

A COST ANALYSIS OF THE AUXILIARY SERVICES
OF BILKENT UNIVERSITY

A THESIS

SUBMITTED TO THE DEPARTMENT OF MANAGEMENT
AND THE INSTITUTE OF MANAGEMENT SCIENCES
OF BILKENT UNIVERSITY
IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF BUSINESS ADMINISTRATION

By

SAMI EFE

February, 1989

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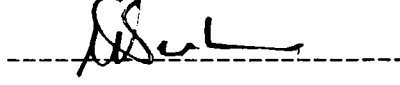
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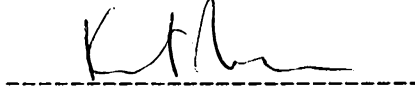
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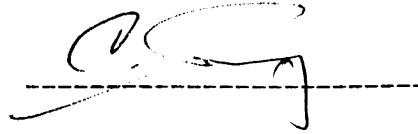
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ABSTRACT

A COST ANALYSIS OF THE AUXILIARY SERVICES
OF BILKENT UNIVERSITY

SAMI EFE
M.B.A. in management
Supervisor: Prof. Dr. Ümit Berkman
February 1989, 54 Pages

Cost analysis results in more effective decision making by management. In this work, two auxiliary services of Bilkent University, the housing facilities and the official cars owned by Bilkent, have been analyzed from a cost perspective to reveal the contribution of cost items to the resulting total expense.

Keywords: Operating Expense, Fixed Costs, Depreciation,
Revenue Per Unit, Cost Per Unit, Total Net Expense
Per Unit

ÖZET

BILKENT ÜNİVERSİTESİ DESTEK HİZMETLERİ

MALİYET ANALİZİ

SAMI EFE

Yüksek Lisans Tezi, İşletme Enstitüsü

Tez Yöneticisi: Prof. Dr. Ümit Berkman

Şubat 1989, 54 sayfa

Maliyet analizi yönetimde daha etkin karar almayı sağlar. Bu çalışmada, Bilkent Üniversitesinin iki destek hizmeti, lojmanlar ve üniversitenin sahip olduğu resmi arabalar, maliyet yönünden incelenmiş ve maliyet kalemlerinin, bulunan toplam maliyet değerine olan katkısı saptanmıştır.

Anahtar Kelimeler: İşletme Gideri, Yatırım Gideri, Amortisman, Birim Başına Düşen Ciro, Birim Başına Düşen Maliyet, Birim Başına Düşen Toplam Net Maliyet

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1. INTRODUCTION

Bilkent University started instruction in Fall 1986 and stands as the first and only private foundation university in Turkey. The University can therefore be considered as a relatively "young" organization. Apparently, the adjectives of being "young" and "first and only private", impose heavier burdens on the organization in pursuing its management, decision making and operations objectives. The operations of Bilkent University can be categorized, in broad terms, to provide instruction and research.

Bilkent University acquires its own resources mainly from its foundations, and university tuition and fees, as opposed to other universities depending on the government for resource acquisition. This independence for resource acquisition, and hence, not having a predetermined resource by the government for budgeting considerations, necessitates a thorough analysis of the cost centers of the university. By all means, the efficient functioning of the cost centers has a critical impact on the effectiveness of the organization.

When Bilkent university is examined from an organizational perspective, at the highest level in the hierarchy, the three functions existent within the organization, namely, administrative and financial affairs, academic affairs, and student affairs are centralized to the three Vice-Presidents.

The academic and student functions can be considered to be more closed systems, when compared with the administrative and financial function, the degree of closeness being measured by the relative isolation from the environment. The degree of isolation of the former functions, however, are by all means affected by the effective functioning of the administrative and financial affairs. In other words, the academic and student affairs can only function effectively, if and only if the administrative and financial function supports them with its auxiliary departments. The degree of this support is a major factor in improving the degree of "closeness" of the academic and student functions.

The purpose of this thesis is to provide a cost analysis of the two auxiliary departments of Bilkent, namely, the housing department and the transportation department, and illustrate the framework to be pursued in analyzing the other auxiliary departments from a cost perspective.

2. BACKGROUND LITERATURE

Cost allocation is an essential instrument for providing the results necessitated by a cost objective. A cost objective is defined as any activity, for which costs are desired to be measured separately. Cost objectives are chosen to facilitate management decisions. Cost allocation, however, is the term used for defining the assignment and reassignment of costs to cost objectives [2]. For example, in the case of the housing department of Bilkent University, the cost objective is to express the net cost of the housing facilities in square meters per month. Costs relevant for the housing premises are allocated to respective cost items in line with the cost objective depicted above.

Cost accumulation is the process of collecting cost data through an accounting system in an organized way. Actual costs, which are determined on the basis of historical costs (costs incurred), and forecasted costs form the framework of cost accumulation [2].

A common cost is the one that is shared by two or more divisions of an organization. Common costs are allocated to cost objects on the basis of a predetermined base [1]. For example, a common cost may be a plumber working for Bilkent. The cost allocation scheme of this plumber to the housing department could be done on the basis of work time spent at the housing premises, which is the allocation base in this

case.

In this thesis, operating expenses are intended to indicate variable-costs, which are defined as costs that vary with the changes in the volume of "activity" in a directly proportional fashion. Conversely, fixed costs, do not change with the volume of activity within a given period or activity range [4].

Service departments (such as the auxiliary departments of Bilkent University) do not produce direct profits for the entity. Since the output of service departments is not sold outside the firm, the costs of these departments must be incurred by the revenue producing departments. Service departments involve difficult control and planning problems since their costs are not charged to user groups, thus, bearing negative consequences. The most important of these consequences is more service being demanded than the economically reasonable level [3].

In the following chapters, variable and fixed costs pertaining to the housing and transportation departments are analyzed in detail, within the framework described above.

3. AN ANALYSIS OF THE HOUSING DEPARTMENT

3.1 BACKGROUND INFORMATION

The academic personnel of Bilkent University is offered "free" housing facilities on campus. The purpose of this analysis, is to investigate the revenue and cost items pertaining to the housing department, thereby, extract the net cost per square meter of the housing facilities. All the data and prices utilized in this analysis are within the framework of September 1988 figures. The 17th housing block is not included in the analysis, since it was not ready for dwelling when data was accumulated. There are 23 housing blocks and 178 apartments for dwelling. A detailed listing of the blocks and apartments can be seen in Appendix 1. The apartments 6/7, 7/7, 8/7, 9/7, 10/7, 11/7, 12/13, 13/13, 19/2, 19/13, 20/2, 20/13, 27/7, 28/7, 29/7, 30/7, 31/7, 32/7, 33/13 and 34/13 are not used for dwelling and are therefore not included in the analysis. These apartments are either basements used by maintenance personnel, or are storage areas. The apartment 19/2 is the Housing Office.

3.2 REVENUES

The revenues collected from the residents of the apartments are itemized under three billings. These are;

1. Fuel and general expenses.
2. Electricity consumption expenses.
3. The damaged furnishing expense to be accounted for by

the residents.

The electricity bills paid by the residents exactly offset the electricity consumed by the apartments, as well as the illumination of the housing premises. That is to say, the electricity consumed by the housing facilities does not impose any financial burden on the university. The residents are billed by the Housing Office on the basis of T.L. 71.4 /KWH for monthly consumptions under 150 KWH, whereas T.L. 118 /KWH is charged for monthly consumptions over 150 KWH. This per KWH billing rate is above the T.E.K. (Turkish Electricity Authority) standards which charges around 51 T.L./KWH for monthly consumptions under 150 KWH. Bilkent is charged by T.E.K. on a monthly basis, where the monthly electricity consumption of the university is offset by a single receipt. This receipt accounts for VAT (Value Added Tax) and meter taxes, as well as the consumption incurred. The underlying reason behind the higher per KWH charges incurred by the residents, vis-a-vis the normal household consumption rate charged by T.E.K., is the adjustment of rates by Bilkent to cover the VAT, meter tax and illumination of the housing premises. Therefore, the billings collected under electricity consumption expenses do not provide any net income or net cost to the university. Hence, it is not included in the cost analysis of the housing department.

The billings incurred under damaged furnishings expense are also exactly offset by the residents responsible for the

damage. Since neither a net income, nor a net cost is incurred, this item is also eliminated from the analysis.

