The Economics of Quality

An empirical study of the hotel industry

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Abstract

The purpose of this study is to assess the economics of quality. Our main source of information is customer based quality scores and detailed accounting information from more than 500 hotels. These hotels are participants in one of the worlds largest hotel companies. Their strategy is to offer high quality and consistent accommodations. The chain has monitored quality and customer satisfaction for many years.

The survey provides bits and pieces of evidence related to the economics of quality. We find that there are specific costs and sacrifices involved and that quality efforts pay off.

The analysis does not document a direct link between quality and cost items reflecting wages, maintenance and housekeeping. We concluded that these items are disturbed by mismanagement and waste - neither of which are beneficial to the quality ratings. However, we did document a positive association between the cost related to the breakfast ingredients and the customers' perception of the breakfast serving. We hold that more refined quality cost measures will further expose the costs of quality. Finally, we discovered a strong relationship between the age of the property and the quality perceptions related to physical assets. This result indicates that investments and maintenance are necessary resources in a quality strategy. Quality is not free.

We failed to document a significant direct connection from quality to economic performance. This does not entail that the link is absent. Omitted variables are a more tempting explanation. Besides, we found a significant and positive relationship between customers' quality perceptions and revenue per room compared to the closest competitor. We also detected higher growth rates in hotels of superior quality. These results support our faith in quality as a profitable strategy.

The economics of quality is not a simple matter. Previous research is dominated by convincing case studies and well written anecdotes. It is complicated to capture and isolate the problem empirically.

The hotel companies in our survey produce high and stable quality. Nevertheless, we have succeeded to document positive economic effects from the minor variations in quality provided. Thus, even at this level, quality improvements may have some positive implications. However, we believe that the economics of quality is far more significant in hotels where quality and customer satisfaction has been overlooked.

Foreword

This thesis is a product of a project in tourism (SIR) financed by the Department of Industry and Trade. Ideas and influence from Professor Sigurd Troye, my principal adviser and initiator of SIR have inspired the specific research question.
The work started in 1991 and the final product was published in 1998.

The economics of quality is a "delicate" area. Relevant empirical data are hard to obtain. The author could have inflated productivity by following the procedures of most work in this area – by engaging an institute to map the managers' beliefs regarding quality, costs and performance. Instead, I started to collect objective data. These should be more valid and reliable. Unfortunately, they were time consuming to acquire.

I managed to get comprehensive information from a large hotel chain in Norway. Nonetheless, I found that neither the amount of information nor the quality of the data fulfilled the requirements of this study. Thus, alternative sources were consulted. Some luck must be admitted when Eivind Farstad managed to persuade one of the world's largest hotel companies to co-operate. This firm controls more hotels than the entire Norwegian hotel industry. Thus, both the amount and the quality of the data were acceptable.

Who should one thank, and who should one blame after working with the same problem for seven years?

My mother deserves particular attention after "catching" more than one thousand small, medium and serious grammatical errors in the final draft. Einar Breivik, Kåre Sandvik, Torvald Øgaard and Bendik Samuelson have provided assistance in the analytical part of my work. Herbjørn Nysveen and Geir Bruflot have been helpful in sharing common frustrations, readymade pizzas, tin food, apartments etc. In fact, this is also the case with Einar Breivik, Kåre Sandvik, Bendik M. Samuelsen, and Bjørn Ove Grønseth. Cigarettes and databases have been important issues in my relationships with Olav Kvitastein, Nils Risholm and Inge Jan Henjesand.

I appreciate that none of my colleagues at the Institute of Marketing have tried to kick me "out of office" (an office without any but still decreasing power, I must add). The working environment is probably debatable. However, I have mostly enjoyed the friendly sarcasm and the enormous room for alternative social behaviour. The perverted working hours has also been an advantage in order to complete a thesis.

Finally, I wish to thank Arild Engh who informed me about the possibilities of becoming a student for life.

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ABSTRACT

FOREWORD

Chapter 1: Introduction

As companies around the world transform themselves for competition that is based on information, their ability to exploit intangible assets has become far more decisive than their ability to invest in and manage physical assets.

