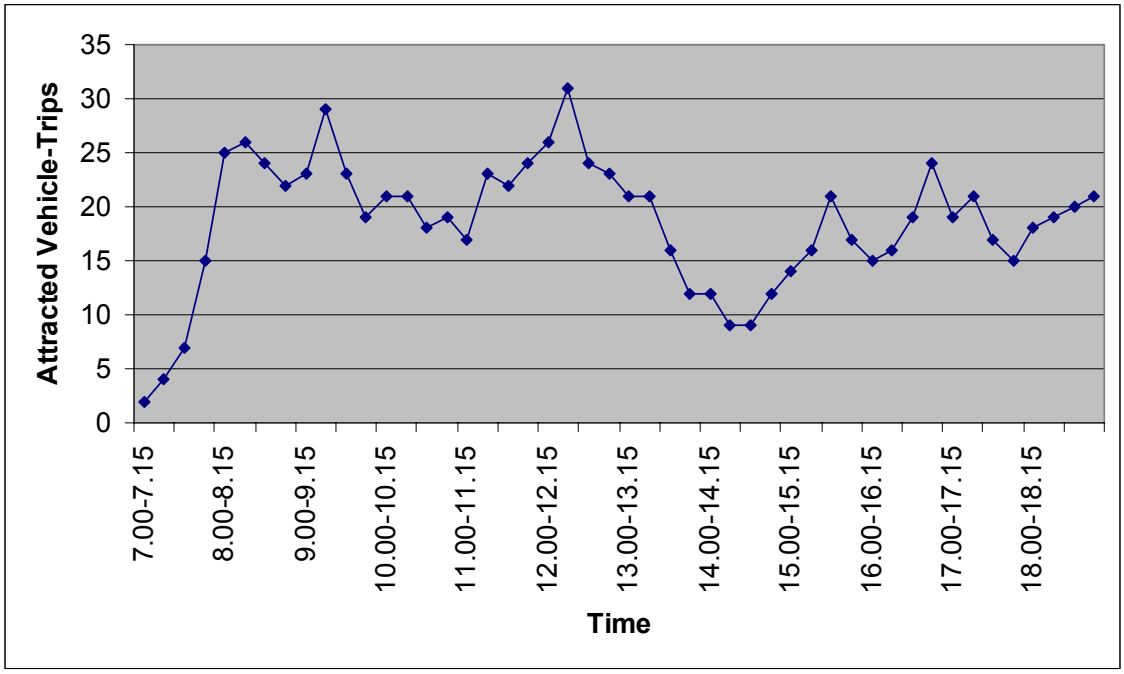
4. Attracted Vehicle Trips vs. Time for Marriott Hotel



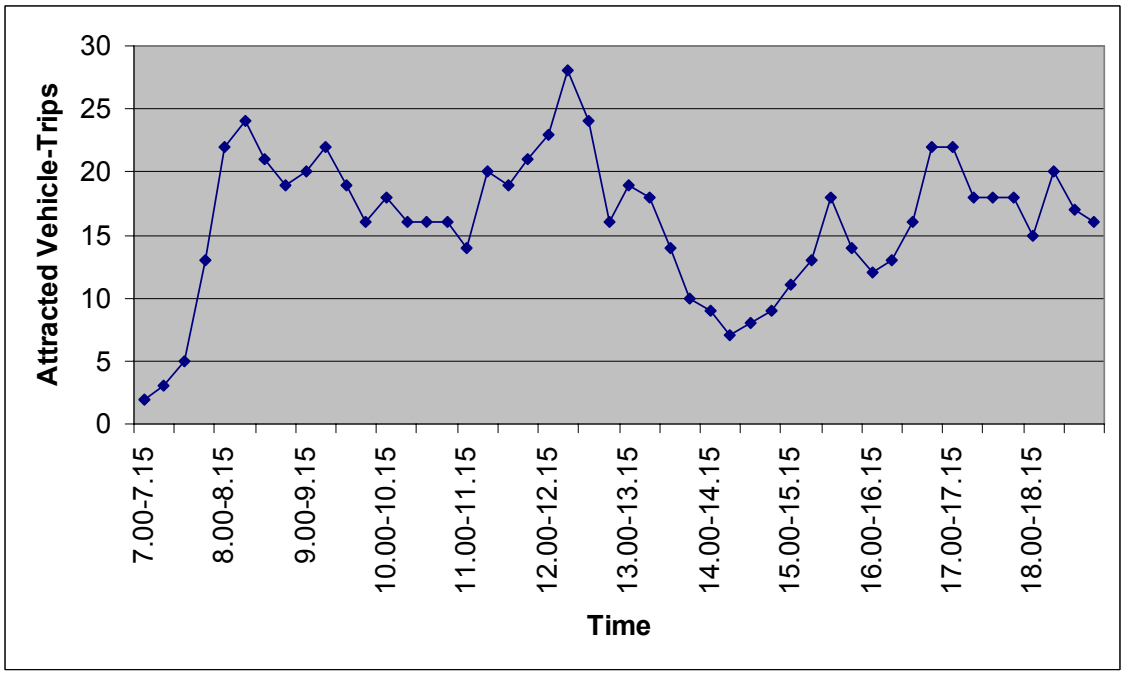
5. Attracted Vehicle Trips vs. Time for Radisson Sas Hotel