Consequently, the only revenue items critical for cost analysis are the fuel and general expense items. A detailed breakdown of the revenue items, accounted for by each apartment can be seen in Appendix 1, where the area in square meters of each apartment is also given.

The monthly revenue per meter-square can be calculated by dividing the monthly billings (fuel and general expenses) by the total area (meter-square) of the housing blocks.

The total monthly revenue that can be collected from the apartments is calculated in Appendix 1 to be T.L. 8,485,000.

The total meter-square area of the apartments is also found in Appendix 1 to be 14,522 meter-square.

The average revenue per meter-square is therefore calculated to be T.L. 584.3 /metre-square-month ((T.L. 8,485,000 /month) / (14,522 metre-square) = T.L. 584.3 /metre-square-month).

3.3 EXPENSES

The expenses to be incurred by Bilkent University can be categorized under two major headings, namely, operating expenses and fixed expenses.

3.3.1 OPERATING EXPENSES

The operating expenses are composed of personnel costs, supplies expense, water consumption expense (cold water), maintenance costs, heating and hot water expense, carpenter material costs, washing expenses and broken bulb expenses of stairs and basements, which will be itemized below in more detail.

3.3.1.1. PERSONNEL COSTS

a) Permanent personnel:

In the Housing Office, ten caretaker and two administrative personnel are on permanent full-time duty. The costs of these personnel to be incurred by Bilkent include their gross wages and salaries, and fringe benefits such as meal, clothing and transportation.

i) Salaries and wages:

The gross monthly wage of a caretaker personnel is T.L. 220,000 , whereas, administrative personnel working for the Housing Office have a monthly gross salary of T.L. 350,000. Therefore, total monthly salary and wage expense is calculated to be T.L. 2,900,000 /month ((10 x T.L. 220,000 /month) + (2 x T.L. 350,000 /month) = T.L. 2,900,000 /month).

ii) Meal expenses:

Six meals are offered to each full time personnel on a weekly basis. The price of a meal is T.L. 1,100. Therefore, the total meal aid expense to be incurred by the university amounts to T.L. 340,560 /month (12 personnel x 6 meals/week-personnel x 4.3 week/month x T.L. 1,100 /meal = T.L. 340,560 /month).

iii) Clothing expenses (applicable only to the ten caretaker personnel):

Each year, each caretaker personnel is supplied with two pairs of clothes (one for summer and one for winter with a total cost of T.L. 100,000), two pairs of shoes (one pair for winter and one for summer with a total cost of T.L. 100,000), and two sweaters and undershirts (with total cost of T.L. 60,000). Therefore, the monthly total clothing aid expense is T.L. 216,667 /month ((10 x (T.L. 100,000 + T.L. 100,000 + T.L. 60,000) / 12 months = T.L. 216,667 /month.

iv) Transportation expenses:

Each full-time personnel of the Housing Office is granted with two-way free transportation to Ankara, six times a week. The cost assumed by the University per transportation is T.L. 150 .

Consequently, the monthly transportation expense incurred by the university amounts to T.L. 92,880 /month (12 personnel x

6 days/week x 2 transportations (two-way) x 4.3 week/month x
T.L. 150 /transportation = T.L. 92,800 /month).

Therefore, the total permanent personnel cost per month is
found to be T.L. 3,550,107 /month (T.L. 2,900,000 /month
(gross salary) + T.L. 340,560 /month (meal aid) + T.L.
216,667 /month (clothing aid) + T.L. 92,880 /month
(transportation aid) = T.L. 3,550,107 /month).

b) Temporary personnel:

The payments made to temporary personnel are itemized and
converted into monthly cost as follows:

i) The cost of the workers hired for irrigation of the
saplings of the housing premises:

The wages and related expenses incurred in one year
(September 1987 to September 1988) totaled T.L. 500,000.
Irrigation is only needed in July, August and September and
the cost of T.L. 500,000 is therefore only assumed in these
months. Hence, the average monthly cost becomes T.L. 41,667
/month (T.L. 500,000 /12 months = T.L. 41,667 /month).

ii) Transporter costs:

In one year (September 1986 to September 1987), transporter
costs accounted by the housing department totaled to T.L.
300,000. This cost was assumed by approximately ten
transportations that occurred during the specified period.

Hence, monthly average cost for this item is T.L. 25,000 /month (T.L. 300,000 /year X 1 year/12 months = T.L. 25,000 /month).

iii) Cleaner costs:

The payments made to cleaning ladies in one year amount to T.L. 1,000,000. Therefore, a monthly cost of T.L. 83,333 /month (T.L. 1,000,000 /year x 1 year/12 months = T.L. 83,333 /month) is calculated for cleaner costs.

Therefore, the total amount of monthly temporary personnel wages is T.L. 150,000 /month (T.L. 41,667 /month (irrigation worker expense) + T.L. 25,000 /month (transporter expense) + T.L. 83,333 /month (cleaner expense) = T.L. 150,000 /month).

c) Labor costs:

i) Electrician cost:

An electrician working full-time for Bilkent University spends about two thirds of his time at the housing facilities. The gross monthly wage of an electrician is T.L. 350,000 /month. Therefore, T.L. 233,333 /month electrician expense is observed ($2/3 \times \text{T.L. } 350,000 \text{ /month} = \text{T.L. } 233,333 \text{ /month}$).

ii) Plumber cost:

A plumber working for Bilkent, with a gross wage of T.L. 350,000 /month, spends all his work time in the housing premises, thus, accounting for a monthly cost of T.L.

350,000 /month.

iii) Carpenter costs:

A carpenter employed by Bilkent spends two thirds of his time for the Housing Office. The gross monthly wage of a carpenter is T.L. 350,000 /month. Therefore, a cost of T.L. 233,333 /month (T.L. 350,000 /month \times 2/3 = T.L. 233,333 /month) is accounted for this item.

Consequently, total monthly labor costs amount to T.L. 816,666 /month (T.L. 233,333 /month (electrician cost) + T.L. 350,000 /month (plumber cost) + T.L. 233,333 /month (carpenter cost) = T.L. 816,666 /month).

d) Security guard cost:

On the average, three security guards are responsible for the security of the housing premises, on a full-time basis. The monthly gross wage of a security guard is T.L. 220,000 /month. The monthly total cost for security guards is therefore, T.L. 660,000 /month (3 \times T.L. 220,000 /month = T.L. 660,000 /month).

Consequently, the total monthly personnel cost is found to be T.L. 5,176,773 /month (T.L. 3,550,107 /month (permanent personnel cost) + T.L. 150,000 /month (temporary personnel cost) + T.L. 816,666 /month (worker cost) + T.L. 660,000 /month (security guard) = T.L. 5,176,773 /month).

3.3.1.2. SUPPLIES

The supplies expenses incurred are itemized under stationary expenses of the Housing Office, cleaning supplies used for cleaning the stairs of the apartments, and the tea expenses of the Housing Office.

a) Stationary costs of the Housing Office:

An average of the most recent (prior to September 1988) three, three-month stationary request forms of the Housing Office have been utilized in the estimation of this cost item. The average three month stationary cost amounted to T.L. 83,000, thus, implying an average monthly stationary cost of T.L. 27,667 /month (T.L. 83,333 / 3 months = T.L. 27,667 /month).

b) Cleaning supplies expense:

The average monthly cleaning supplies expense utilized for the apartment facilities are T.L. 173,000 /month.

c) Tea (and sugar) expenses of the Housing Office:

On average, on a monthly basis, this expense item amounts to approximately T.L. 36,000 /month.

As a result total supplies expenses accounted for the Housing Office amount to T.L. 236,667 /month (T.L. 27,667 /month (stationary cost) + T.L. 173,000 /month (cleaning

material cost) + T.L. 36,000 /month (tea and sugar) = T.L. 236,667 /month).

3.3.1.3 WATER CONSUMPTION (COLD WATER) EXPENSE

The residents of the apartments are not charged for their water consumption. Therefore, the whole cost of this item is incurred by Bilkent University.

No water-meters are installed to indicate the consumption of specific apartments, or the housing premises. Daily water consumption is estimated to be approximately 500 liters per apartment, thus, giving a monthly average of 15,000 liters per apartment.