Robert S. Kaplan and David P. Norton, HBR, 1996

To service-based companies, quality is the lifeblood that brings patronage, competitive advantage, and long-term profitability.

Clow & Vorhies, (1993). Journal of Service Marketing

1.1 Background

Quality in general and service quality in particular has received impressive attention during the last decades. The anticipated relationship between quality and variables such as return on investments, cost, productivity, sales growth, customer satisfaction and loyalty, should explain the priority quality related work and research has obtained (Troye et. al., 1995). Most studies advocate high quality as a driver of economic performance (e.g. Porter 1980, Peters and Waterman 1987, Gummesson 1992, Luchs 1986, Buzzell et al. 1975, Takamiya 1979, Ackere et. al. 1997). Besides, inferior product quality has been regarded as a paramount factor in the market failure experienced by American companies in Japan (Kotler, Fahey and Jatusripitak, 1985). Finally, quality experts estimate that the total cost of poor quality is around 20% of gross sales for manufacturing companies and 30% for the service industry (Talley, 1991).

However, there is very little empirical evidence supporting the alleged relationship between quality and economic measures (Phillips et al 1983, Bowbrick 1992; Stemsrudhagen, 1997). Some studies advocate "optimal quality". Hence, quality improvements are only cost-effective and profitable up to a certain point (Dorfman and Steiner, 1954; Brems, 1957; Garret and Silver, 1973; Lundvall and Juran, 1974; Riggs 1981). Others propose a negative association (Garret and Silver, 1973).

Aaker and Jackobsen (1994) dispute that quality expenditures in general have obvious profit implications. They do not necessarily reduce costs but often increase them, at least in the short term (Griliches 1971). Finally, the almost «automatic link» between quality and profitability in the service sector has recently been questioned by Rust et. al. (1995).

1.2   Quality and economic measures

*Is quality
a cost cutter?*

Gummesson (1992) argues that quality can be related to economic performance through several paths. One path goes via image, sales growth, economies of scale, lower costs and finally increased profit. Another effect of quality flows through reduced costs as a result of fewer mistakes and less rework. (see exhibit 6.3). According to Gummesson, quality basically reduces costs and thus improves profits.

*Is quality
profitable?*

Troye et. al. (1995) have suggested and tested a similar concept.   Figure 1.1 illustrates their overall framework. Opposed to Gummesson, the authors anticipate that quality improvements also imply higher costs of production. The relation between quality and economic performance thus becomes more uncertain than the popular view anticipates.

Figure 1.1   How does quality fuel profitability?
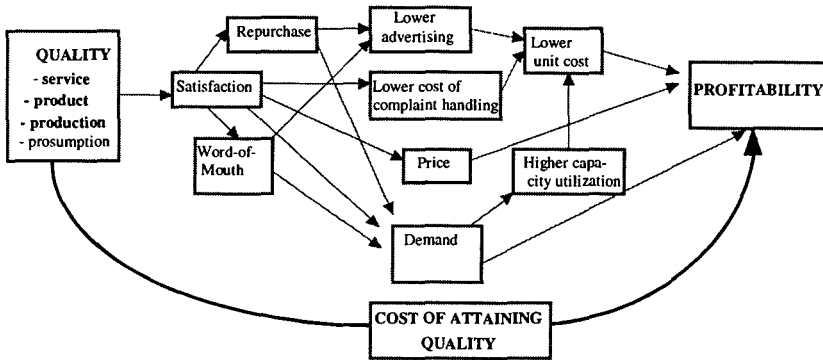
1.3   The positioning of our research question

Nobody seems to understand or agree upon what quality really is. This might explain the lack of empirical evidence and the disagreement between scholars to whether quality pays off or not. The quality construct and the quality philosophy are discussed and developed by numerous academics from a variety of disciplines. The confusion regarding the quality construct represents both a threat and an opportunity. The threat to quality research is basically that it analyses a construct nobody understands - if quality exists at all. On the other hand, the lack of consensus and knowledge about the construct represents an opportunity for academics from various disciplines to create a subjective understanding and promote their own "quality movement" (cf. Garvin 1987, 1988).

