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The relationship between size and performance of furniture outlets

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"The Relationship Between Size and Performance of Furniture Out[illegible]"

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ABSTRACT

A sample of approximately 60 furniture stores belonging to one chain is used to analyse correlations between a store's size and its performance. The research uses two measures of size: value of sale and floor space, and four measures of performance: costs/unit sales, collection percentage, stock turn and market share. The last measure uses an equation for expected market share developed as part of the research. A combination of costs per unit sales and collection percentage measures is used to analyse cash generation/consumption propensity of small and large stores.

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Ms L Ward, of the same School, has also helped me, particularly in evaluation of some of the store performance measures.

M ROCHON

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1. Introduction

This research sets out to investigate whether the size of furniture stores affects their performance. For the sake of availability and consistency of data, a sample of stores from one specific chain was chosen.

The research uses two measures of size: value of sales and physical size of the trading area, and four measures of performance: costs/rands sales, installment %, stock turn and market share. By looking for correlations between these measures the research undertakes a limited test of the validity of the Economies of Scale concept. The limitation arise from the selection of the sample and the definitions of size and performance.

Furniture retailing in South Africa can be regarded as a fairly mature industry. The main types of retailer are:

- chains (eg. Russells) comprising many stores of varying sizes (R300 000 - R2 000 000 annual sales) using credit as an important marketing tool. While the chains account for approximately 50% of the furniture market none of them individually has a market share of more than 15%.

- superstores (eg. Joshua Doore) which are chains comprised of few very large stores (R4 000 000 - R10 000 000 annual sales) usually located in out-of-town (non-CBD) locations and able to display a wide range of merchandise at lower prices than chain stores due to their lower overheads structure and higher volumes (estimated market share 10%). These stores represent a very recent (5 years) development.

- discounters (eg. Dions) who do not offer credit and can thus afford to sell at margins lower than either of the above categories. (Market share less than 10%).

- independents, which are family owned and operated stores usually catering for specific needs of the local segment of the market. Very similar to the chain operation. Also include specialist boutiques selling only limited range of merchandise (eg. lounge suites or appliances). (Market share of approximately 30 - 40%)

2. Literature Survey

2.1 Introduction

The concept of economies of scale is well-established in economics. Initially most of the research in this area was conducted with data obtained from manufacturing firms. The research was primarily concerned with dependency of the unit production cost on plant size. Research related specifically to retailing started appearing only during the last thirty years.

Economies of scale can be defined as a situation where an increase in input leads to proportionally larger increase in outputs (Manfield 1979). It can operate at a plant and/or firm level (firm is understood here as a collection of plants - individual self-contained businesses). Its characteristics will probably differ depending on whether the long- or short-run operation is considered. The latter analyses economies of scal using cost and performance data for a particular period of time. The long-run position can be established by aggregating short-run curves for several different periods. Our research is concerned with short-run economies of scale at plant (store) level.

The sample used in this research presents a rather unique opportunity for the investigation of the economies of scale. Most research in this area considered either the same plant at different points in time, as its size grew (time series data) or several plants of differing sizes at a particular point in time (cross sectional data). In both cases other factors than size could have affected the measured performance, eg. changes over time or from place to place of accounting or operation procedures, or market conditions. This research uses a sample composed of plants which are basically identical except for size. The effect of factors other than size on the results of this research are thus minimal.

The main issues raised by the research fall into the following four categories:

- sources of economies of scale
- measurement of effect
- measurement of size
- problems affecting research

2.2 Sources of economies of scale

This aspect is analysed very thoroughly in the works of Robinson (1931), Pratten (1965) and Silberston (1972).

Some of the main reasons for the existence of the economies of scale mentioned in these publications are:

- specialisation or division of labour. This factor is unlikely to be present in our sample due to common systems, policies and functions across the stores.

- integration of processes, economies of increased dimensions and massed resources is probably the most likely reason for the existence of economies of scale in our sample. Cost of certain functions is fairly independent of the size of the store.

Whether the store is small or large is needs at least one manager, one cashier and one cleaner. Similarly the minimum stock holding cannot change substantially with the increase in store size.

- superior organisation of production is unlikely to be present in the sample for the same reasons as mentioned under the first point.

- learning effect relates more to long-run economies of scale and hence is of no relevance to our research.

Tucker (1975) in his very extensive study of economies of scale in retailing did look at the variations in the cost components and was able to identify some of the reasons for the scale effect (staff structure, lease conditions). Our research does not test any hypothesis as to the reasons for the existence of economies of scale.

2.3 Measurement of effect

Three main approaches were proposed to measure performance:

- engineering
- statistical
- survivor

The first two are primarily concerned with costs, the last one is of a more holistic nature. The engineering approach is based on extrapolations of expected costs from past experience and calculations proposed by the technical experts (Yamey 1973). Since it relies on extrapolations the factor (component) costs usually do not take into account changes caused by different size of operations. Eg. the cost of increase involved in moving from a machine producing 1000 units to 2000 units may be less than the increase in moving from 500 to 1000 units.