Bilkent University is charged for water, on the basis of T.L. 1,176.0148 per cubic meter of water consumed. Considering that 1,000 liters is equal to 1 cubic meter, the monthly average cost incurred by Bilkent University for each apartment is T.L. 17,640 /apartment (T.L. 1176.0148 /metre-cube x 15 metre-cube/apartment = T.L. 17,640 /apartment).

Therefore, the monthly average water consumption expense incurred by Bilkent, for the whole apartment facilities is T.L. 3,139,920 /month (T.L. 17,640 /apartment x 178 apartments).

3.3.1.4. MAINTENANCE COSTS

The maintenance expenses to be incurred by Bilkent can be categorized under roof maintenance, television antenna maintenance, broken windows, consumer durables maintenance, exterior paints of the apartments, interior paints of the apartments, and apartment building maintenance.

a) Roof maintenance:

In September 1987, T.L. 700,000 had been spent for roof repairs of the apartments. Taking into account an estimated approximate average inflation rate of 60% for the period September 1987 to September 1988, a maintenance of this sort would have cost T.L. 1,120,000 in September 1988 (T.L. 700,000 x 1.6 = T.L. 1,120,000). However, roof maintenances are estimated to be needed every two years, thus, giving a monthly average cost figure of T.L. 50,000 /month (T.L. 1,200,000 / 24 months = T.L. 50,000 /month).

b) Television antenna maintenance:

The annual cost for this item is estimated to be around T.L. 250,000. Therefore, a monthly cost of T.L. 20,833 /month (T.L. 250,000 / 12 months = T.L. 20,833 /month), is accounted for television antenna maintenance.

c) Broken windows:

This cost item pertains to broken windows, where the persons responsible for the damage could not be identified and

therefore, the expense had to be incurred by Bilkent. Costs of windows broken by the wind and damaged wall lamps are also included in this item. In one year, a cost of T.L. 210,000 (T.L. 60,000 for broken windows, T.L. 150,000 for wall lamps), had been attributed for this cost item, giving a monthly average of T.L. 17,500 /month (T.L. 210,000 /12 months = T.L. 17,500 /month).

d) Consumer durables cost:

This is the cost of the consumer durable goods (refrigerator, oven, washing machine, vacuum cleaner) damaged, but refused to be paid by the residents responsible for the damage. The monthly average cost is T.L. 8,333 /month.

e) Exterior wall paintings of apartment blocks:

A cost of about T.L. 300,000 had been incurred by Bilkent for exterior wall paintings, in one year (September 1987 to September 1988). Hence, a monthly average of T.L. 25,000 /month is estimated (T.L. 300,000 /12 months = T.L. 25,000 /month).

f) Interior paintings of apartments:

This cost is accounted for the painting expense incurred when the resident moves out. An annual cost of T.L. 1,600,000 had been observed, giving rise to a monthly average of T.L. 133,333 /month (T.L. 1,600,000 / 12 months = T.L. 133,333 /month).

g) Apartments building maintenance:

The filling of holes in the interior walls of the apartments, broken tiles, dish-washer arrangements in the kitchen walls, etc. are all considered under this item, which accounts for an average monthly cost of approximately T.L. 16,700 /month.

To sum up, the maintenance costs listed above (a through g), account for an average monthly cost of T.L. 271,699 /month (T.L. (50,000 + 20,833 + 17,500 + 8,333 + 25,000 + 133,333 + 16,700) /month = T.L. 271,699 /month).

2.3.1.5. HEATING AND HOT WATER EXPENSE

All the thermal powerhouses, except for powerhouse # 10, are used commonly by the apartments, dormitories and "academic buildings", in provision of heating and hot water. Therefore, powerhouse # 10 has been taken as a sample in the estimation of heating and hot water expenses of the housing facilities. This powerhouse only serves the 6,7,8,9 and 10th blocks of the housing facilities, where, there are fifteen 125 and fifteen 140 meter-square apartments. Therefore, the area served by powerhouse #10 is 3975 meter-squares ((15 x 125 meter-square) + (15 x 140 meter-square) = 3975 metre-square).

For the ten month period of September 1987 to July 1988, 145,119 kilograms of fuel had been purchased for powerhouse # 10. The price of fuel in September 1988 was T.L. 286 /kg.

Therefore, the cost incurred during the specified period, to heat and provide hot water to the 3975 meter-square area is T.L. 41,504,034 (T.L. 286 /kg x 145,119 kg =T.L. 41,504,034). Hence, a monthly average cost of T.L. 4,150,403 (T.L. 41,504,034 / 10 months) is estimated for every 3975 metre-square. The monthly average cost per metre-square is thus T.L. 1,044 /metre-square-month ((T.L. 4,150,403 /month)/(3975 metre-square) = T.L. 1,044 /meter-square - month). The heating and hot water provision expense per month, for the whole housing premises is therefore T.L. 15,160,968 /month (T.L. 1,044 /meter-square - month x 14,522 meter-square = T.L. 15,160,968 /month). The total area of the apartment facilities is calculated in Appendix 1, by taking advantage of a spreadsheet presentation, to be 14,522 metre-square.

3.3.1.6 CARPENTER MATERIAL COSTS

The average monthly cost incurred by Bilkent for this item is estimated to be approximately T.L. 8,000 /month.

3.3.1.7. WASHING EXPENSES

This item takes into account the expenses incurred for the washing of sheets, towels and curtains when a resident moves out. The average monthly expense for washing is around T.L. 42,000 /month.

3.3.1.8. BULBS OF BASEMENTS AND STAIRS OF APARTMENT BLOCKS

An average monthly expense of T.L. 10,500 /month has been estimated for this item.

3.3.2 AN EXAMINATION OF OPERATING EXPENSES

A tabular listing of the items constituting operating expenses is documented in Appendix 2, under the column labelled as "T.L. cost per month". However, the goal of this analysis, as stated before, is to find the net cost incurred per square-meter per month. Consequently, the operating expenses expressed in "T.L. per month" has to be converted to "T.L. per meter-square per month". In line with this objective, Lotus 1-2-3 spreadsheet has been utilized in constructing Appendix 2, and hence the "T.L. cost per meter-square per month" column of Appendix 2. This column has been constructed, by dividing the respective "T.L. cost per month" figure by 9,102.75 meter-squares, for every expense item on the list, except for "heating and hot water provision expense", which is divided by 14,522 meter-squares. Two assumptions have been made to come up with the figures, 9,102.75 and 14,522 as explained below.

Assumption #1: Personnel, material, cold water, maintenance, carpenter material, washing and bulbs of stairs and basements expenses (all operating expenses, except for the heating and hot water provision expense), are all directly related with the monthly occupancy rate of the housing facilities. In other words, as the area inhabited (in meter-squares)

increases, the operating expenses are expected to increase in a directly proportional fashion. The average monthly occupied area, for the year September 1987 to September 1988, was 9,102.75 meter-square/month. In calculating the monthly cold water consumption expense (on page 14), the T.L. 17,640 /month-apartment figure was multiplied with 178 (total number of apartments) in obtaining the T.L. 3,139,920 /month expense. Therefore, logically, it may be sounder to divide the monthly expense (T.L. 3,139,920 /month), by 14,522 metre-square (total area in metre-square of the apartments), to attain the expense expressed in T.L. per metre-square per month. However, the 9,102.75 metre-square figure has been used to cover the expense incurred, by the consumption of water in cleaning the stairs of the blocks, and irrigating the plants around the housing facilities. That is to say, dividing the monthly expense figure T.L. 3,139,920 /month, by a smaller number (9,102.75 vis-a-vis 14,522), a larger monthly per square-meter expense figure is obtained (T.L. 344.94 /meter-square-month as compared to T.L. 216.2 /meter-square-month) to take into account water consumed for the housing facilities, other than the consumption of the residents.

Assumption #2: The monthly heating and hot water expense (T.L. 15,160,968 /month) is divided by the total meter-square area of the apartments (14522 meter-square) to obtain the T.L. 1044 /meter-square-month figure shown in Appendix 2. The powerhouses supply central heating to the housing blocks,

therefore, it is more appropriate to take into account the whole residential area (14,522 meter-square) rather than the occupied apartments area (9,102.75 meter-square).

Appendix 3 is constructed to provide a breakdown of operating expenses expressed in a percentage form. Once again, Lotus 1-2-3 spreadsheet has been employed to obtain the percentage representation of the operating expense items. The expense incurred, in T.L. per meter-square per month of the respective expense items (listed in Appendix 2), has been divided by the total operating expense expressed in same units (also given in Appendix 2), to obtain the percentage figures.