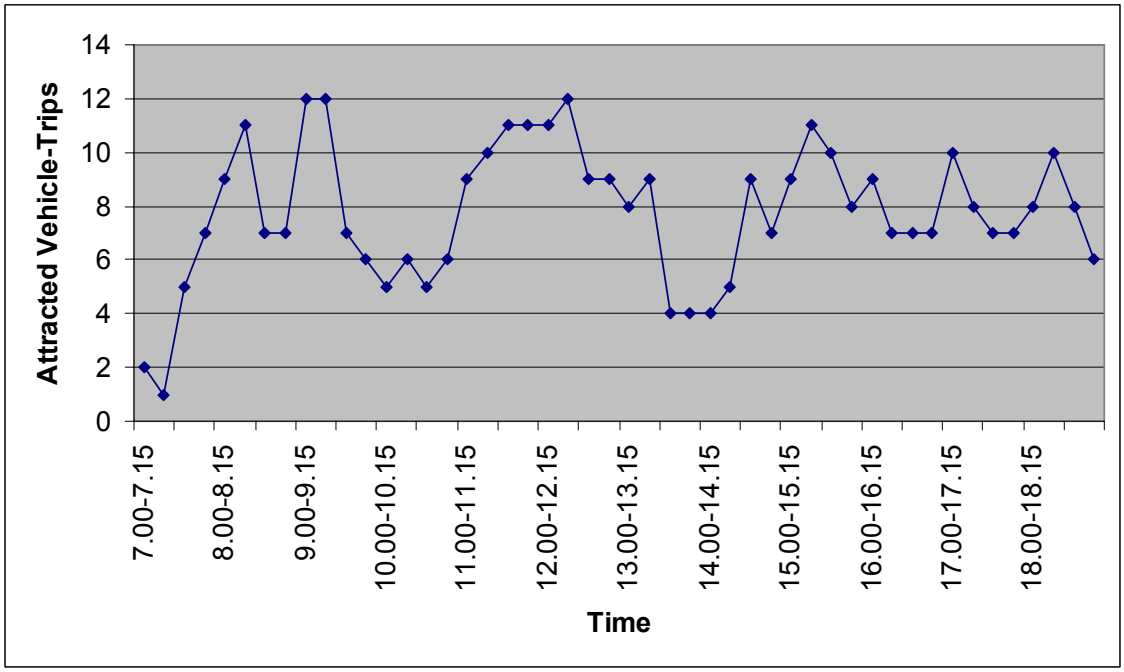
6. Attracted Vehicle Trips vs. Time for Four Seasons Hotel



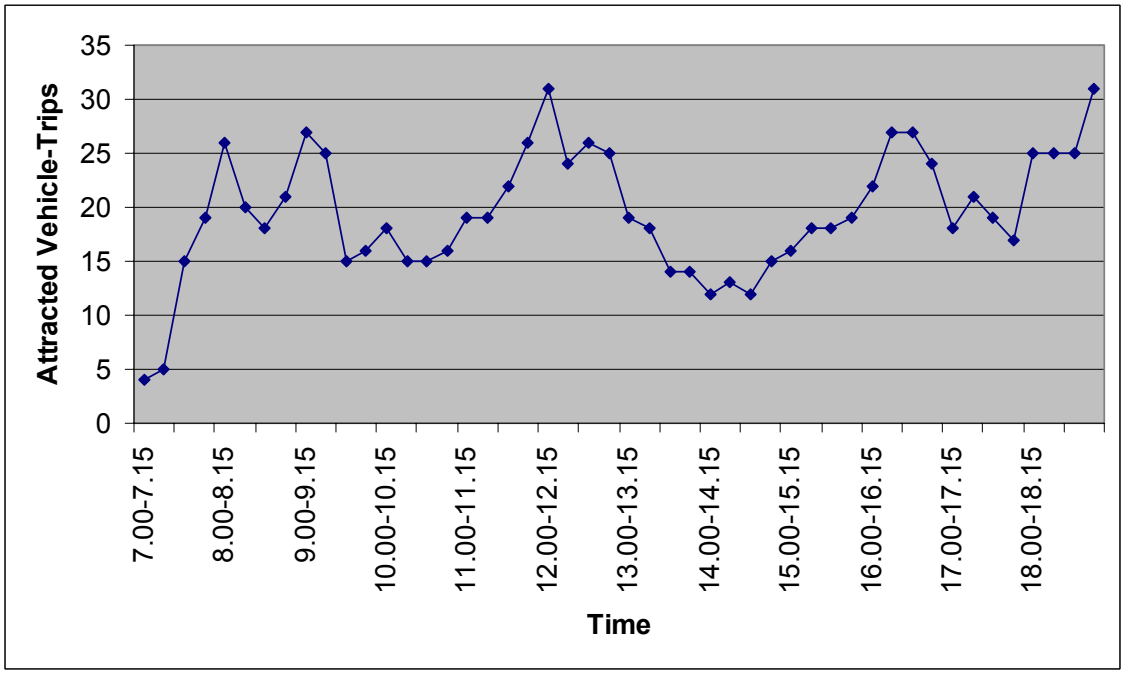
7. Attracted Vehicle Trips vs. Time for Jordan Intercontinental Hotel



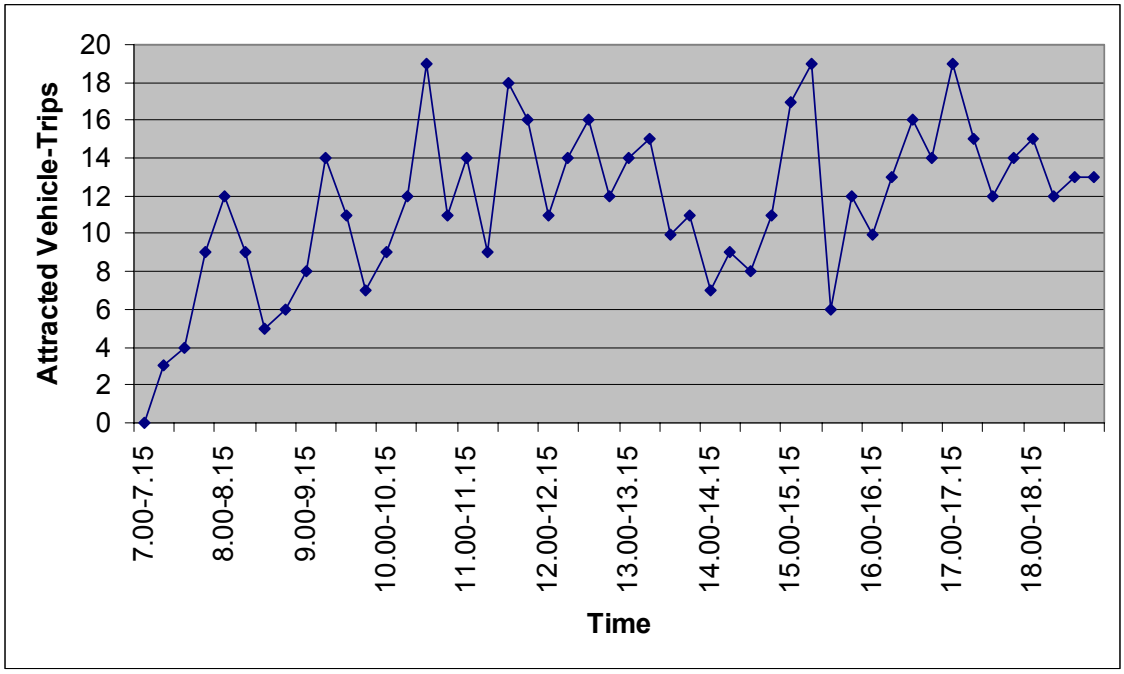
8. Attracted Vehicle Trips vs. Time for Hyatt Amman Hotel