The statistical approach (used in this research) relies on sampling and statistical analysis of data from existing firms or plants. Mathmematical formulas describing the behaviour of cost or other performance criteria are developed and analysed on that basis (Dean 1936). While the engineering approach is over-reliant on technical experts the statistical approach usually suffers from over-reliance on accountants. The data used in this approach is usually drawn from historical accounting records, and thus may not represent the true cost or performance picture. Furthermore, it usually does not reflect the minimum cost of production, which is the prime concern in economies of scale measurement.

The survivor approach (Stigler 1958) uses the survival and failure of businesses as an indicator of their performance. Unlike the previous two approaches it is not concerned with individual performance measures (cost per unit, ROI, etc) but with survival/failure, growth/decline of the total business. The testing of hypotheses using this method requires extensive and often difficult to obtain historical data. Another possibility could be to rely on the stock market's valuation of firms as indicator of success. The ratio of market to net asset value could be used as a (interval) measure of performance instead of the (nominal) success/failure indicator. To the author's knowledge no study using such a measure has been used in research of economies of scale.

2.4 Measurement of Size

In the early studies of economies of scale the number of units produced per unit of time was used as the measure of size (Mansfield, 1975). This measure became inadequate, however, when looking at firms producing less homogenous output. Retailing in particular is characterised by output which consists of a variety of products and services. A measure used most in these cases is the value of cost of output (sales or cost of sales) (Plant and Fowler 1939 or Holdren 1960). Insofar the physical size content and value of a consumer basket is comparable across outlets, sales are a comparable measure of output. However, the attributes of a consumer basket are likely to be comparable only for similar type of retail outlets. The homogenity of these outlets becomes therefore a critical consideration (highlighted by Tilley and Hicks 1970). Floor area was also used as a measure of size (Tucker 1975).

2.5 Problems

In analysing economies of scale one should be aware of several important problems affecting the research (Douglas 1962):

- output, while being a function of size is not necessarily its measure, either because of the hetrogenity problem mentioned above or because it is related more to the utilised portion of the total size or because it ignores efficiencies of the operation unrelated to size. This study reduces the effect of this problem by using two different measures of size.

- estimates of cost often include allocated costs. As the cost of the head office formed less than 4% of the total cost of operation of all branches in the sample, the effect of inaccuracies in allocating cost was not considered significant in this study.

- costs and sizes of heterogeneous firms are often not comparable hence the results of research into relationships between costs and sizes may not be comparable. The main attraction of this research is that it uses a very homogenous sample.

- while statistical research may show the existence of a correlation between cost and size it does not follow that the relation is causual. In particular cost is sometimes more dependent on planned output than actual output. For example, the amount paid for store rental is the result of decisions regarding expected sales of the store, made before the store was opened and thus not related to its actual output. As far as this study is concerned, most other costs adjust to the actual output in a fairly short period of time (6 - 12 months).

- related to above is the problem of difference between production costs and selling costs (Chamberlain 1933). Production costs are costs incurred in producing particular output. Selling costs are the costs incurred in generating future demand for the output. For example, today's advertising should not be included in costs of today's sales, because it will only have an effect on tomorrow's sales.

- one other problem in measurement of size in retailing is that the output contains intangibles: service, reputation, etc.

3. The store sample

3.1 Introduction

The store sample used in this research consists of all stores belonging to the Transvaal Division of the Russells chain. The chain's target market is the lower-to-middle income, "conservative" segment of the population. It retails home durables (price +R200). (Lower priced merchandise is used primarily for traffic generation).

The stores are located throughout the Transvaal and Northern Orange Free State in various size towns and suburbs. It is considered that the chain has almost saturated its market in this geographical area. As in all other chain furniture retailers 80% of sales are done on credit (up to 24 months, average 20 months) with a finance charge of approximately 25%.

The following chapters describe relevant characteristics of the sample: its size, homogenity and sources of financial information.

3.2 Sample, size and distribution

The sample consists of 64 stores. Their distribution in terms of value of sales and size of the market in which they operate (see 5.5) is as follows:

Annual sales R000's	Number of stores
< 500	18
500 - 749	21
750 - 1 000	11
1 000 - 1 249	6
1 250 - 1 500	4
> 1 500	4

Market size R000's pa (see 5.6)	Number of stores
< 1 250	15
1 250 - 2 499	8
2 500 - 4 999	10
5 000 - 7 499	10
7 500 - 9 999	7
10 000 -14 999	5
15 000 -19 999	6
> 20 000	3

Average sales per store are R771 000 per annum (1982) with a standard deviation of R421 000.

3.3 Sample homogenity

As mentioned all the stores belong to one chain. The chain's management style is very centralised. Its General Manager visits the stores often together with the regional controller to whom all store managers in a particular region report. A region consists of 10 - 15 stores. The regional controller operates within strictly defined policies regarding store operation and appearance.

All marketing (advertising, promotions, discounts, etc) and merchandising decision are made at the Head Office. Relevant promotional activities are then communicated to the regional controllers and store managers. Store merchandise replenishment is controlled primarily by the store manager, but both the regional controllers and general manager have information for monitoring out of line situations.

All financial and other systems are common to all branches.

The common systems and policies across branches means that their results are comparable and that most factors unrelated to size (more efficient systems, better marketing, locations) can be excluded from the investigation.