Appendix 3 illustrates that, 28.5% of the operating expenses are accounted for personnel costs, 1.29% for material costs, 17.08% for cold water consumption expense, 1.48% for maintenance costs, 51.68 % for heating and hot water provision expense, 0.04% for carpenter material costs, 0.23% for washing expenses, and 0.06% for expenses of broken bulbs of stairs and basements.

Therefore, the important operating expense items are shown to be the heating and hot water provision expense (51.68%), personnel expenses (28.15%) and cold water consumption expense (17.08%).

3.3.3. FIXED COSTS

The fixed costs of the housing facilities can be analyzed under two depreciation headings; building depreciation and, fixtures and furnishings depreciation.

3.3.3.1. DEPRECIATION OF THE HOUSING BUILDINGS

The total area of the housing buildings (including stairs, basements, etc.) can be derived from the following table.

Housing blocks

1-13,19,20	:1,200 meter-square (each block)
27-29	:880 meter-square (each block)
30-32	:648 meter-square (each block)
33,34	:828 meter-square (each block)

Therefore, the total meter-square area of the buildings is found to be 24,240 meter-square ((15 blocks x 1,200 meter-square) + (3 blocks x 880 meter-square) + (3 blocks x 648 meter-square) + (2 blocks x 828 meter-square) = 24,240 meter-square).

The current value of the buildings can be estimated by multiplying the meter-square area by a factor of 156,000 T.L./metre square. This is the factor utilized by the Construction Office of Bilkent University in September 1988. Consequently, the estimated total value of the housing blocks is T.L. 3,781,440,000 (24,240 meter-square x T.L. 156,000

/meter-square = T.L. 3,781,440,000).

The annual depreciation rate to be employed for the buildings is estimated to be 2%. That is to say, the useful life of the buildings is estimated to be 50 years. In line with this reasoning, the annual depreciation of the buildings is T.L. 75,628,800 /year (T.L. 3,781,440,000 x 2% = T.L. 75,628,800 /year). Therefore, the monthly depreciation value of the buildings is T.L. 6,302,400 /month (T.L. 75,628,800 /year x 1 year/12 months = T.L. 6,302,400 /month).

As a result, the monthly depreciation per square-meter for the buildings is T.L. 260 /meter-square-month ((T.L. 6,302,400 /month) / (24,240 meter-square) = T.L. 260 /meter-square-month).

3.3.3.2 DEPRECIATION OF FIXTURES AND FURNISHINGS

The apartments can be grouped into three samples, by taking into consideration the similarity, in monetary value, of the fixtures and furnishings present in them.

Group 1: Blocks 1,2,4,5,6,7,8,9,10,11

Group 2: Blocks 27,28,29,30,31,32

Group 3: Blocks 3,12,13,19,20,33,34

In Group 1, approximately, each apartment of the housing blocks within the group, contains fixtures and furnishings of value T.L. 11,709,605. This value is T.L. 8,812,975 for

Group 2 apartments and T.L. 7,426,145 for Group 3 apartments. These figures have been obtained, by taking a listing of fixtures and furnishings in three sample apartments in Groups 1, 2, and 3, and summing up the values of the fixtures and furnishings in the respective apartments.

The average apartment area in Group 1 has been calculated to be 132.5 meter-square/apartment in Group 1. This figure has been obtained by utilizing Appendix 1. The areas of all the apartments in the blocks of Group 1 has been summed up, and the resulting meter-square area (7,950 meter-square), divided by the number of apartments (60) in Group 1. Exactly the same procedure has been employed for Groups 2 and 3, yielding average apartment areas of 70 meter-square/apartment and 49.4 meter-square/apartment respectively. In Group 2's case, the total area of the apartments is 2,520 meter-square, whereas, the number of apartments is 36, thus yielding 70 meter-square/apartment ($2,520 \text{ meter-square} / 36 = 70 \text{ meter-square/apartment}$). In the case of Group 3, on the other hand, the total area is found to be 4,052 meter-square and the number of apartments is 82. Therefore, an average area per apartment of 49.4 meter-square/apartment ($4,052 \text{ meter-square} / 82 \text{ apartments} = 49.4 \text{ meter-square/apartment}$) is calculated.

Therefore, the average fixture and furnishings value per meter-square can be obtained, by dividing the estimated fixtures and furnishings value of each sample group apartment by the average meter-square area of each group. This value is

T.L. 88,374.4 /meter-square for Group 1 (T.L. 11,709,605 / 132.5 meter-square = T.L. 88,374.4 /meter-square), T.L. 125,899.6 /meter-square for Group 2 (T.L. 8,812,975 / 70 meter-square = T.L. 125,899.6 /meter-square) , and T.L. 150,326.8 /meter-square for Group 3 (T.L. 7,426,145 / 49.4 meter-square = T.L. 150,326.8 /meter-square).

To get a general figure, expressing the meter-square fixtures and furnishings expense incurred by Bilkent, a weighted average of the values derived for the three groups must be taken. The areas of apartments in group 1, 2 and 3, as stated before, are 7,950 meter-square, 2,520 meter-square and 4,052 meter-square respectively, with a total sum of 14,522 meter-square, in line with Appendix 1. Hence, the weighted average figure, expressing the general T.L. cost per meter square is T.L. 112,172.4 ((T.L. 88,374.4 /meter-square x (7950/14,522)) + (T.L. 125,899.6 /meter-square x (2,520/14,522)) + (T.L. 150,326.8 /meter-square x (4,052/14,522)) = T.L. 112,172.4 /meter-square). The weights (7950/14,522), (2,520/14,522) and (4,052/14,522) are the weights employed for Groups 1,2, and 3, respectively. They take into account the "weight of the group" area vis-a-vis the total area of the apartments.

The annual depreciation rate to be employed for fixtures and furnishings is assumed to be 25%. That is, the fixtures and furnishings are expected to have useful lives of four years.

As a result, the meter square cost per annum is T.L. 28,043.1 /meter-square-year (T.L. 112,172.4 /meter-square x 25% = T.L. 28,043.1 /meter-square-year). Hence, the monthly depreciation figure, for the fixtures and furnishings of the housing facilities, per meter-square is T.L. 2,336.9 /square-meter-month (T.L. 112,172.4 /meter-square-year x 1 year/12 months = T.L. 2,336.9 /meter-square-month).

As a result the depreciation values for buildings and, fixtures and furnishings are found to be T.L. 260 /meter-square-month and T.L. 2,336.9 /meter-square-month, respectively, yielding a total fixed cost of T.L. 2,596.9 /square-meter-month (T.L. 260 /meter-square-month + T.L. 2,336.9 /meter-square-month = T.L. 2,596.9 /meter-square-month).

3.4 RESULTS OF THE HOUSING ANALYSIS

The results of the analysis are illustrated in Appendix 4. The net total expense per meter-square per month, can be calculated by subtracting the total revenue per square-meter per month, from total expenses (operating and fixed) expressed in per meter-square per month. The net expense per square-meter per month is calculated to be T.L. 4,032.73 /meter-square-month (T.L. 2,020.13 /meter-square-month + T.L. 2,596.90 /meter-square-month - T.L. 584.3 /meter-square-month = T.L. 4,032.73 /meter-square-month).

If fixed costs are ignored, that is to say, if only the

operating expenses (variable costs) are taken into consideration, a net expense of T.L. 1,435.83 /meter-square-month (T.L. 2020.13 /meter-square-month - T.L. 584.3 /meter-square-month = T.L. 1,435.83 /meter-square-month) is observed.

If only the depreciation of buildings is ignored, in other words, if only the operating expenses and depreciation of fixtures and furnishings are taken into consideration, a net expense of T.L. 3,772.73 /meter-square-month is obtained (T.L. 2,020.13 /meter-square-month + T.L. 2,336.9 /meter-square-month - T.L. 584.3 /meter-square-month = T.L. 3,772.73 /meter-square-month).

If only operating expenses and depreciation of buildings is taken into account (depreciation of furnishings and fixtures ignored), a net expense of T.L. 1,695.83 /meter-square-month is attained (T.L. 2,020.13 /meter-square-month + T.L. 260 /meter-square-month - T.L. 584.3 /meter-square-month = T.L. 1,695.83 /meter-square-month).