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Quality ≈ general perfection

Several quality spokesmen pronounce that quality basically is to produce excellent products without any errors occurring in either production or consumption. Besides, it is paramount to consult the consumers to ensure that the perfectly produced and consumed products are appreciated. If a company manages to fulfil these requirements, it may call itself a quality supplier and aspire for the Malcolm Baldridge National Award.

A large body of literature (for instance Gummesson, 1992) argues that this kind of quality effort will increase loyalty and simultaneously make the customers willing to pay more for the products offered. Even more important, the costs will drop and profits will improve. The empirical evidence related to these "allegations" consists of rhetorical arguments, anecdotes and case studies.

Perfection is cheaper than chaos

This perspective on quality makes empirical work redundant. In essence, the relations are perfectly logical and do not cry out to be tested. First, a perfect production process is clearly more cost effective than a system full of chaos and disasters. Second, it is reasonable to accept that satisfied customers are loyal and willing to pay more than the ones who feel cheated and abused. Finally, a company that manages its production process perfectly and controls a faithful group of customers will certainly be more profitable than its counterpart.

Quality is by definition a profitable strategy

The topic in this thesis is not to empirically test whether quality is a profitable strategy. Instead, we are testing how some companies succeed in obtaining quality and how these achievements are related to economic measures.

Hence, the basic research question is how fulfilment of various aspects of quality may be associated indirectly and directly to economic measures.

In a pilot study, a conceptual model of quality suggesting a distinction between service quality, product quality, production quality and prosumption quality is applied on several guest surveys and economic performance measures for about 40 hotels. The distinction between the different types of quality is based on the way various facets of the offering are tied to production factors such as personnel, raw material, physical facilities and customers. The various types of quality can then be related to the cost of these factors.

Our main study is based on information from a U.S. hotel company, managing more than 800 hotels. The overall research question is as follows:

How does successful quality relate to economic measures?

1.4 A visual overview

The purpose of exhibit 1.2 is simply to illustrate the structure of the study. First, we start by discussing the two main constructs in focus – namely quality and economic performance. From the various understandings of quality, the customer-based approach is the core of our interests. Furthermore, we introduce the multi-level product and measurements concept suggested by Troye (1990). During our review of concepts and measures related to economic performance, we propose an accounting based approach.

Based on the analysis of quality and economic measures, we examine the literature that relates the two constructs. Furthermore, we discuss our hypotheses, models and research design. An empirical study follows. Finally, we analyse the results and discuss their implications.

Exhibit 1.2 A visual structure of the study
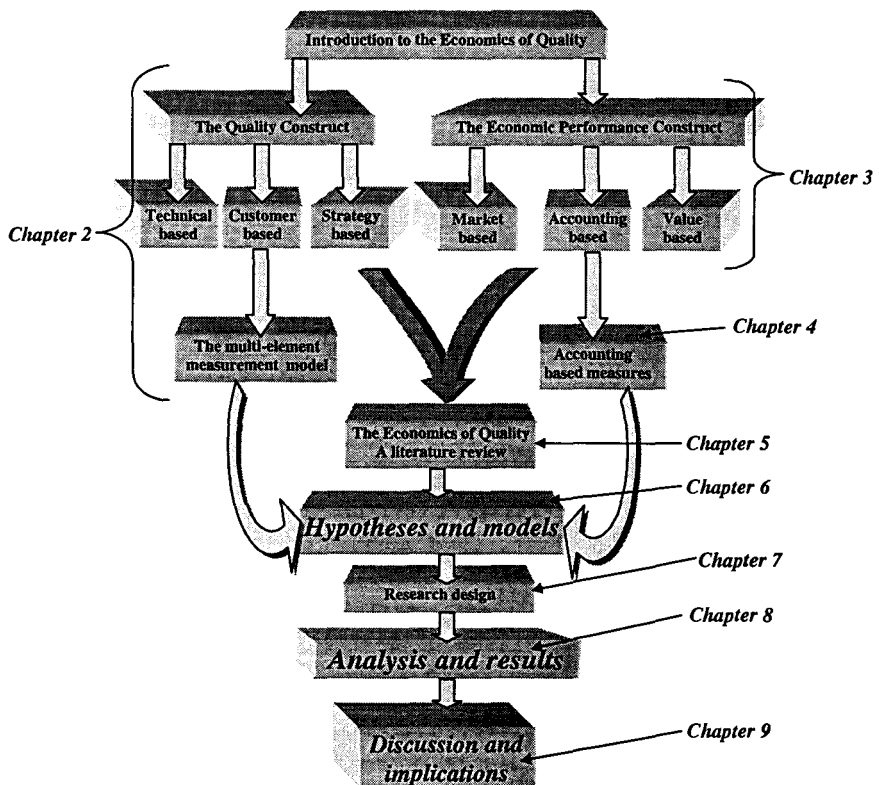
Chapter 2: The quality construct