3.4 Sources of information

The primary source of information used in this research is the store Profit and Loss account. The account produced monthly for each store contains the main income and expenditure items relevant for a store. The meaning of these items is as follows:

Sales	-	value of sales before discounts and mark-ups at cash prices
Cost of sales	-	cost of goods sold before supplier discounts
Stock adjustments	-	adjustments due to supplier discounts/additional charges
Gross margin	-	sales - cost of sales and stock adjustment
Finance charges	-	total finance charges on installment sale contract
BPP income	-	Buyers Protection Plan premiums charged (only some installment customers take it)
Interest on arrears	-	interest charged on overdue installment sale agreements
Total income	-	gross margin and finance charges and BPP income and interest on arrears
Sales promotion	-	cost of advertising, customer incentives, display materials and fixtures incurred by the stores and allocated by the head office.

Credit control	-	Primarily provision for bad debt. Also cost of credit control staff at the store and credit referencing and follow-up.
Shop	-	Shop rental and depreciation of fixtures.
Staff	-	Wages and commissions (all sales staff operates on sales-linked commissions).
Motor & delivery	-	Cost of operating and depreciation of vehicles.
Divisional levy	-	Other costs incurred by the Head Office and allocated in proportion to budgeted sales to each store.
Total expenses	-	Total of all expenses from Sales promotion through Divisional Levy. It does not include Cost of Sales.
Total costs	-	Total expenses + Cost of Sales - Stock adjustments.
Net contribution	-	Total income - Total expenses.

4. Size Indicators

4.1 Introduction

Two basic measures of size were used in this research:

- value of sales
- physical store size (area)

The first one measures the actual output of the utilised part of the store's capacity. The second measures the size of the full-capacity operation. This last statement is based on the assumption that physical store size places an upper limit on sales a store can achieve.

4.2 Value of sales

As mentioned earlier value of sales is the most frequently used measure of size.

Since the stores used in this sample are very homogenous in terms of marketing and merchandising it can be expected that the content and hence value of typical consumer basket bought at different stores are the same. This assumption has not been tested. Should it be significantly incorrect, sales could no longer be used as indicator of physical output produced by a store.

For similar reasons, value of sales was defined as sales at cash prices, i.e. not including finance charges. (The usual practice in financial reporting by furniture retailers is to include finance charges in the sales figure). Finance charges vary from store to store (from 12% to 16%) due to differences in the ratio of cash to credit sales and the length of credit taken by customers. Consequently the physical size of a consumer basket of a fixed value (including finance charges) would no longer be the same for different stores.

4.3 Floor area

Floor area describes the actual, physical size of a store. Particularly in the case of furniture, it limits the amount of merchandise displayed and stocked at the store. It also limits the number of customers and staff present in the store at any given time. In this way the size of the floor area places an upper limit on the output (sales) the store can produce.

The floor area of the sample stores can be divided into display area and storage area. The size of the latter is determined primarily by the road distance between the store and the warehouse. The larger the distance the less frequently is the store's back-up stock replenished and the more back-up stock the store needs to keep on premises. The storage area is therefore less related to output than the display area. Consequently this research used the latter as one of the size indicators.

5. Performance Indicators

5.1 Introduction

In this chapter , the following performance measures are discussed:

- cost per rand sales
- return on gross assets (ROGA)
- installment %
- actual to potential market share ratio

For reasons given below the first two measures are synonmous

The first three measures look at the performance of the store relative to each other independently of the environment in which they operate. The last one incorporates an element of this environment - market size.

5.2 Cost/Rand Sales

The Cost/Rand Sales is defined as:

$$\text{Cost/Rand Sales} = \text{CRS} = \frac{\text{Total cost}}{\text{Sales at cash prices}} = \frac{\text{TC}}{\text{SCP}} \quad (5.1)$$

This is the commonly used measure of performance in the economies of scale context. To the extent that Sales at Cash Prices describe the total size of physical output of a branch (See 4.2) this measure indicates the cost per unit (basket) produced (sold).

One could argue whether certain components of the Branch Expenses should not be excluded from this calculation, in particular:

- the Divisional Levy which is allocated on a fairly arbitary basis (% of budgeted sales)
- the provision for bad debt which is basically a cost of servicing past output and hence not related to current output.

Preliminary tests indicated that these two items, comprising an average 10% of total branch expenses have no material effect on test results and for simplicity, were included in the total cost.