The right column of Appendix 4, illustrates the percent contribution of the expense items to the total expense of T.L. 4,617.03 /meter-square-month (total of operating and fixed costs). In Appendix 4, it can be observed that, operating expenses account for 43.75% of the total expense, whereas the fixed costs account for 56.25% of the total

expense. Moreover, it is shown that, the most important expense items are depreciation of fixtures and furnishings (50.61% of total expense), heating and hot water provision expense (22.61% of total expense), and personnel costs (12.32% of total expense). The cold water consumption and depreciation of buildings expenses, carry a moderate significance, with ratios to the total expense of 7.47% and 5.63% respectively. The other expense items on the list can be considered insignificant, as far as contributions to the total expense are concerned.

4. AN ANALYSIS OF THE TRANSPORTATION DEPARTMENT

4.1 BACKGROUND INFORMATION

This analysis takes into account only the cars of the university, that is to say, the trucks and ambulance of the university are not included in the analysis. This strategy has been pursued, as the former vehicles have very different uses for the university, when compared with the latter. However, the trucks and ambulance can be analyzed in a similar manner to get a general T.L./km cost for the transportation department. Moreover, the buses and minibuses serving the university should not be included in the analysis, as they are owned by private firms.

The purpose of this analysis is to derive a T.L./km cost for

the cars of the university. These cars are either used as official cars for the President and Vice-Presidents, or are used for general duties in transporting documents and personnel.

The prices used in the analysis pertain to September 1988 prices. The data gathered are within the framework of a one year period (September 1987 to August 1988). In September 1988, the price of super gasoline was 590 T.L./liter and the price of regular gasoline was 550 T.L./liter.

There is no revenue item for the transportation department. The vehicle expenses of Bilkent University can be analyzed under two major categorizations, namely, operating expenses (variable costs) and fixed costs.

4.2 OPERATING EXPENSES

The operating expenses of the car services are composed of personnel, gasoline, maintenance and repair, and insurance expenses.

4.2.1. PERSONNEL COSTS

One administrative personnel and ten drivers are employed by the transportation office. The personnel costs can be itemized under gross salaries and wages of personnel, and the meal, clothing and transportation aids granted.

a) Gross salary cost:

The total annual gross salaries and wages of the one

administrative personnel and ten drivers amount to T.L. 34,315,068 /year.

b) Meal expense:

The number of meals granted vary from driver to driver. Weekly, eight drivers are provided 25, one driver 35, and one 45 meal aids. Therefore, total number of meals granted per week is 280, giving a monthly figure of 1,204 meals/month (280 meals/week x 4.3 weeks/month = 1204 meals/month). The price of each meal is T.L. 1,100 /meal. Consequently, a total monthly meal cost of T.L. 1,324,400 /month is calculated (1,204 meals/month x T.L. 1,100 /meal = T.L. 1,324,400 /month), yielding an annual meal cost of T.L. 15,892,800 /year (T.L. 1,324,400 /month x 12 weeks/year = T.L. 15,892,800 /year).

c) Clothing expense:

The annual clothing aid cost incurred, per driver is calculated in Appendix 5. Annually, each driver is granted an overcoat, a jacket, two pairs of trousers, four shirts, one pair of shoes, one pair of boots, one tie, one sweater and two T-shirts. The total cost incurred in provision of these items, per driver per annum is T.L. 428,000 /year. Therefore, the total expense incurred for ten drivers, per annum, is T.L. 4,280,000 /year (T.L. 428,000 /year x 10 drivers = T.L. 4,280,000 /year).

d) Transportation expense:

The administrative personnel is provided with two daily transportations to Ankara, five times a week (total of 10). The drivers, on the other hand, are provided with two daily transportations, six times a week (total of 120 for 10 drivers). Therefore, weekly, 130 transportations are accounted for. The price of "one transportation" is T.L. 150 /transportation, thus, giving a total weekly transportation cost of T.L. 19,500 /week (130 transportations/week x T.L. 150 /transportation = T.L. 19,500 /week). Therefore, the annual transportation aid expense incurred is T.L. 1,014,000 /year (T.L. 19,500 /week x 52 weeks/year = T.L. 1,014,000 /year).

The total annual personnel cost is calculated to be T.L. 55,501,868 /year (T.L. 34,315,068 /year (gross salaries) + T.L. 15,892,800 /year (meal aid) + T.L. 4,280,000 /year (clothing aid) + T.L. 1,014,000 /year (transportation aid) = T.L. 55,501,868 /year).

Appendix 6 illustrates the monthly breakdown of kilometers travelled, gasoline expense incurred, maintenance expense incurred, and kilometers travelled with one liter of gasoline, for each car owned by Bilkent University. The total kilometers travelled in one year (September 1987 to August 1988), by all the cars, is calculated at the end of Appendix 6 to be 325,383 kilometers.

The personnel cost expressed in units of T.L /year, can be converted into units of T.L./km., by dividing the respective T.L./year cost figure by 325,383 km./year (total kilometers travelled in one year). Following the above reasoning, a personnel cost of T.L. 170.6 /km. is derived (T.L. 55,501,868 /year / 325,383 km./year = T.L. 170.6 /km).

4.2.2. GASOLINE EXPENSES

The four Doğan and one Kartal type of cars owned by Bilkent use super gasoline, and the four Renault Stations and one Renault-9 use regular gasoline. The relationship between the type of car and license plates can be observed in Appendix 8. In the last column of Appendix 6, the kilometer travelled by each car, with one liter of gasoline is calculated. This is done by dividing the gasoline price incurred, by the cost of one liter of gasoline pertaining to that month, for each car, and further dividing the kilometer travelled by the result of the former division. In carrying out the above procedure, the different prices of one liter of gasoline, as far as regular gasoline and super gasoline used by respective license plated cars are concerned, has been taken into consideration, together with different prices pertaining to different months. The price of one liter of super gasoline was T.L. 302 /liter in September, October and November 1987, T.L. 378 /liter in December 1987, T.L. 435 /liter in January, February and March 1988, T.L. 535 /liter in April, May and June 1988, and T.L. 590 /liter in July and August 1988. The price of

one liter of regular gasoline, on the other hand, increased from T.L. 282 /liter to 358, 410, 505 and to T.L. 550 /liter, for the periods stated above.

The average of the "km. travelled with one liter of gasoline" data in Appendix 6 is found to be 9.24 km./liter, which is indicated by the "mean of non-zero data in column" statement, at the end of Appendix 6. The average of non-zero data is taken, as zeros in the column imply that either the car was "off-service" (e.g. being repaired), or it was not being bought yet.

The price of one liter of regular gasoline is T.L. 550 /liter, whereas, the price of one liter of super gasoline is T.L. 590 /liter (September 1988 prices). The number of cars using super gasoline is equal to the number of cars using regular gasoline. If the number of kilometers travelled by cars of Bilkent using super gasoline, is assumed to be approximately equal to the number of number of kilometers travelled by cars using regular gasoline, it can be stated that Bilkent University spends T.L. 570 per liter of gasoline (average of T.L. 550 /liter and T.L. 590 /liter). Therefore, the gasoline expense incurred by Bilkent can be found, by dividing average gasoline expense incurred per liter (T.L. 570 /lt.), by the average number of kilometers travelled with one liter (9.24 km./lt.). The average gasoline expense incurred per kilometer is T.L. 61.7 /km.

4.2.3 CAR MAINTENANCE AND REPAIR EXPENSE

As calculated at the end of Appendix 6, during a one year period (September 1987 - August 1988), an expense of T.L. 8,188,838 has been incurred for the maintenance and repairs of the cars. During the specified period, these cars have travelled a total of 325,383 kilometers, thus, implying an expense figure of T.L. 25.2 /km. (T.L. 8,188,838 \ 325,383 km. = T.L. 25.2 /km.).

4.2.4. CAR INSURANCE EXPENSES

The annual insurance expense of each car, and the resulting total expense incurred (3,313,091 T.L.), is shown in Appendix 7. The total insurance expense incurred by Bilkent, per kilometer travelled, is found to be T.L. 10.2 /km. (T.L. 3,313,091 / 325,383 km. = T.L. 10.2 /km.), where, as with previous calculations, 325,383 km. express the total kilometer travelled in one year.