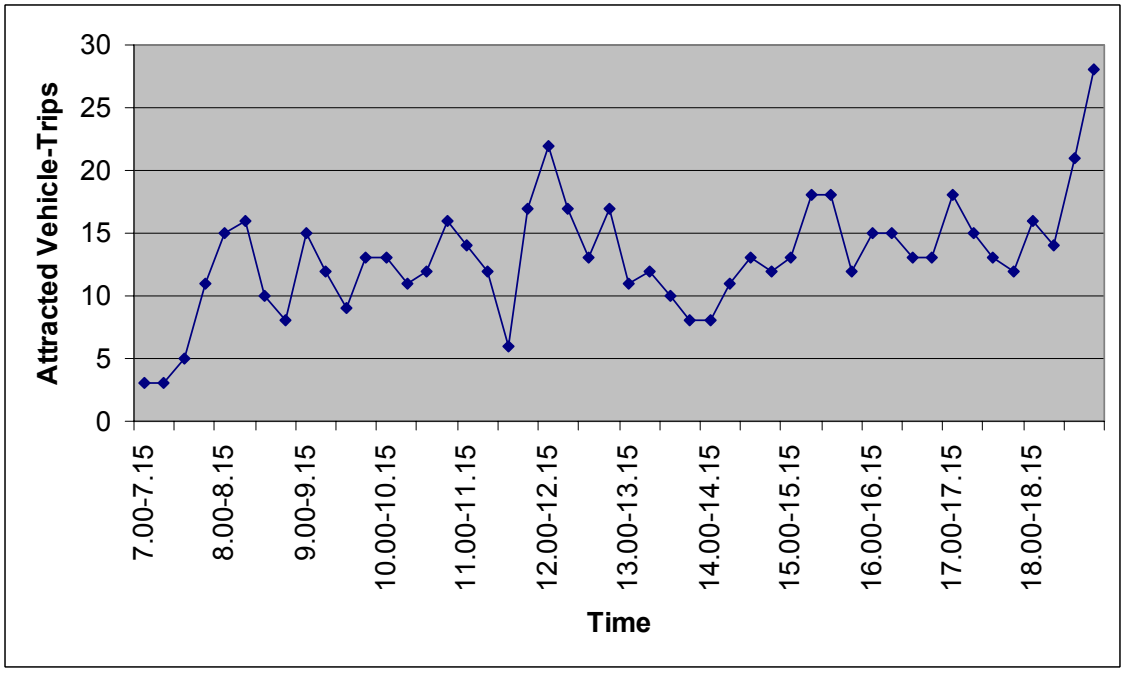
9. Attracted Vehicle Trips vs. Time for Kempinski Hotel