5.3 ROGA

ROGA is defined as :

$$\text{ROGA} = \frac{\text{Net contribution}}{\text{Gross Debtors + Gross stock}} = \frac{NC}{GD + GS} \qquad (5,2)$$

or earnings divided by assets. In that sense it is similar to Return on Investment. There is however an important difference. ROI measures period returns produced by an investment made at a particular point in time. Because the investment was made at a particular localised point in time its net present value can be easily determined and is in fact directly proportional to the historical value. In the definition of ROGA, only stock has similar property - most of it was purchased during a relatively short period of time. Net Contribution and Gross Debtors, particularly in furniture retailing with its 24-months credit are accounting entries which cannot be directly related to a particular cash in- or out-flow at a particular moment in time. The cost of debtors could be calculated as net present value of all past (up to 24 months) cash expenses required to establish them. Their value could be calculated as net present value of future cash inflows they will produce. Both values will be significantly different from the book value of the debtors - depending on collection rate - typically up to 50%. Similar consideratons apply to the Net Contribution. ROGA therefore does not measure the same characteristics as ROI in, say manufacturing*). In fact, it can be proven that ROGA has a linear relationship to the previously defined Cost/Rand Sales, (eg. 5.1.)

$$\text{ROGA} = \frac{NC}{GD + GS} = \frac{\text{Sales (SCP)} - TC}{GD + GS}$$

in furniture retailing $GD \gg GS$ and since most sales are on 24 months credit

$$(5.3) \qquad GD = k \cdot SCP, \text{ where k is a proportionality factor (for Russells approximately 0,8)}$$

Hence

$$(5.4) \qquad \text{ROGA} = \frac{SCP - TC}{GD + GS} \simeq \frac{SCP - TC}{GD} = \frac{SCP - TC}{k * SCP} = \frac{1}{k} * \left(1 - \frac{TC}{SCP}\right)$$

Where

$\frac{TC}{SCP}$ is Cost/Rand Sales.

In other words, ROCA measures the same thing as Cost/Rand Sales and will thus not be used in this research.

* A more appropriate measure for retailing would be the ratio of cash inflows to outflows over a period of a year (full trading cycle).

An analogy to Long Term Fixed Deposits and Current Accounts could be made here. In the case of the former the total interest earned divided by initial deposit is a good reflection of the accounts earning power. In the case of latter, total withdrawals divided by total deposits (taking into account any net balance increase) is a more appropriate measure.

5.4 Installment Rate

$$\text{Installment Rate} \quad (IR) = \frac{\text{Installment received}}{\text{Gross debtors}} \qquad (5.5)$$

Where Installment Received is amount of cash received during a month from the debtors. Gross Debtors is the book value of debtors at the beginning of that month. Installment ratio is of critical importance for a furniture retailer, since up to 85% of his cash inflow comes from installments (the remaining 15% being deposits and cash sales). The monthly installment ratio varies typically from 5% (low income Black market) to 10%. In operating a branch one would seek to maximise the Installment Rate.

5.5 Stock turn

$$\text{Stock turn (ST)} = \frac{\text{Cost of sales}}{\text{Average stock}} \qquad (5.6)$$

Where cost of sales were taken for one year and Average Stock was taken as average of 12 month-end values of stockholding.

The importance of high stock turn is two-fold. Firstly stock represents an investment of funds on which interest is charged. Secondly, low stock turn means that a significant amount of merchandise is old, and due to either fashion changes or breakage needs to be written off or disposed of at a considerable discount. In operating a branch one would seek to maximise the stock turn.

5.6 Market share

The previous four measures are related to the internal performance of the stores, independently of any characteristic of the market in which it operates. The market share test evaluates the question of how well the stores are doing, in terms of turnover compared to what they should be doing, taking the market size into account.

While each store is oriented at the same target market the size of that market varies considerably from store to store. Differences in competitive conditions, too, are associated with the size of the market: larger markets (large town) will have a higher number of competitive stores than smaller markets (small towns). The market share of the stores can thus be expected to vary inversely with the size of the market, in which they operate.

The practical problem arising in this connection is the difficulty in determining the market size for a particular store. Firstly the size of the population which a store is servicing is not easy to determine, particularly in the larger urban areas. While a suburb may have a population of say 50 000, it is not immediately known what proportion of that population is in fact likely to shop in the area in which the store operates, rather than going to another town/suburb. Neither is it known how many people come to this suburb to shop from another suburb. To overcome this difficulty a sample of 100 delivery addresses were extracted from the customer lists of the sample stores. These addresses were plotted onto the maps of towns/suburbs in which the stores operate. It was found that:

- in towns far removed from other larger towns (50 km distance) 90 - 95% of the addresses were in the town
- in locations where the customer has a choice of several shopping centres, 65% - 80% of addresses were in well-defined areas whose population could be established, adjacent to the stores.

The fact that the addresses were so localised relative to the store means that inflows and outflows of shoppers to and from particular areas are limited (5 - 35%). The size of population of a particular town or adjacent suburb can thus be used to estimate the market size, but for one additional problem: it includes people who are not in the Russells target market (high and very low income groups). This is particularly true of towns, where income mixture is more varied than in suburbs. Seeing though that Russells target market includes a fairly large proportion of the population the above measure was accepted for estimating the market size.