As a result, the operating expenses incurred per kilometer sum up to T.L. 267.7 /km. (T.L. 170.6 /km. (personnel costs) + T.L. 61.7 /km. (gasoline expense) + T.L. 25.2 /km. (car maintenance and repair expense) + T.L. 10.2 /km. (car insurance expense) = T.L. 267.7 /km.).

4.3 FIXED COSTS

The fixed costs are composed of the depreciation of the cars. Here, an assumption has been made, and the useful life of each car has been estimated to be 350,000 kilometers. During

the one year period analyzed in Appendix 6, an average of approximately nine cars provided service. This can be found, by adding the number of cars in service, during each month (with non-zero data in km. travelled column), and dividing the resulting total by 12 (12 months). Therefore, an average of nine cars, travelled a total distance of 325,383 kilometer in one year. Hence, the distance travelled by each car, in one year is 36,154 kilometers. Therefore, it can be estimated that, it will take a car approximately ten years ($350,000 \text{ km.} / 36,154 \text{ km./year} \approx 10 \text{ years}$), to reach to a zero salvage value. Consequently, a depreciation rate of 10% has been used for the cars. Appendix 8 illustrates the "zero kilometer value" of the cars, and the resulting depreciation value per annum, when a 10% depreciation rate is used. The total depreciation expense per annum, is calculated at the end of Appendix 8 to be T.L. 13,988,800 /year. Thus, dividing this figure by 325,383 km. (total distance travelled in one year), yields a depreciation expense of T.L. 43 /km. .

4.4 RESULTS OF THE TRANSPORTATION ANALYSIS

The results of the analysis pertaining to the transportation department are shown in Appendix 9. The total expense incurred by Bilkent, for providing transportation using cars owned by the University, is T.L. 310.7 /km, when all the expense items (operating (variable costs) and fixed) are taken into consideration.

If only the operating expenses are considered (car

depreciation expense ignored), an expense of T.L. 267.7 /km. is observed.

The most significant expense item is personnel costs, accounting for 54.91% of the total expense. Gasoline expenses' contribution to the total expense is 19.86%, whereas, car maintenance and repair, and car insurance expenses account for 8.11% and 3.28% of the total expense respectively. Fixed costs (car depreciation expense) constitute 13.84% of the total expense of T.L. 310.7 /km. .

5. CONCLUSION

The application of a cost analysis framework for Bilkent University housing department revealed that, the net expense incurred per meter-square per month, for the housing facilities granted to the academic personnel of Bilkent is T.L. 4,032.73 /meter-square-month, when both operating and fixed costs are taken into account. If, only the operating expenses are considered, the resulting figure is T.L. 2,020.13 /meter-square-month. The most important cost items have been found to be the depreciation of fixtures and furnishings (50.61% of total expense, with T.L. 2,336.9 /meter-square-month), and heating and hot water provision expense (22.61% of total expense, with T.L. 1,044 /meter-square-month). The heating and hot water provision expense must be paid utmost attention in strategies aimed towards reducing operating expenses.

A similar framework has been employed for analyzing the transportation services (official cars of Bilkent), which revealed a total expense of T.L. 310.7 /km. to be incurred by Bilkent. Most significant expense items, in this analysis have been found to be personnel costs (54.91% of total expense, with T.L. 170.6 /km.), and gasoline expenses (19.86% of total expense, with 61.7 T.L./km.). If the depreciation expense of cars is ignored, an expense of T.L. 267.7 /km is observed.

Evidently, cost analysis of this sort, provide management with valuable information for effective decision making. The analysis sheds light into the most significant cost items, to be overviewed by management. Furthermore, the data present within the organization can be utilized and converted to valuable information.

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APPENDIX 1

APARTMENT AND REVENUE BREAKDOWN

BLOCK AND APARTMENT NO.	METER- SQUARE	FUEL (T.L.)	GENERAL EXPENSES (T.L.)	FUEL AND GENERAL EXPENSES (T.L.)
1/1	140	63000	14000	77000
1/2	125	63000	14000	77000
1/3	140	63000	14000	77000
1/4	125	63000	14000	77000
1/5	140	63000	14000	77000
1/6	125	63000	14000	77000
2/1	140	63000	14000	77000
2/2	125	63000	14000	77000
2/3	140	63000	14000	77000
2/4	125	63000	14000	77000
2/5	140	63000	14000	77000
2/6	125	63000	14000	77000
3/1	68	32000	8000	40000
3/2	51	24000	6000	30000
3/3	44	20500	4500	25000
3/4	50	24000	6000	30000
3/5	68	32000	8000	40000
3/6	51	24000	6000	30000
3/7	44	20500	4500	25000
3/8	50	24000	6000	30000
3/9	68	32000	8000	40000
3/10	51	24000	6000	30000
3/11	44	20500	4500	25000
3/12	50	24000	6000	30000
4/1	140	63000	14000	77000
4/2	125	63000	14000	77000
4/3	140	63000	14000	77000
4/4	125	63000	14000	77000
4/5	140	63000	14000	77000
4/6	125	63000	14000	77000
5/1	140	63000	14000	77000
5/2	125	63000	14000	77000
5/3	140	63000	14000	77000
5/4	125	63000	14000	77000
5/5	140	63000	14000	77000
5/6	125	63000	14000	77000
6/1	140	63000	14000	77000
6/2	125	63000	14000	77000
6/3	140	63000	14000	77000
6/4	125	63000	14000	77000
6/5	140	63000	14000	77000
6/6	125	63000	14000	77000
7/1	140	63000	14000	77000
7/2	125	63000	14000	77000
7/3	140	63000	14000	77000
7/4	125	63000	14000	77000
7/5	140	63000	14000	77000
7/6	125	63000	14000	77000

APPENDIX 1 CONTINUED

BLOCK AND APARTMENT NO.	METER- SQUARE	FUEL (T.L.)	GENERAL EXPENSES (T.L.)	FUEL AND GENERAL EXPENSES (T.L.)
8/1	140	63000	14000	77000
8/2	125	63000	14000	77000
8/3	140	63000	14000	77000
8/4	125	63000	14000	77000
8/5	140	63000	14000	77000
8/6	125	63000	14000	77000
9/1	140	63000	14000	77000
9/2	125	63000	14000	77000
9/3	140	63000	14000	77000
9/4	125	63000	14000	77000
9/5	140	63000	14000	77000
9/6	125	63000	14000	77000
10/1	140	63000	14000	77000
10/2	125	63000	14000	77000
10/3	140	63000	14000	77000
10/4	125	63000	14000	77000
10/5	140	63000	14000	77000
10/6	125	63000	14000	77000
11/1	140	63000	14000	77000
11/2	125	63000	14000	77000
11/3	140	63000	14000	77000
11/4	125	63000	14000	77000
11/5	140	63000	14000	77000
11/6	125	63000	14000	77000
12/1	68	32000	8000	40000
12/2	51	24000	6000	30000
12/3	44	20500	4500	25000
12/4	50	24000	6000	30000
12/5	68	32000	8000	40000
12/6	51	24000	6000	30000
12/7	44	20500	4500	25000
12/8	50	24000	6000	30000
12/9	68	32000	8000	40000
12/10	50	24000	6000	30000
12/11	44	20500	4500	25000
12/12	50	24000	6000	30000
13/1	68	32000	8000	40000
13/2	51	24000	6000	30000
13/3	44	20500	4500	25000
13/4	50	24000	6000	30000
13/5	68	32000	8000	40000
13/6	51	24000	6000	30000
13/7	44	20500	4500	25000
13/8	50	24000	6000	30000
13/9	68	32000	8000	40000
13/10	51	24000	6000	30000
13/11	44	20500	4500	25000
13/12	50	24000	6000	30000