10. Attracted Vehicle Trips vs. Time for Le Royal Hotel

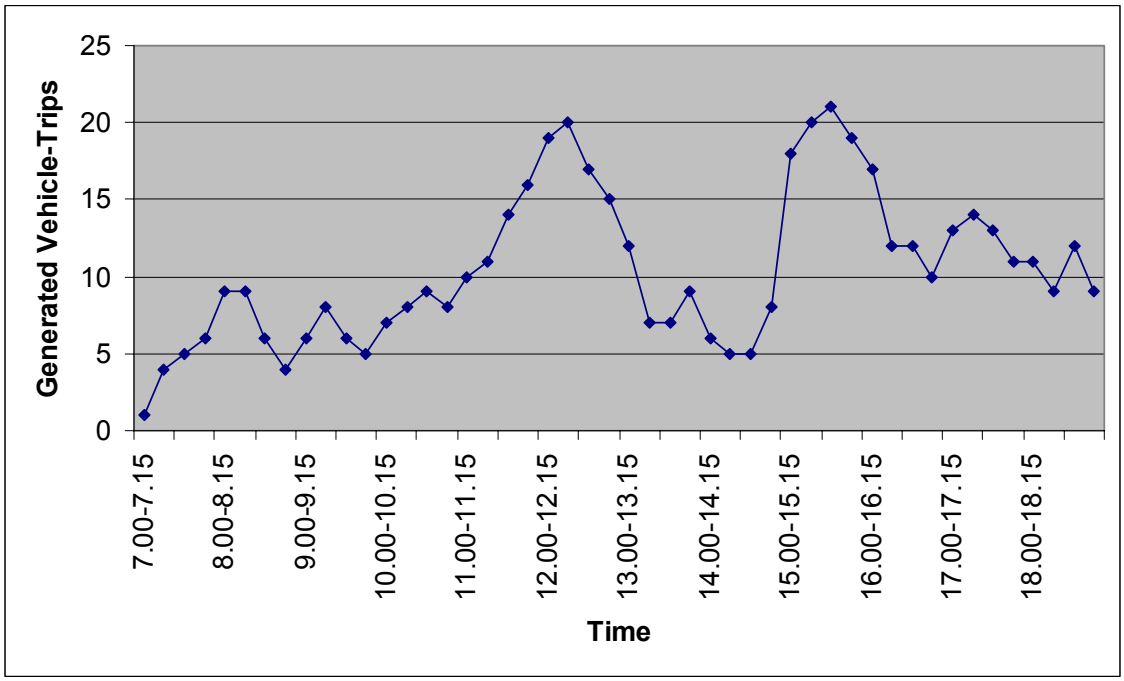


11. Attracted Vehicle Trips vs. Time for Sheraton Hotel

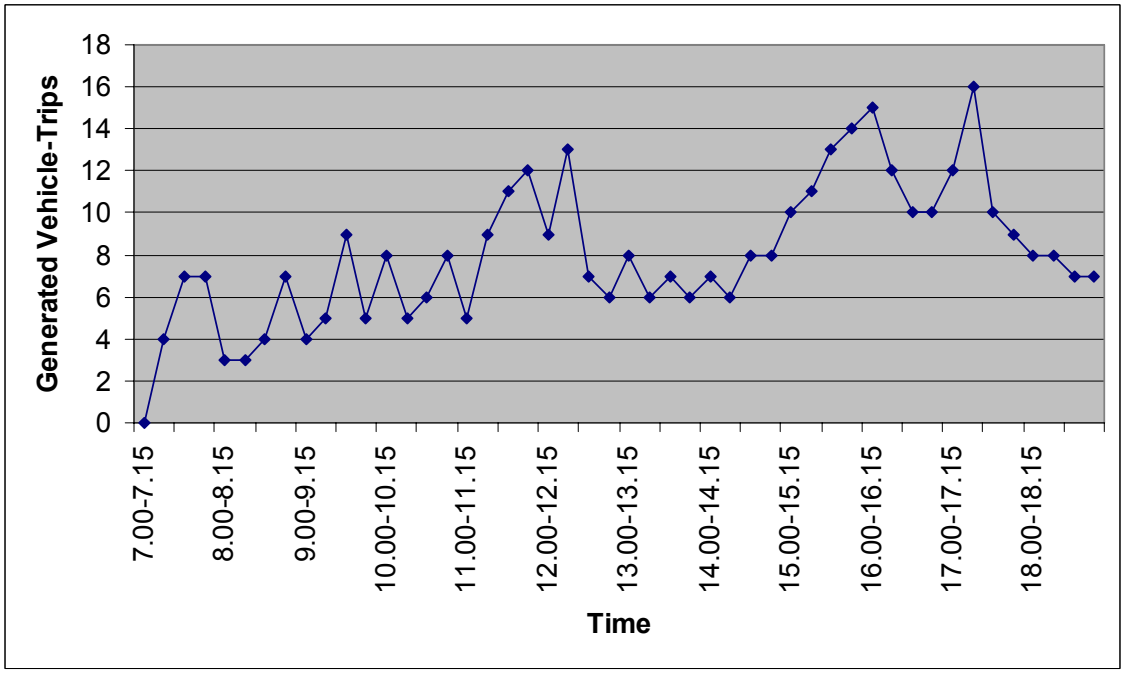


12. Attracted Vehicle Trips vs. Time for Meridien Hotel

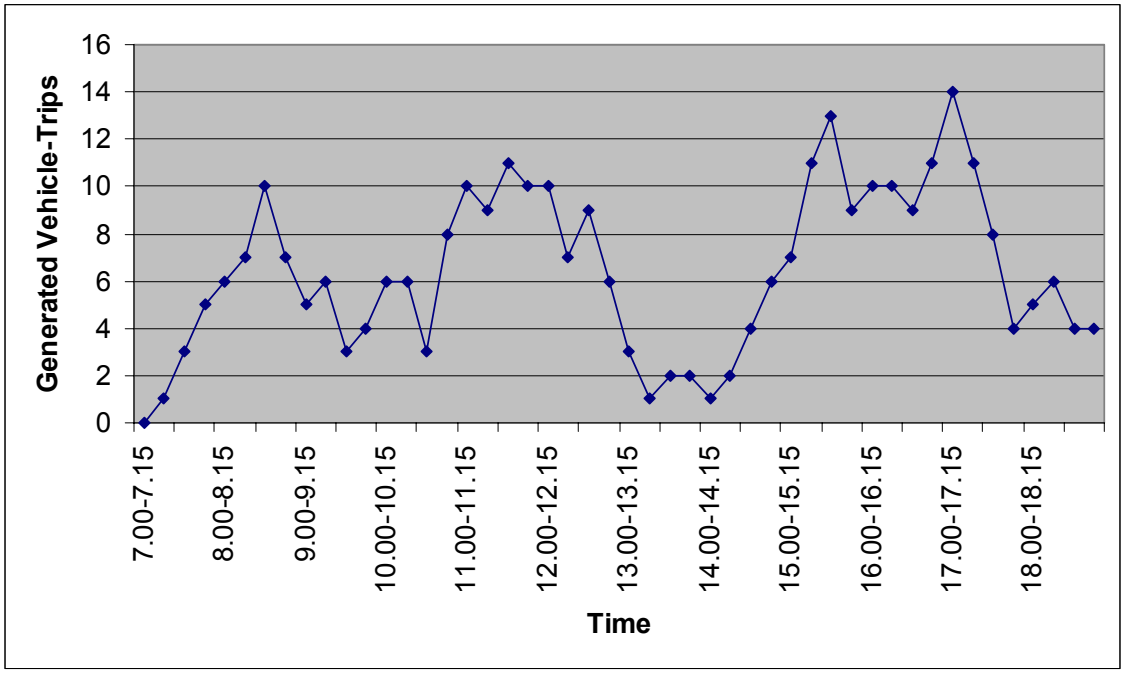
B.GENERATION PATTERN FOR THE STUDIED HOTELS



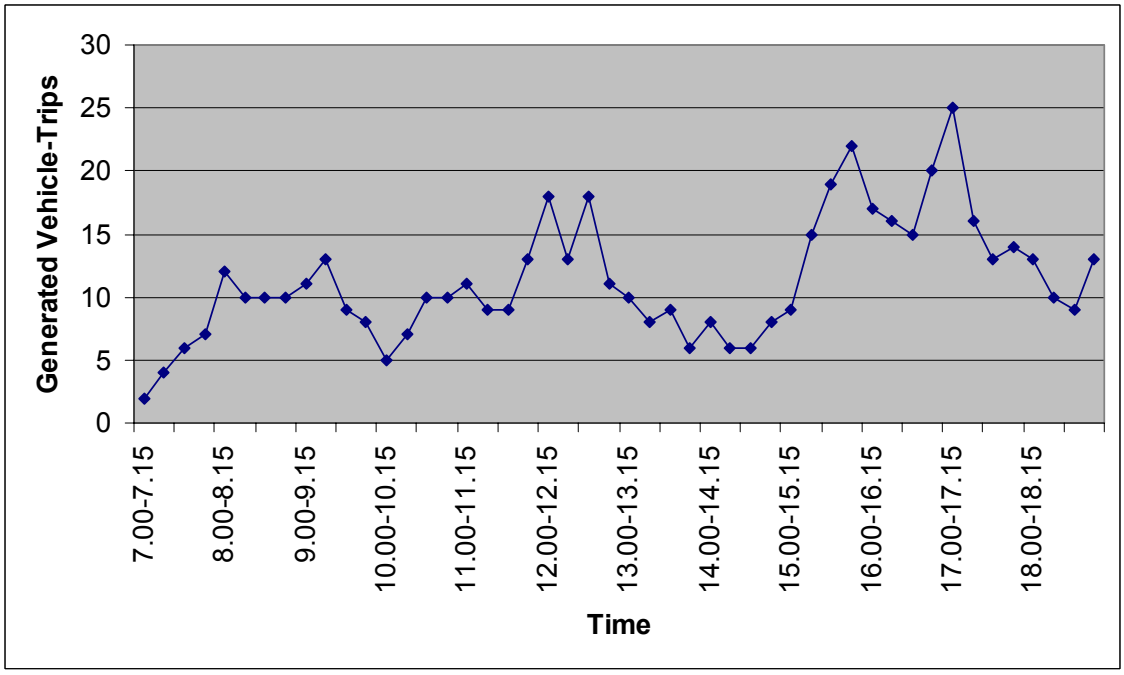
1. Generated Vehicle Trips vs. Time for Crown Plaza Hotel