Figure 5.1 depicts graphically the relationship between the market size and the market share for individual stores. The hyperbolic relationship evident in this figure was tested using linear regression on the logarithm of the two values. The best fit equation is: (See table 5.1)

$$MS = 8783\ Mk^{-.753} \qquad (5.7)$$

where MS = market share in %
Mk = market size in R1 m

FIGURE 5.1

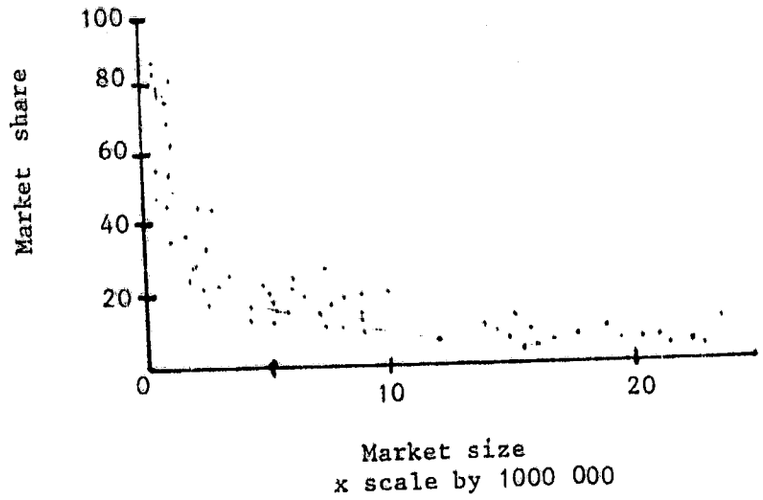


TABLE 5.1

REGRESSION ANALYSIS

Dependent variable : LN (share)
Range 1 to 64 +OBS:64

Variable	Coeff	Std Err	T-Stat
Constant	3,879	.080	47.949
LN (market size)	-,753	.045	-16.724

R-SQ:	.818	CORR R-SQ:	.815
SER :	.417	SSR:	10.820
F (1,62) =	279.714	DW:	1.496

We can thus say that market size is a major determinant of a store's share. Consequently stores with lower and higher market shares than predicted by eq 5.7 could be regarded as respectively under- and over-achievers. The ratio of actual market share to expected market share (eq 5.7) could therefore be used as a performance indicator.

6. Empirical results

6.1 Introduction

This chapter looks at the existence and significance of the correlations between the various scale (chapter 4) and performance (chapter 5) indicators. In most cases the results are presented by means of a graph and computer print-out of a regression analysis. The meaning of the various parameters appearing on the print-out are as follows:

DEPENDANT VAR	=	dependent variable name
RANGE	=	irrelevant
OBS	=	sample size
VARIABLE	=	column listing the names of independent variables. CONSTANT is not a variable.
COEFF	=	slope coefficient for the corresponding variable or value of the constant
STD ERR	=	standard error on COEFF
T-STAT	=	t-statistic for the COEFF
R-SQ	=	coefficient of correlation
CORR-R-SQ	=	corrected coefficient of correlation
SER	=	standard error of estimate
SSR	=	sum of squared residuals
F	=	F-statistic
DW	=	Durbin-Watson statistic

At the 99% confidence level the following minimum F- and t-statistics are required (Markridadis, 1978) for the acceptance of the hypothesis that r-square and equation parameters are significantly above zero:

F = 7.05
t = 1.30

The minimum Durbin-Watson statistic at the 95% confidence level for one variable is 1,59 and 1,63 for two.

6.2 Sales vs Cost/Rand Sales

Figure 6.1 depicts graphically the relationship between sales value (in R1000's) against Costs per Rand Sales. Regression analysis (Table 6.1) reveals that Costs per Rand Sales are negatively correlated to Sales with a correlation coefficient of 26%. The function is described by the following equation:

$$\text{Cost/Rand Sales (\%)} = 86.1 - 5.9 \times \text{Sales (in R1m)} \quad (6.1)$$

The negative sign of the slope coefficient is as would be expected of the scale effect.

The relatively low correlation coefficient is probably caused by the use of historical costs and by the fact that some of the costs (eg. rental) are more related to planned capacity than actual output.

FIGURE 6.1

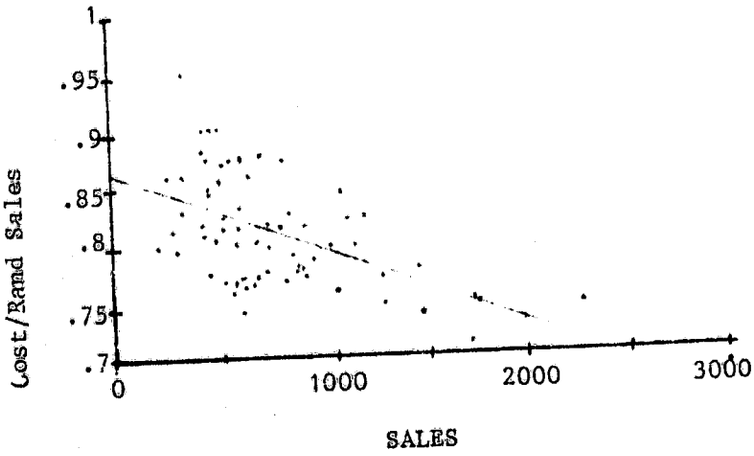


TABLE 6.1

REGRESSION ANALYSIS

Dependent Variant: Cost/Rand Sales
Range: 1 to 64

+OBS:64

Variable	COEFF	Std Err	T- Statistic
Constant	.861	.010	78.944
Sales/1000	- .059	.012	-4.809