APPENDIX 1 CONTINUED

BLOCK AND APARTMENT NO.	METER-SQUARE	FUEL (T.L.)	GENERAL EXPENSES (T.L.)	FUEL AND GENERAL EXPENSES (T.L.)
19/1	68	32000	8000	40000
19/3	44	20500	4500	25000
19/4	50	24000	6000	30000
19/5	68	32000	8000	40000
19/6	51	24000	6000	30000
19/7	44	20500	4500	25000
19/8	50	24000	6000	30000
19/9	68	32000	8000	40000
19/10	51	24000	6000	30000
19/11	44	20500	4500	25000
19/12	50	24000	6000	30000
20/1	68	32000	8000	40000
20/3	44	20500	4500	25000
20/4	50	24000	6000	30000
20/5	68	32000	8000	40000
20/6	51	24000	6000	30000
20/7	44	20500	4500	25000
20/8	50	24000	6000	30000
20/9	68	32000	8000	40000
20/10	51	24000	6000	30000
20/11	44	20500	4500	25000
20/12	50	24000	6000	30000
27/1	80	38000	8000	46000
27/2	80	38000	8000	46000
27/3	80	38000	8000	46000
27/4	80	38000	8000	46000
27/5	80	38000	8000	46000
27/6	80	38000	8000	46000
28/1	80	38000	8000	46000
28/2	80	38000	8000	46000
28/3	80	38000	8000	46000
28/4	80	38000	8000	46000
28/5	80	38000	8000	46000
28/6	80	38000	8000	46000
29/1	80	38000	8000	46000
29/2	80	38000	8000	46000
29/3	80	38000	8000	46000
29/4	80	38000	8000	46000
29/5	80	38000	8000	46000
29/6	80	38000	8000	46000
30/1	60	28500	6500	35000
30/2	60	28500	6500	35000
30/3	60	28500	6500	35000
30/4	60	28500	6500	35000
30/5	60	28500	6500	35000
30/6	60	28500	6500	35000
31/1	60	28500	6500	35000
31/2	60	28500	6500	35000

APPENDIX 1 CONTINUED

BLOCK AND APARTMENT NO.	METER- SQUARE	FUEL (T.L.)	GENERAL EXPENSES (T.L.)	FUEL AND GENERAL EXPENSES (T.L.)
31/3	60	28500	6500	35000
31/4	60	28500	6500	35000
31/5	60	28500	6500	35000
31/6	60	28500	6500	35000
32/1	60	28500	6500	35000
32/2	60	28500	6500	35000
32/3	60	28500	6500	35000
32/4	60	28500	6500	35000
32/5	60	28500	6500	35000
32/6	60	28500	6500	35000
33/1	40	19000	4000	23000
33/2	40	19000	4000	23000
33/3	40	19000	4000	23000
33/4	40	19000	4000	23000
33/5	40	19000	4000	23000
33/6	40	19000	4000	23000
33/7	40	19000	4000	23000
33/8	40	19000	4000	23000
33/9	40	19000	4000	23000
33/10	40	19000	4000	23000
33/11	40	19000	4000	23000
33/12	40	19000	4000	23000
34/1	40	19000	4000	23000
34/2	40	19000	4000	23000
34/3	40	19000	4000	23000
34/4	40	19000	4000	23000
34/5	40	19000	4000	23000
34/6	40	19000	4000	23000
34/7	40	19000	4000	23000
34/8	40	19000	4000	23000
34/9	40	19000	4000	23000
34/10	40	19000	4000	23000
34/11	40	19000	4000	23000
34/12	40	19000	4000	23000

TOTAL NUMBER OF APARTMENTS 178

TOTAL AREA (METER-SQUARE) 14522

TOTAL REVENUE 8445000

APPENDIX 2

BREAKDOWN OF OPERATING EXPENSES

	T.L. cost per month	T.L. cost per meter-square per month
1. Personnel Costs		
a) Permanent personnel	3550107	390.0038
b) Temporary personnel	150000	16.4785
c) Labor	816666	89.7164
d) Security guard	660000	72.5056
	-----	-----
Total Personnel Costs	5176773	568.7043
2. Supplies Costs		
a) Stationary	27667	3.0394
b) Cleaning supplies	173000	19.0052
c) Tea and sugar	36000	3.9548
	-----	-----
Total Supplies Costs	236667	25.9995
3. Water Consumption Expense	3139920	344.9419
4. Maintenance Costs		
a) Roof	50000	5.4928
b) T.V. antenna	20833	2.2886
c) Broken windows	17500	1.9225
d) Consumer Durables	8333	0.9154
e) Exterior wall painting	25000	2.7464
f) Interior wall painting	133333	14.6476
g) Building Maintenance	16700	1.8346
	-----	-----
Total Maintenance Costs	271699	29.8480
5. Heating and Hot Water Provision Expense	15160968	1044.0000
6. Carpenter Material Costs	8000	0.8789
7. Washing Expenses	42000	4.6140
8. Bulbs of Basements and Stairs	10500	1.1535
	-----	-----
Total Operating Expense	24046527	2020.1401

APPENDIX 3

PERCENTAGE BREAKDOWN OF OPERATING EXPENSES BASED ON
EXPENSES INCURRED PER METER-SQUARE PER MONTH

	percent of total operating expense (%)
1. Personnel Costs	
a) Permanent personnel	19.31
b) Temporary personnel	0.82
c) Labor	4.44
d) Security guard	3.59

Total Personnel Costs	28.15
2. Supplies Costs	
a) Sationary	0.15
b) Cleaning supplies	0.94
c) Tea and sugar	0.20

Total Supplies Costs	1.29
3. Water Consumption Expense	17.08
4. Maintenance Costs	
a) Roof	0.27
b) T.V. antenna	0.11
c) Broken windows	0.10
d) Consumer Durables	0.05
e) Exterior wall painting	0.14
f) Interior wall painting	0.73
g) Building Maintenance	0.09

Total Maintenance Costs	1.48
5. Heating and Hot Water Provision Expense	51.68
6. Carpenter Material Costs	0.04
7. Washing Expenses	0.23
8. Bulbs of Basements and Stairs	0.06

Total Operating Expense	100.00

APPENDIX 4

RESULTS OF THE HOUSING ANALYSIS

REVENUE	T.L. revenue per meter-square per month	
	584.3	
OPERATING EXPENSES	T.L. cost per meter-square per month	percent of total (operating and capital) expense (%)
	-----	-----
1. Personnel Costs	568.70	12.32
2. Supplies Costs	26.00	0.56
3. Water Consumption Expense	344.94	7.47
4. Maintenance Costs	29.85	0.65
5. Heating and Hot Water Provision Expense	1044.00	22.61
6. Carpenter Material Costs	0.88	0.02
7. Washing Expenses	4.61	0.10
8. Bulbs (Basements & Stairs)	1.15	0.02
Total Operating Expense	----- 2020.13	----- 43.75
 FIXED COSTS		
1. Depreciation of buildings	260.00	5.63
2. Depreciation of fixtures and furnishings	2336.90	50.61
Total Fixed Costs	----- 2596.90	----- 56.25
 TOTAL EXPENSE (OPERATING AND FIXED)	 4617.03	 100.00
 TOTAL NET EXPENSE (Expenses minus revenue)	 4032.73	

APPENDIX 5

ANNUAL CLOTHING EXPENSE PER DRIVER

	PRICE (T.L.)	AMOUNT	TOTAL PRICE (T.L.)
OVERCOAT	80000	1	80000
JACKET	90000	1	90000
TROUSERS	40000	2	80000
SHIRT	17000	4	68000
SHOES	35000	1	35000
BOOTS	35000	1	35000
TIE	5000	1	5000
SWEATER	20000	1	20000
T-SHIRT	7500	2	15000
TOTAL COST			428000

APPENDIX 6

DATA COLLECTED FOR CARS FOR ONE YEAR (SEPTEMBER 1987-AUGUST 1988)

AUGUST 1988

LICENSE PLATE	KM. TRAVELLED	GASOLINE PRICE PAID (T.L.)	MAINTENANCE AND REPAIR PRICE PAID (T.L.)	KM. TRAVELLED WITH 1 Lt.
06AA050	1439	106320	9400	7.9854213695
06K4694	1098	78200	0	8.2841432225
06ZR635	1248	81233	72800	9.0642965297
06M2640	4041	119000	18800	20.035210084
06P3720	791	38500	0	12.1213181818
06E2573	5073	281239	83400	9.9209213516
06K3960	165	13937	579600	6.5114443567
06H9033	2693	182933	0	8.0966802053
06YV396	2006	152515	30760	7.2340425532
06YV397	2359	168532	44899	7.6985379631