> Quality... you know what it is, yet you don't know what it is. But that's
> self-contradictory. But some things are better than others, that is, they
> have more quality. But when you try to say what quality is, apart from
> things that have it, it all goes poof! There is nothing to talk about.
> But if you can't say what Quality is, how do you know what it is,
> or how do you know that it even exists?
>
> <div align="right">Pirsig (1974)</div>

> The improvement of quality in products and the improvement of quality
> in services - these are national priorities as never before.
>
> <div align="right">George Bush (1990)</div>

2.1 The quality construct - a literature review

Quality is a popular term in management literature and strategic plans of both public
and private enterprises. Companies in the industrialised parts of the world accord
product quality its place on the list of paramount strategic issues (Steenkamp 1989).
Quality circles, zero defects and quality teams are words we often hear. However,
there are few words that are as ambiguous or as confusing as "quality". Few
businesses bother to define quality precisely, let alone measure it, or manage it
(DeSouza & Thompson, 1985).

What do we mean by quality?

Although the literature suggests numerous definitions and guidance of measurement,
defining and measuring quality is still a challenging procedure. Bowbrick points out
that producers, consumers, engineers, marketers and strategists often will have
different views of the quality concept. In a market orientated perspective, the
consumers perceptions of quality will form a crucial element (Steenkamp 1989).
Technical sophistication and durability will on the other hand be important dimensions
in a technological driven quality concept.

The understanding of quality often depends on whom the quality is meant to serve,
and who is chosen to decide the «quality of the quality provided». The acceptance of
the quality concept has lead to a development from technical orientated definitions
and towards a broader understanding of quality such as for instance in *perceived
quality* and *service quality*. Exhibit 2.1 describes a few definitions from the literature.

Exhibit 2.1 A sample of quality definitions

Notation	Definition	Central attributes
Qualitas	how put together (the original meaning of the Latin word, Jersin 1984)	physical
Technical quality	In conformance with specifications (Crosby 1979) (Deming 1982)	Product Technical performance Physical attributes
Functional quality	"Fitness for use" (Juran & Gyna 1980)	Product, taste, colour reliability, durability
Customer based	"Fitness for use, given the needs of consumers" (Box 1984, ex. Kotler 1984)	Product taste, colour satisfaction
Customer perceived quality	In conformance with specifications +"Fitness for use, given the needs of consumers" (Gummesson 1987)	Product Technical performance Physical attributes, Product, taste, colour, satisfaction
Consumer based quality	(Mason 1974)	Product, price, brand, image producer/country of production
Perceived quality	Consumers' judgement about the entity's overall excellence and superiority (Zeithaml 1987)	Product, Attitude
Service quality	"Overall evaluation of a product similar to attitude" Olshavsky (1985)	Product, attitude, attitude towards service

Most companies still define quality according to the engineering perspective articulated by the gurus Deming, Juran and Crosby: "Meeting the specifications set by management". These three gurus, however, also provided road maps to establish a quality culture. Although the maps are different, their destination is almost identical. Exhibit 2.2 comprises the common threads of the three gurus (Talley 1991).