R-SQ:	.271	CORR R-SQ	.259
SER:	.041	SSR:	.107
F (1,62) =	23.127	DW:	1.720

FIGURE 6.2

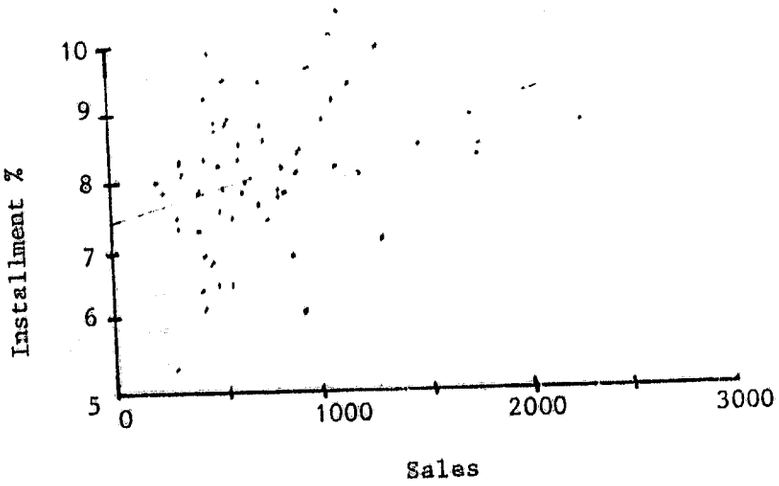


TABLE 6.2

REGRESSION ANALYSIS

Dependent Variant: Installment %
Range: 1 to 64

+OBS: 64

Variable	COEFF	Stand Err	T- Stat
Constant	7.377	.252	29.273
Sales/1000	.884	.287	3.077

R-SQ:	.132	CORR R-SQ	.118
SER:	.961	SSR:	57.326
F(1,62) =	9.471	DW:	1.811

FIGURE 6.3

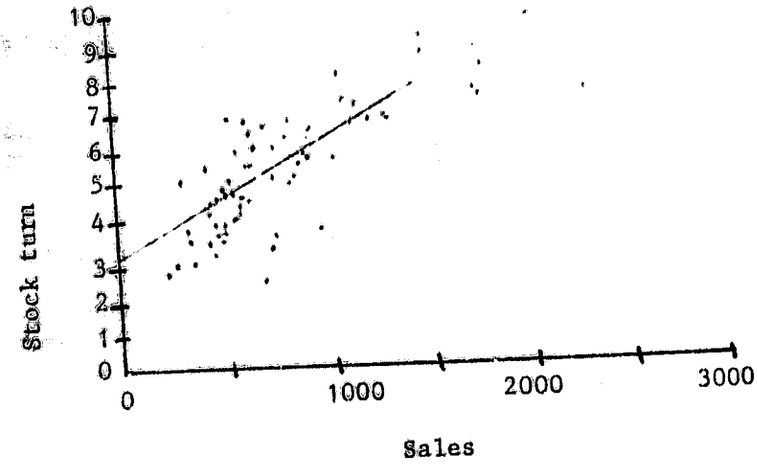


TABLE 6.3

REGRESSION ANALYSIS

Dependent variant : Stock turn + OBS:64
Range: 1 to 64

Variable	COEFF	Std Err	T. Stat
Constant	3.105	.294	10.529
Sales/1000	3.050	.336	9.063

R-SQ:	.570	CORR R-SQ:	.563
SER:	1.125	SSR:	78.515
F (1,62) =	82.264	DW:	1.642

TABLE 6.4

REGRESSION ANALYSIS

Dependent var: Ratio
Range: 1 to 64 +OBS:64

Variable	COEFF	Std Err	T-Stat
Constant	.432	.144	2.990
Space / 100	.125	.026	4.792

R-SQ:	.270	CORR R-SQ	.258
SER:	.384	SSR:	9.163
F(1.62)	22.970	DW:	1.653

TABLE 6.5

REGRESSION ANALYSIS

Dependent variable: LN (share)
Range: 1 to 64

Variable	COEFF	Std Err	T- Stat
Constant	3.089	.225	13.680
LN (market size)	-.823	.045	-18.220
LN (space/100)	.556	.150	3.699

R-SQ:	.851	CORR R-SQ	.846
SER:	.380	SSR :	8.838
F (2.61). =	175.315	DW:	1.715

6.3 Sales vs Installment %

Similar picture (Figure 6.2, Table 6.2) emerges for the sales vs installment % correlation. The equation for this correlation is

$$\text{Installment \%} = 7.377 + 0{,}884 \cdot \text{Sales (in R1m)} \qquad (6.2)$$

Once again, the positive sign of the slope coefficient is consistent with expectations - bigger sales (size) means better performance (higher installment percentage).

This relatively low value of the correlation coefficient is probably due to differences in quality of credit staff and cash availability in the various towns in which the branches operate.

6.4 Sales vs Stock turn

This correlation also reveals the positive impact of size on performance (figure 6.3, table 6.3). The correlation and influence of sales are even stronger (correlation coefficient of 56% and slope coefficient of 3,050 for sales expressed in R1m). An interesting picture revealed by Figure 6.3 is that the stock turn appears to be independant of sales once the latter reach R1m. The eight times stock turn reached by these stores is in fact comparable to the stock turn of the so-called superstores (eg. Joshua Doore with sales of above R4m).