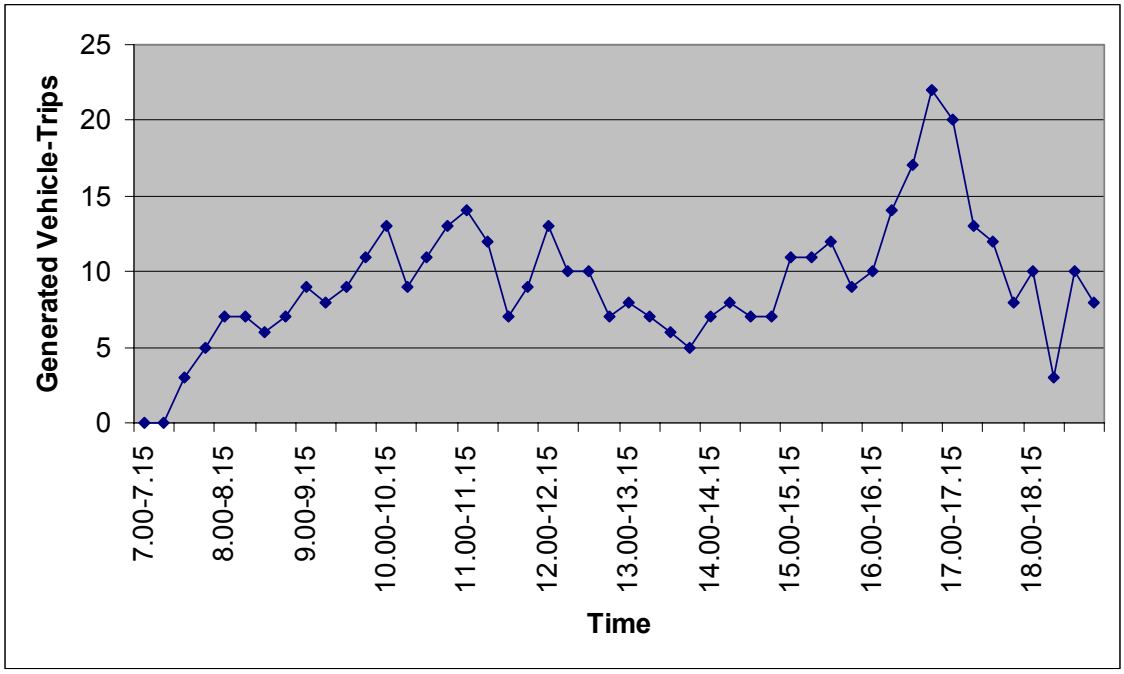
2. Generated Vehicle Trips vs. Time for Holiday Inn Hotel



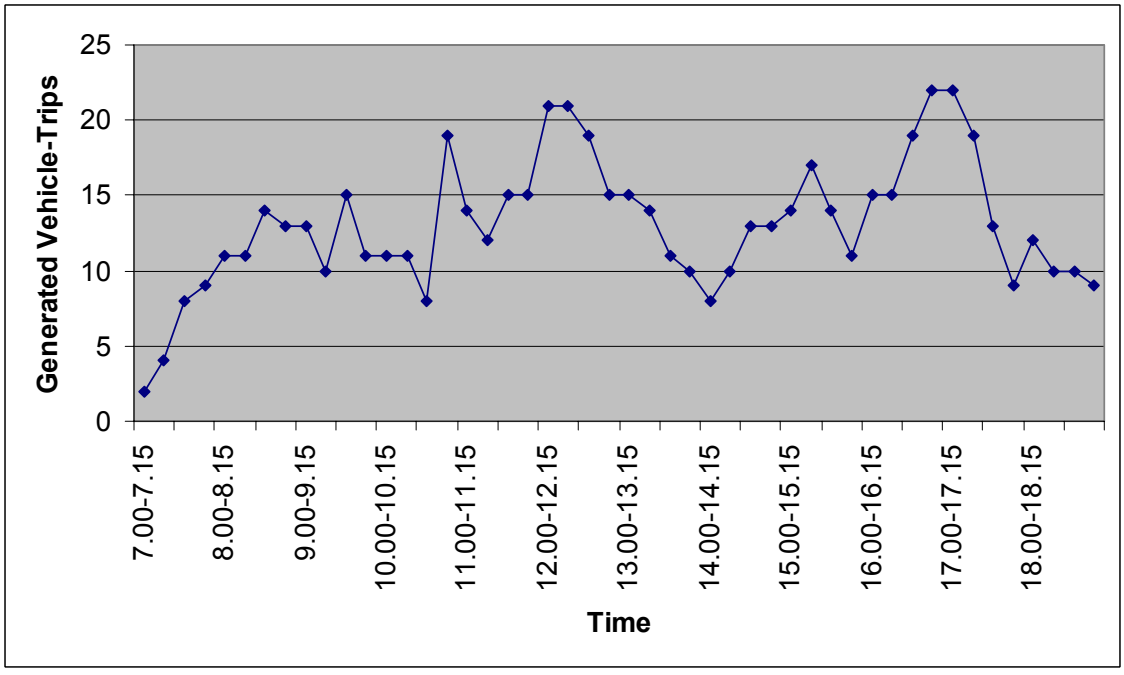
3. Generated Vehicle Trips vs. Time for Regency Palace Hotel