Exhibit 2.2 Common treads among quality philosophies - The customer dimension

Customer Satisfaction is an important element of quality management!

Management Commitment	Training	Measurements Statistical Process Control

Customer Satisfaction

Total Quality Management

Strategy	Participative Problem Solving	Continuous Company-Wide Improvement

Talley (1991)
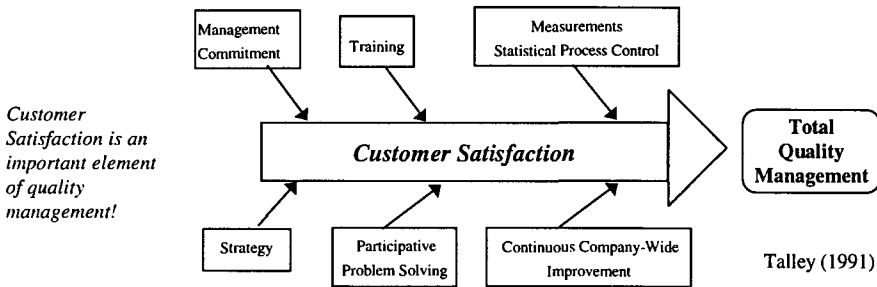
The "consolidated road map" indicates that the technical aspect is one of several elements in a quality-orientated strategy. The development of quality management seems to give the customers a stronger role in the quality judgement process. It is no longer sufficient for products or services to meet specifications. The quality standards also have to comply with customers' expectations and needs.

All the three quality gurus base their understanding of quality on technical performance and physical attributes. Still, they admit that the common core of a quality philosophy is the <u>satisfied customer</u>.

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Parasuraman et. al. (1985) represent a more "technically remote" definition of quality. They understand quality as a comparison between expectations and performance. Thus, to produce a product or to provide a service that perfectly meets management specifications will not be perceived as superior quality if the customer expects better performance. Although a factory manages to fulfil some technical requirements, this will not necessarily alter the general perception of the quality provided.

Quality is product performance as perceived by the customer, not engineers or management (DeSouza, 1989). The modern view of the quality construct is more complex and sophisticated than it used to be. Exhibit 2.3 illustrates how DeSouza expresses the progress of the quality construct.

Exhibit 2.3   "Quality: The Strategic Dimension

*Sophistication of
approach*

+

Strategic
dimension   Competitive Quality
                   and Value Pricing

*The perception
of quality varies
according to the
interests of focus*

Marketing
dimension

                   Quality satisfaction
                        of Customers

Engineering
dimension   Meet

               Specifications

-

- *Environmental Complexity*   +

Source: DeSouza (1989)
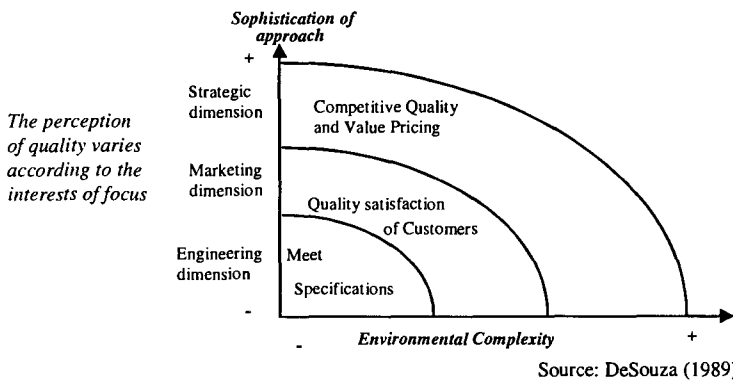
The traditional definition is called the engineering dimension and represents the groundwork in quality management. After ensuring that the products fulfil the technical requirements, the next step is to secure that these requirements comply with customers' expectations and demand, namely the *marketing dimension*. We remind that the quality work conducted according to Deming, Juran and Crosby involves the marketing dimension via the presence of customer satisfaction. In addition, DeSouza adds a *strategic dimension* - pronouncing that the quality provided must be competitive in the market place.