JULY 1988

06AA050	1375	101432	165949	7.9979690827
06K4694	2390	148500	0	9.4956228956
06ZR635	1979	126030	0	9.2645401888
06M2640	3651	246764	104960	8.7293527419
06P3720	0	0	0	0
06E2573	2981	32300	0	50.76006192
06K3960	3892	288076	0	7.4306780155
06H9033	5015	343974	12656	8.0187746748
06YV396	2202	114991	39919	10.5321286014
06YV397	4796	404939	461311	6.5140675509

JUNE 1988

06AA050	3632	209843	12300	9.2598752401
06K4694	0	0	0	0
06ZR635	2230	135800	0	8.7853460972
06M2640	4366	251608	27400	9.2835283457
06P3720	0	0	0	0
06E2573	2638	131105	390768	10.1612448038
06K3960	3379	244500	120400	6.9791206544
06H9033	4133	242403	149848	8.6103101034
06YV396	2171	131972	7850	8.3074818901
06YV397	4682	284496	157323	8.3108725606

APPENDIX 6 CONTINUED

MAY 1988

LICENSE PLATE	KM. TRAVELLED	GASOLINE PRICE PAID (T.L.)	MAINTENANCE AND REPAIR PRICE PAID (T.L.)	KM. TRAVELLED WITH 1 Lt.
06AA050	3886	218823	8400	9.5008751365
06K4694	2214	129050	0	9.1785354514
06ZR635	1636	95330	0	9.181369978
06M2640	3603	196029	12500	9.833264466
06P3720	0	0	0	0
06E2573	2504	110480	19500	11.4456915279
06K3960	3380	224127	6160	7.6157714153
06H9033	4258	249616	7500	8.6143917057
06YV396	1815	113457	21304	8.07861128
06YV397	3847	227020	682140	8.5575499956

APRIL 1988

06AA050	3282	204939	0	8.5677689459
06K4694	1285	62000	0	10.4665322581
06ZR635	2125	123820	8000	9.1816750121
06M2640	3793	202415	0	9.4630585678
06P3720	0	0	0	0
06E2573	2501	113944	147643	11.0844362143
06K3960	4111	266335	9500	7.7949011583
06H9033	3486	243266	196400	7.2366463049
06YV396	2341	126630	8560	9.3358998658
06YV397	3170	198524	124760	8.0637605529

MARCH 1988

06AA050	4765	262756	6900	7.8885924584
06K4694	2945	136800	131016	9.3645833333
06ZR635	2398	123043	402920	8.4777679348
06M2640	4332	219628	16300	8.5800535451
06P3720	0	0	0	0
06E2573	3442	145606	652961	9.6920456575
06K3960	2922	168470	900	7.1111770642
06H9033	3923	216059	7400	7.4444017606
06YV396	2092	115762	27080	7.4093398525
06YV397	3354	160183	0	8.584806128

APPENDIX 6 CONTINUED

FEBRUARY 1988

LICENSE PLATE	KM. TRAVELLED	GASOLINE PRICE PAID (T.L.)	MAINTENANCE AND REPAIR PRICE PAID (T.L.)	KM. TRAVELLED WITH 1 Lt.
06AA050	3594	173723	79840	8.999326514
06K4694	2030	100650	8800	8.7734724292
06ZR635	2262	109254	39540	9.0062606403
06M2640	4444	204034	8700	9.474597371
06P3720	0	0	0	0
06E2573	3577	151496	19435	9.680585626
06K3960	4023	174814	26880	9.4353427071
06H9033	3492	170821	114468	8.3814050966
06YV396	1942	93410	52135	8.5239267744
06YV397	3683	193598	156911	7.7998223122

JANUARY 1988

06AA050	3350	163822	21900	8.8953254142
06K4694	2970	90500	0	14.2756906077
06ZR635	2521	111680	0	9.8194394699
06M2640	4663	190946	23952	10.622924806
06P3720	0	0	0	0
06E2573	3321	110543	220907	12.3174692201
06K3960	3487	169062	89555	8.4564834203
06H9033	4198	198571	190616	8.6678316572
06YV396	1878	94860	0	8.1170145478
06YV397	3679	169600	42809	8.8938089623

DECEMBER 1987

06AA050	3010	151747	38233	7.4978747521
06K4694	3112	126410	0	9.3057194842
06ZR635	2465	119010	60336	7.8293420721
06M2640	4401	194873	22966	8.5367290492
06P3720	0	0	0	0
06E2573	3848	146153	7400	9.4256293063
06K3960	3558	193181	82850	6.5936298083
06H9033	3843	179069	156675	7.6830383819
06YV396	1814	74476	195559	8.7197486439
06YV397	3758	171605	83948	7.8398881151

APPENDIX 6 CONTINUED

NOVEMBER 1987

LICENSE PLATE	KM. TRAVELLED	GASOLINE PRICE PAID (T.L.)	MAINTENANCE AND REPAIR PRICE PAID (T.L.)	KM. TRAVELLED WITH 1 Lt.
06AA050	3552	138700	8500	7.7339870224
06K4694	1959	67005	6300	8.829460488
06ZR635	2239	85475	14900	7.9108277274
06M2640	3795	111281	111276	10.2990627331
06P3720	0	0	0	0
06E2573	2920	94461	216632	8.7172483882
06K3960	3684	138901	21060	7.4793414014
06H9033	4045	161715	700	7.0537055932
06YV396	1589	59017	48620	7.5926936306
06YV397	3838	130150	1400	8.3159124088

OCTOBER 1987

06AA050	916	28152	0	9.8263711282
06K4694	2195	66500	7700	9.9682706767
06ZR635	2631	100165	5175	7.9325313233
06M2640	700	28836	0	7.3311138854
06P3720	0	0	0	0
06E2573	3580	94510	13077	10.6820442281
06K3960	4776	169659	4677	7.9384648029
06H9033	3728	144231	95441	7.2889739376
06YV396	4034	130808	0	8.6966240597
06YV397	2625	90169	503013	8.2095842252

SEPTEMBER 1987

06AA050	0	0	0	0
06K4694	1924	65165	0	8.9165656411
06ZR635	2963	91730	0	9.7549983648
06M2640	0	0	0	0
06P3720	0	0	0	0
06E2573	3727	120000	0	8.75845
06K3960	3778	140902	120945	7.5612553406
06H9033	3941	132795	39639	8.3690048571
06YV396	4206	145228	182749	8.1671027626
06YV397	3280	101874	54432	9.0794510866

TOTAL (12 MONTHS)	325383		8188838	979.13237166
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MEAN OF NON-ZERO DATA	IN COLUMN			9.2370978458
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APPENDIX 7

ANNUAL INSURANCE EXPENSE OF EACH CAR

LICENSE PLATE	ANNUAL INSURANCE EXPENSE (T.L.)
06K4694	195249
06ZR635	196543
06M2640	247208
06AA050	248238
06YV397	249769
06H9033	403109
06K3960	596190
06E2573	342038
06YV396	249769
06P3720	584978
TOTAL	3313091

APPENDIX 8

CAR DEPRECIATION EXPENSES

LICENSE PLATES	TYPE	ZERO KM. VALUE (T.L.)	ANNUAL DEPRECIATION EXPENSE WITH 10% DEPRECIATION RATE
06K4694	DOGAN	15447000	1544700
06ZR635	DOGAN	15447000	1544700
06M2640	DOGAN	15447000	1544700
06AA050	DOGAN	15447000	1544700
06YV397	RENAULT STATION	12998000	1299800
06H9033	RENAULT STATION	12998000	1299800
06K3960	RENAULT STATION	12998000	1299800
06E2573	RENAULT STATION	12998000	1299800
06YV396	RENAULT STATION	12998000	1299800
06P3720	KARTAL	13110000	1311000
TOTAL			13988800

APPENDIX 9

RESULTS OF THE TRANSPORTATION ANALYSIS

	T.L. cost per km.	percent of total (operating and fixed cost) expense (%)
	-----	-----
OPERATING EXPENSES		
1. Personnel Costs	170.6	54.91
2. Gasoline Expense	61.7	19.86
3. Car Maintenance and Repair Expenses	25.2	8.11
4. Car Insurance Expense	10.2	3.28
Total Operating Expense	----- 267.7	----- 86.16
FIXED COSTS		
1. Car Depreciation Expense	43	13.84
Total Fixed Costs	----- 43	----- 13.84
TOTAL EXPENSE (OPERATING AND FIXED COST)	310.7	100.00