The equation for this correlation is

$$\text{Stock turn } (x) = 3{,}105 + 3{,}050 \cdot \text{Sales (in R1m)} \qquad (6.3)$$

Using linear regression with both values logorithmically transformed does not yield a better fit.

That the correlation coefficient is so high is probably mainly due to the fact that each store has to keep a certain basic stock which is standard to all stores. Therefore, stockholding does not change as rapidly as the cost of sales.

6.5 Physical Size vs Market Share

As shown in section 5.4 a store's market share is determined mainly (80% correlation) by the size of the market in which it operates. The hypothesis tested here however, is whether the physical size of the store (square meterage of the display area) has any additional effect on the market share.

Table 6.4 lists statistics for the correlation of the ratio of actual market share to theoretical market share (eq. 5.7) against the size (in 100 m²) of the store's display area. The correlation shows that an increase in the store's trading area has a positive influence on its ability to overachieve market share.

Table 6.5 shows another way of looking at basically the same correlation. Here the natural logorithm of the market share (in %) was regressed against natural logorithms of both the market size (in R1m) and the store size (in 100 m²). This correlation is described by the following equation:

$$\text{Market share } (\%) = 21.955 \quad Mk^{-0.823} \quad SP^{0.556}$$

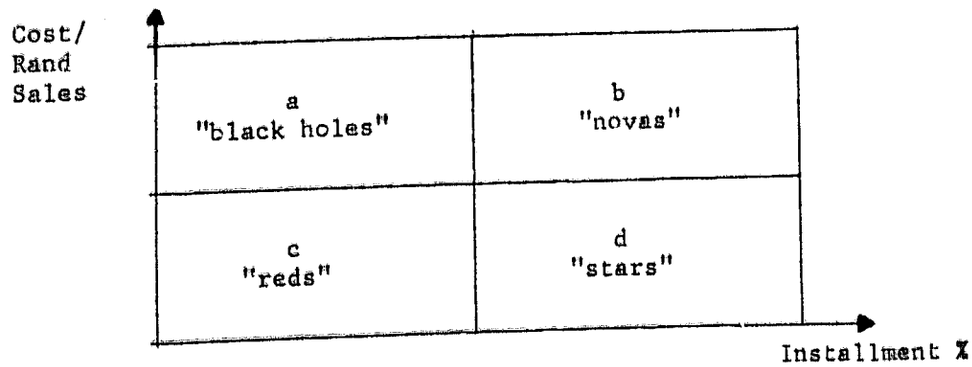
where Mk is market size in millions of Rands
SP is store's trading area in hundreds of m².

Note that the correlation coefficient has increased from 81,5% (Table 5.1) to 84.6%. The positive component of SP means that an increase in the store's trading area is likely to increase the market share.

6.6 Cash Consumption vs Sales

The individual correlations between Sales and respectively Costs/Rand Sales and Installment % were measured in Chapters 6.2 and 6.3. Both these factors taken together have a significant impact on the cash consumption and generation of a store. Costs represent approximately 40% of the cash requirements of a store - the other 60% being purchases which are directly related to sales. Installments represent 80% of the cash generated by a store. On average the cash generated to cash consumed for a store varies from 0,9 to 1,1. Even small variations in either costs or installment % can swing a store from being a net cash generator to a net cash consumer.

Figure 6.4 - Cost/Installment Grid.



The four quadrants represent the following situations:

a) High cost, low installment - stores in this quadrant are likely to be net (and hopeless) cash consumers (hence black holes)

b) High cost, high installment - these are generally newer stores with high rental and other initial start-up expenses. Their book is low and even though they have a high installment % they are likely to be net cash consumers. As the main reason for being in this category is the store's age, it is not particularly significant for management purposes.

c) Low costs, low installments - stores in these quadrant could be the older stores (low rentals, low quality debtors book). Depending on the size of the other factors contributing to cash-flow (cash sales, deposits) they could be net generators or consumers of cash.

d) Low costs, high installments - this is the most desirable quadrant to be in: all of these stores are net cash generators.

Using sample averages for the midpoints of the two axis yielded the following data for the four quadrants:

Quadrant	Average sales	Standard deviation	No of stores
a	573	237	17
b	798	473	13
c	689	391	15
d	1 306	788	21

Of particular interest is whether the difference in average sales between quadrant "a" and "d" is significant.

In statistical terms the above situation can be described as Two-Independent Group Design (Huysamen 1976) with the two groups (stars and blackholes) classified on the basis of Cost/Rand Sales and Instalment %. The null hypothesis and alternative hypothesis are:

H_0 : BS = BH

H_1 : BS > BH

where BS and BH are average sales of respectively "stars" and "blackholes".

Assuming homogeneity of the population and normality of both sub-populations yields a t-statistic equal to 3.6939. The minimum t-statistic for 36 degrees of freedom at 99% confidence is 1.306. Hence the null-hypothesis, that the average size (sales) of "blackholes" and "stars" are the same can be rejected.