Troye and Henjesand (1992) have used the value chain in order to illustrate the differences in the understanding of the quality concept. Quality management will depend on the location in the value chain. During the production phase at the factory floor, technical quality will dominate. However, as the product or service proceeds towards the end consumer in the market place, aspects of more intangible nature become evident.

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Exhibit 2.4: The value chain - a framework for different concepts of quality

Quality becomes more complex along the value chain

The value chain

The "unassembled product"
-material

The manufactured product
-material
-design
-production

The received product
-material
-design
-production
-distribution

The experienced product
-material
-design
-production
-distribution
-consumption

The prosumed product
-material
-design
-production
-distribution
-consumption
-consumer processes production

"Vertical" quality
Technical quality
"Traditional" quality
Production based quality
Product based

"Vertical" and "horisontal"
Marked oriented quality
"Modern" quality
User based quality
Consumer oriented

Source: Troye & Henjesand (1992)

Both exhibit 2.3 and 2.4 show that more cues are taken into consideration of the quality construct as we move along the value chain, or from a technical orientation and towards quality in the perspective of marketers and strategists. These arguments imply that an industrial buyer of raw material will have fewer cues in his/her evaluation of quality, opposed to consumers of finished goods and services.

Troye and Wilcox (1989) stress the different dimensions of the quality construct. One extreme is the traditional technical quality approach. At the other end you find a subjective quality interpretation which highlights the customer's personal satisfaction. Between these two extremes, the authors present "inter subjective quality" - a syntheses between the two. The purpose of inter subjective quality is to reveal an objective opinion from the customer about the quality of the offering.

Exhibit 2.5: Technical - Inter subjective - Subjective - QUALITY

Who should decide what superior quality is?

1. Technical Quality (I):	Does the product meet specifications and standards.
2. Inter subjective Quality (II):	Is it a good product?
3. Subjective Quality (III):	Is the product good for you?

In a subjective quality perspective, customer satisfaction forms an important aspect of quality management. Consequently, marketing, or more specifically, market segmentation - becomes a significant tool in order to recruit customers with the proper qualifications and attitudes for asserting quality (Troye et. al., 1995). Subjective quality implies that marketing is instrumental to quality management.

Exhibit 2.6 exemplifies this point in the hotel industry. Attracting to many holiday travellers - a segment in which the business hotel does not target its service effort, causes the poor average quality score.

Exhibit 2.6: Subjective quality and segmentation

"Segmentation is an important tool to recruit customers with the proper "qualifications" for ascertaining quality"

Troye et. al (1995)

The level of quality

Hotel A

Hotel A aggregated

Business hotel aggregated

Business hotel

Evaluations among customers

Business travellers   *Holiday travellers*
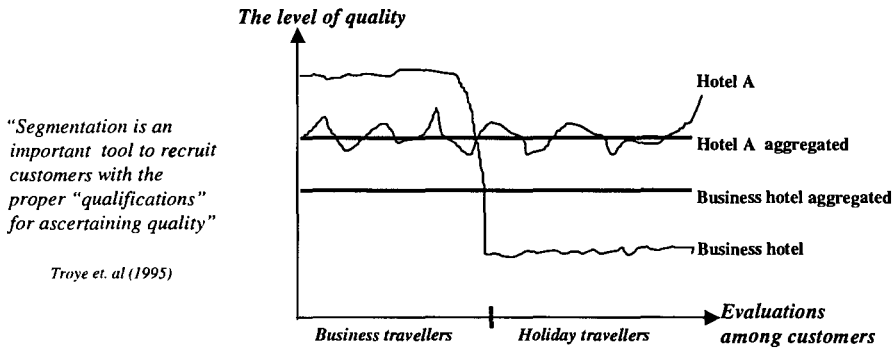
Exhibit 2.7 summarises the various quality concepts discussed. It also presents an overview of the criteria providers, and the judges. The former group is responsible for creating superior quality, whereas the latter group evaluates and decides the success of the effort.