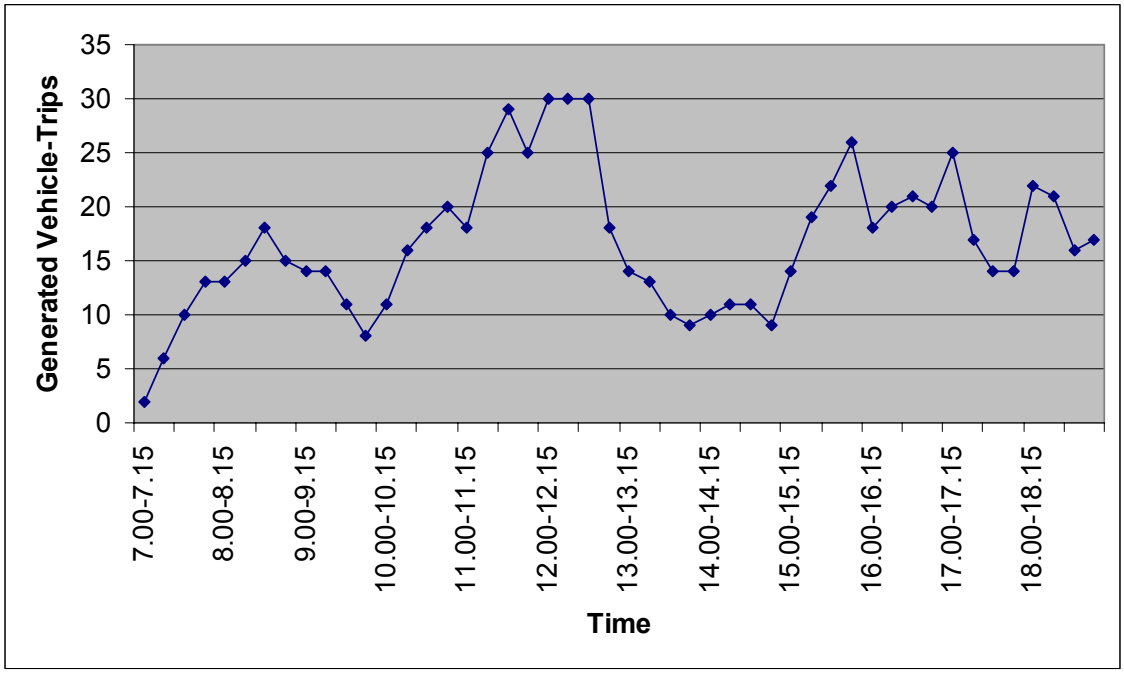
4. Generated Vehicle Trips vs. Time for Marriott Hotel



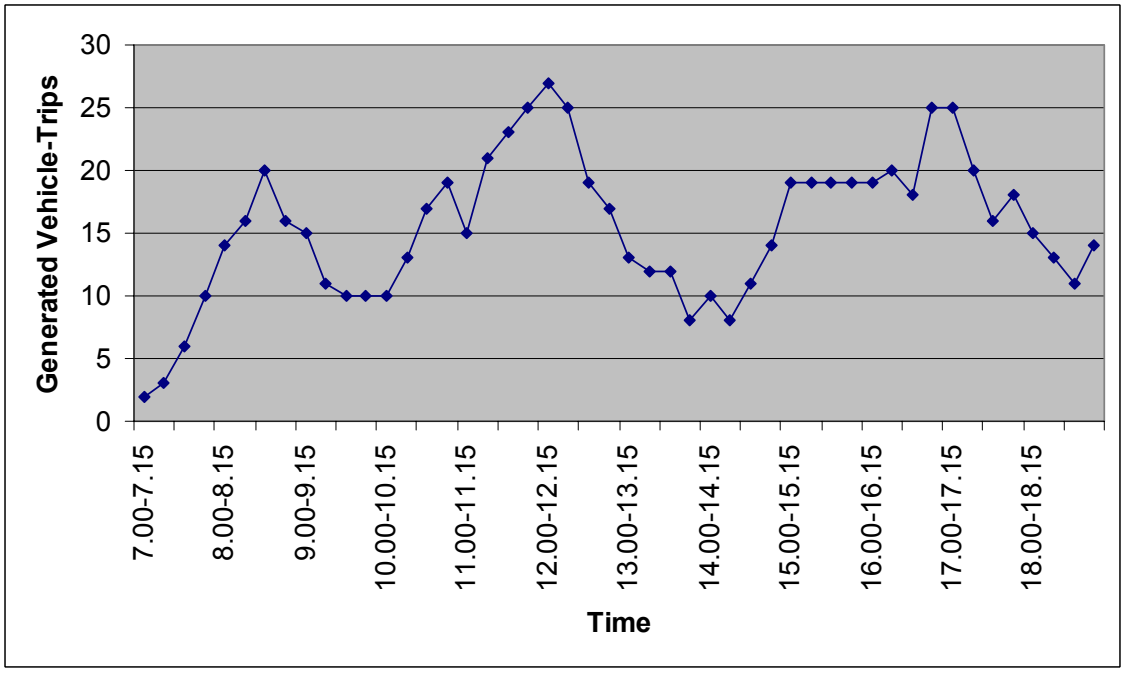
5. Generated Vehicle Trips vs. Time for Radisson Sas Hotel