7. Conclusions

The main conclusions which can be drawn from the above research are as follows:

a) size of the store, expressed either in terms of sales value or trading area, size has a positive effect on certain critical performance measures.

b) costs of operating a store decrease by 6% for every R1m increase in sales.

c) stock turn increases by 3 x for every R1m increase in sales

d) a store's market share increases in proportion to (approximately) square root of the increase in the store's trading area.

e) higher costs and lower installment percentage of smaller stores means that stores with annual sales of less than R600 000 are very likely to be cash-traps.

It would seem thus that in furniture retailing "bigger is more beautiful". The recent successful development of Joshua Doore and Furniture City support this view.

It is important however, to keep in mind certain limitations which affect the validity of the above statement.

a) the product of a retail plant (store) is highly heterogenous. Apart from merchandise it includes a large intangible service. While in a chain the common use of policies and systems and certain degree of socialisation leads to a standard service level across the stores, for the independent retailer, the service component can be much higher and much more important. This is particularly true of the upper income market where even very small independents are generally faring better than the chains.

b) the sample was limited to stores with a turnover of R3m and less. Joshua Doore's experience suggests however that some of the results obtained here are also applicable to stores with turnovers in excess of R6m.

c) Location: an important factor which can influence a store's performance was not taken into account in this research. Good location may at time favour a small store. It is unlikely though to be of lasting or general consequence.

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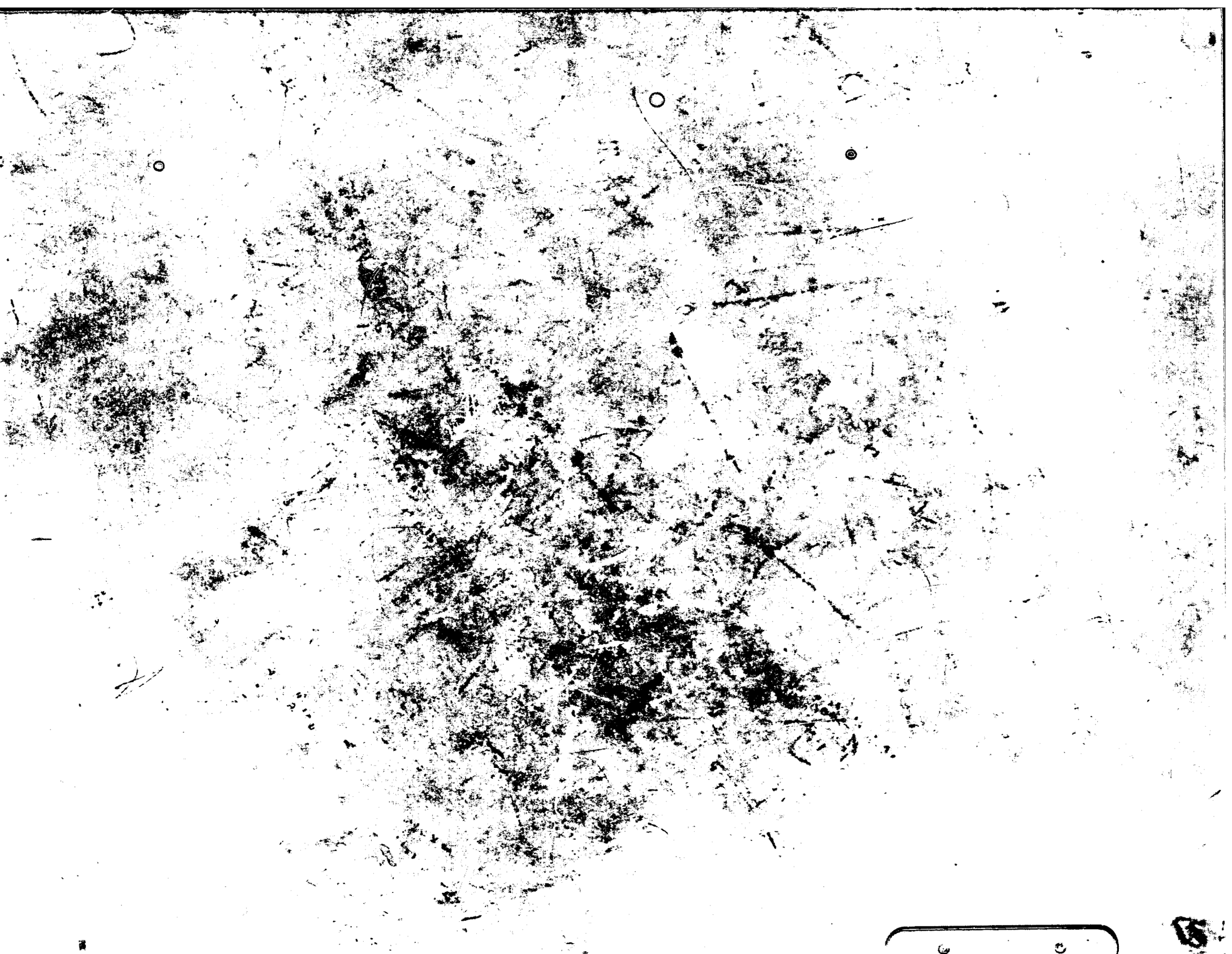
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