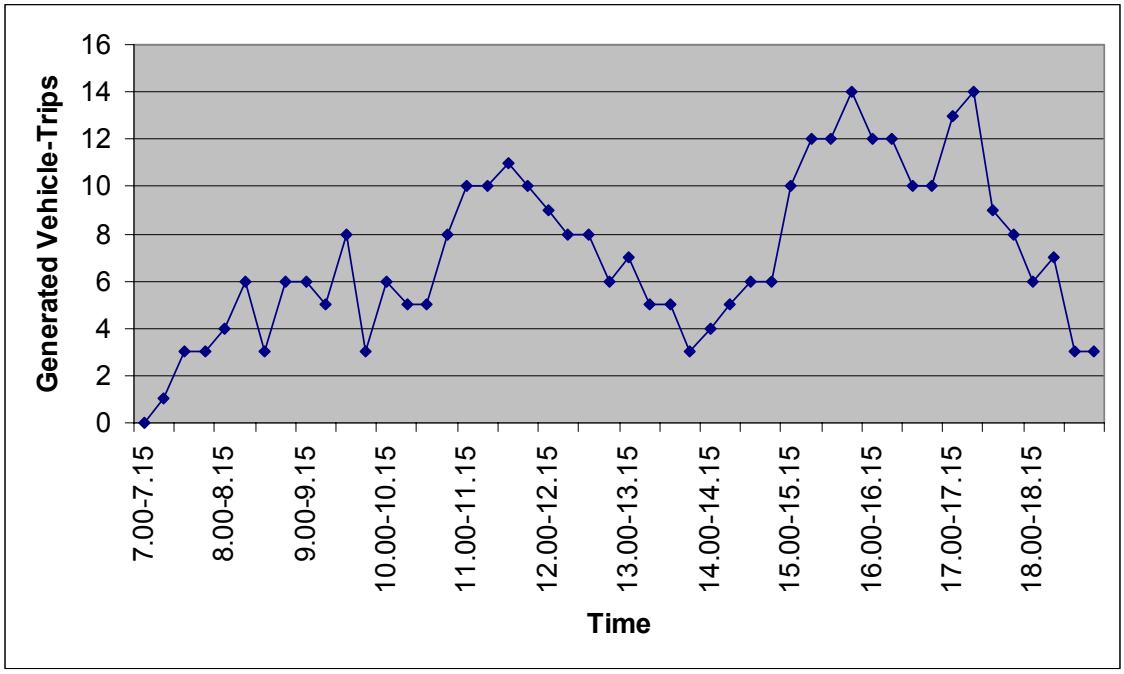
6. Generated Vehicle Trips vs. Time for Four Seasons Hotel



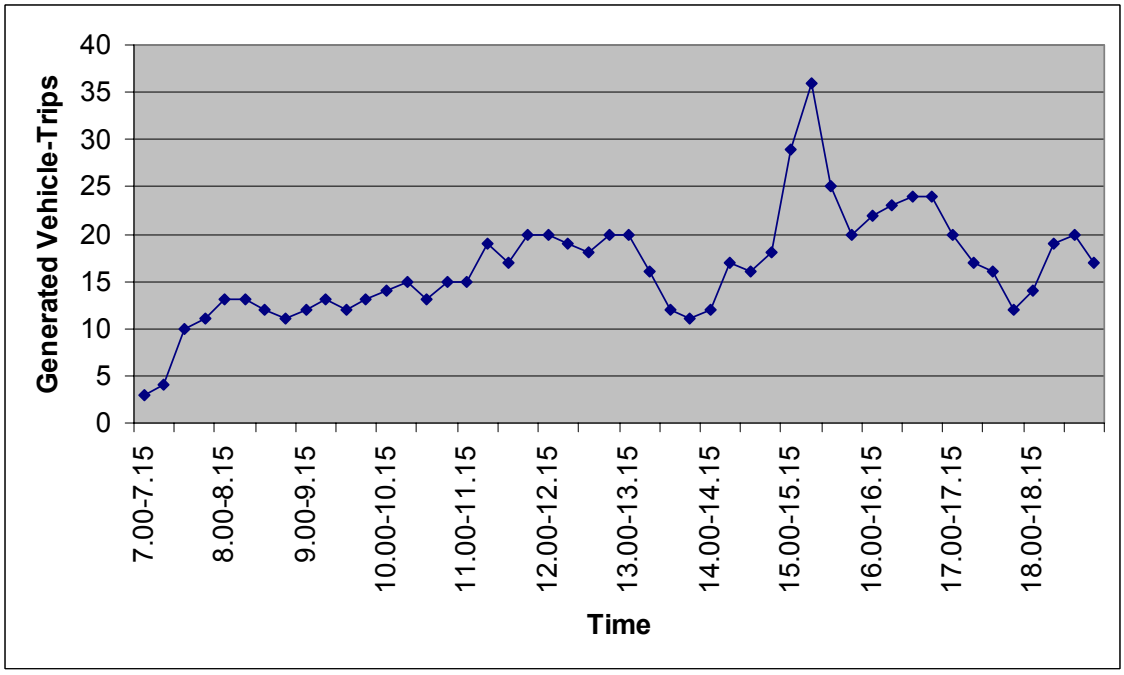
7. Generated Vehicle Trips vs. Time for Jordan Intercontinental Hotel



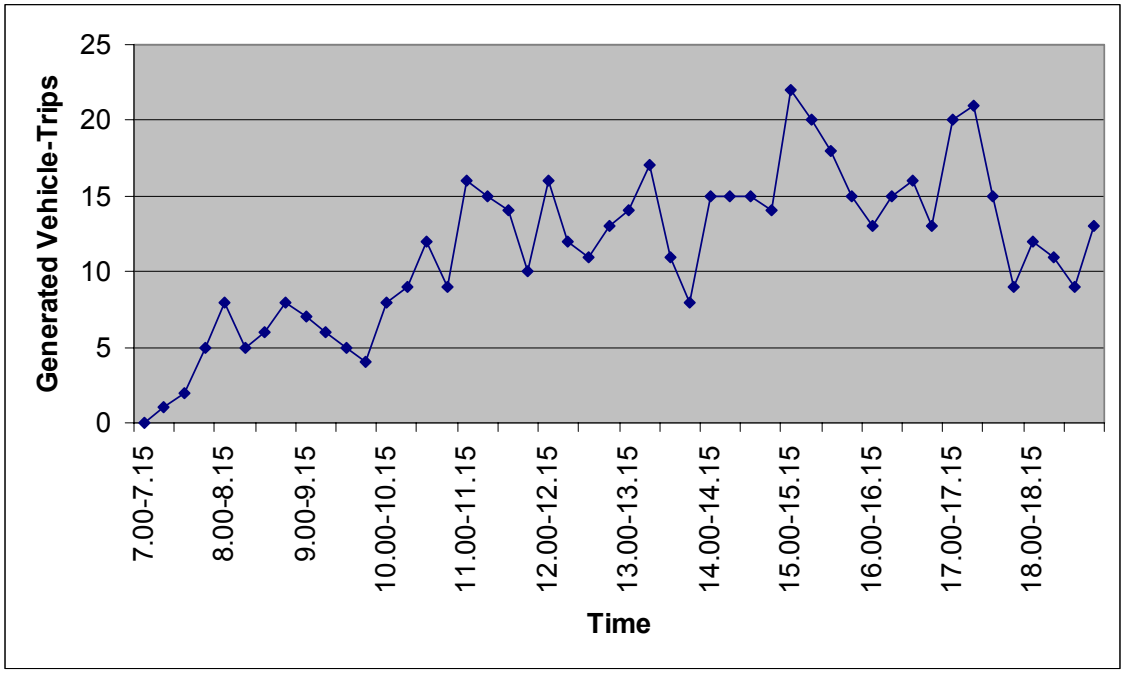
8. Generated Vehicle Trips vs. Time for Hyatt Amman Hotel



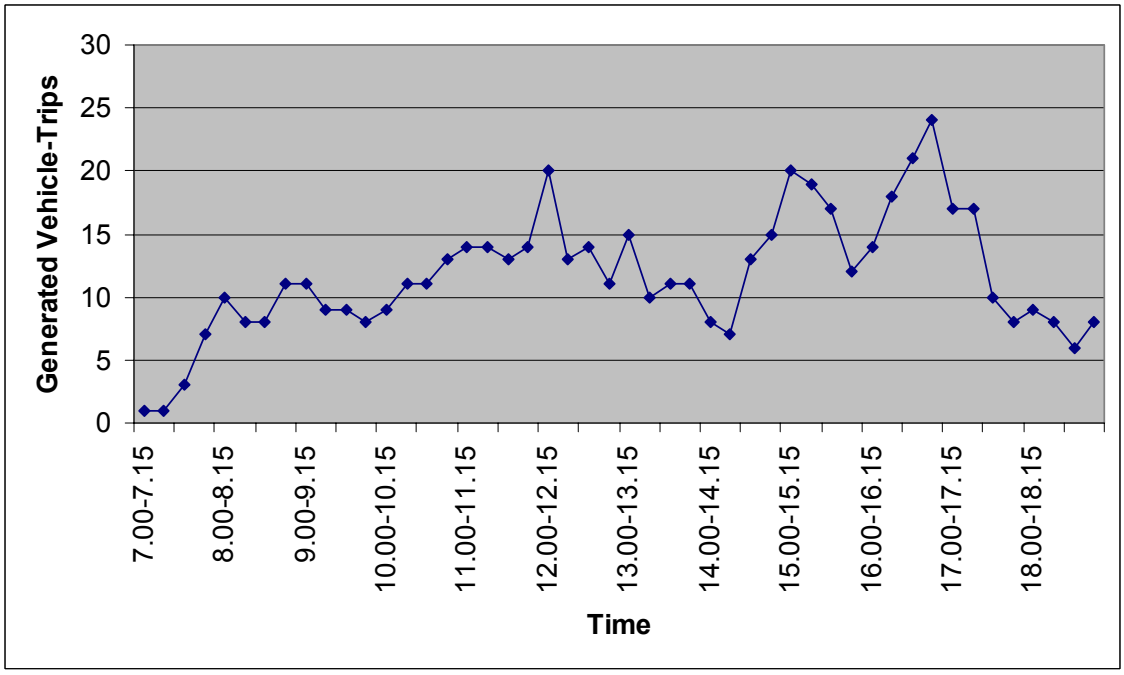
9. Generated Vehicle Trips vs. Time for Kempinski Hotel



10. Generated Vehicle Trips vs. Time for Le Royal Hotel



11. Generated Vehicle Trips vs. Time for Sheraton Hotel



12. Generated Vehicle Trips vs. Time for Meridien Hotel

نموذج جذب لأعداد رحلات المركبات التي تستقطبها فنادق الدرجة الأولى في عمان

إعداد
حيدر محمد الخليفات

المشرف
الأستاذ الدكتور عدلي البلبيسي

ملخص

إن الهدف من هذه الدراسة هو إيجاد نموذج للتنبؤ بأعداد رحلات المركبات التي تستقطبها فنادق الدرجة الأولى في عمان، عاصمة المملكة الأردنية الهاشمية. لقد أجريت هذه الدراسة خلال العام 2007 وقد شملت جميع فنادق الدرجة الأولى الواقعة ضمن حدود أمانة عمان الكبرى، والبالغ عددها اثنا عشر فندقاً. ولمعرفة الأعداد الحقيقية للرحلات المستقطبة، تم تسجيل أعداد المركبات المستقطبة والمتولدة عن كل من هذه الفنادق في فترات طول كل منها خمسة عشر دقيقة ولمدة يومين لكل فندق. إن عدد الرحلات التي تستقطبها الفنادق من المتوقع، بحسب هذه الدراسة، أن يتأثر بعدد من المتغيرات التفسيرية، وهذه المتغيرات تشمل موقع الفندق، المساحة الكلية لمبنى الفندق، عدد الموظفين العاملين في الفندق، مؤشر السعر، ومساحة مواقف السيارات التابعة للفندق.

إن عملية جمع البيانات اللازمة لإجراء هذه الدراسة اشتملت على إجراء عملية العد اليدوي لجميع السيارات المستقطبة والمتولدة عن الفنادق لمدة يومين. بالإضافة إلى ذلك، فقد تم جمع المعلومات المتعلقة بالفنادق والموضحة بالمتغيرات التفسيرية من خلال الدوائر المعنية في كل من الفنادق التي تم مسحها.

تم إجراء الإنحدار الخطي المتعدد لإيجاد العلاقة المناسبة للتنبؤ بأعداد المركبات المستقطبة من خلال معرفة المتغيرات التفسيرية المختلفة. وقد خلصت الدراسة إلى أن المساحة الكلية للفندق وعدد الموظفين العاملين في هذه الفنادق هي العوامل المهمة في تحديد أعداد المركبات المستقطبة.

في النهاية، تم احتساب معدل الرحلات المستقطبة بالنسبة للمتغيرات التفسيرية، وقد وجد بأن فنادق الدرجة الأولى في عمان تستقطب يومياً 1.49 رحلة لكل موظف عامل في الفندق، بينما تستقطب هذه الفنادق 1.41 رحلة يومياً لكل 1000 م^2 من مساحة مبنى الفندق.