Exhibit 2.7: Various quality concepts

Quality concept	Definition	Criteria providers	Judges
"Self evident"(Bowbrick) Transcendent (Garvin)		the individual	no one
Production based *"Conformance quality"* *"Vertical quality"* (Bowbrick 1992) (Garvin 1984) (Abbott 1954) (Crosby 1979)	*"Conformance to requirements"*	Engineers	Engineers Quality experts
Inspection based (Bowbrick 1992)	*"Conformance to requirements"*	Consumer organisations Pressure groups	Authorities, Quality experts
Product based	*"Conformance to requirements"*. *"Fitness for use"*.	Engineers Consumers	Engineers Consumers
User based Market oriented *"Perceived quality"* *"Horizontal quality"*	*"Fitness for use, given the needs of the consumer"* (Wimmer 1975; Box 1984)	Consumers	Consumers Experts Producers Sales men
Quality I, II, III	Technical (Quality I) Intersubjective (Quality II) Subjective (Quality III) (Troye & Wilcox 1989) (Troye 1994)	Experts Consumers	Engineers Consumers
Competitive quality	*"Relative perceived quality compared to competitors"* (PIMS) (Buzzell & Gale 1987) (DeSouza 1989)	Consumers	Producers (i.e. Marketing manager) Consumers

2.2   The quality construct - A customer based approach

Quality is ballet, not hockey. Quality has much in common with sex.

Crosby (1979)

The previous section shows that the literature on quality and service management offers several definitions and concepts of quality. We also find various approaches to quality measurement and management. Garvin (1987, 1988) denoted the specific interest in quality research as a "quality movement". The general assumption behind the research is that quality can be inspected and controlled. Quality problems can be detected prior to delivery (Troye et. al., 1995). This view is consistent with the «manufacturing-based» definitions (e.g. Crosby 1979, Gilmore, 1974), and «product-based» definitions of quality (e.g. Abbott, 1955).

Troye et al. (1995) referred to this view as "objective quality" because it is assumed that quality is inherent in the product. Objective quality is basically determined independently by the customers. The main criterion of "objective quality" is not that it satisfies the customers, but instead that the quality meets the technical specifications and requirements decided by engineers and management. Superior "objective quality" may then be equivalent to absence of problems and no discrepancy between standards and measured attributes (Troye et. al., 1995). Objective quality does not consider whether people want the product, or if the present customers are satisfied with the offering.

From a marketing perspective, it is necessary that perfectly produced products and services also are desirable in the market place. If the customers do not like the products offered, they simply will not buy them. Thus, technical or "objective" quality may not be related to economic performance. Troye et al. (1994) suggest that quality often starts where the problems end. Thus, absence of problems is necessary, but not sufficient.

In the following section, we will show how quality can be divided into four separate elements or dimensions suggested by Troye (1990): Production, product, service and prosumption.

Troye et al. (1995) hold that it should be possible to formulate theoretical quality standards for the Backstage (Production) and Structural (Product) elements of a specific service or a product (see exhibit 2.9). However, they regard it as more difficult to establish equivalent standards related to interaction (Service) and prosumption. In the case of the two latter dimensions, consumption and production coincide. It is the production and consumption process itself that provides satisfaction, not the more or less passive consumption of tangibles (Troye et. al., 1995). Customers may differ, both in terms of what they require from a product and how they perceive it. Exhibit 2.6 illustrates that perceptions will vary according to segments. An objective approach to quality ignores customers' preferences.

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Our research problem is to evaluate <u>if and how</u> quality is related to economic measures. We hypothesise that quality eventually will benefit economic performance. Thus, we emphasise the predictive validity[1] of the quality construct. Superior objective or inter-subjective quality (cf. table 2.6) does not imply that the product satisfies the market or the individual customer's requirements[2]. In a free market economy where customers maintain the freedom of choice among a great variety of products and services, it would be difficult to obtain economic success without consulting their needs and preferences. This represents our main objection regarding an objective and technical quality approach – it ignores the "blood" of the business.

We will argue that our research perspective requires a customer-orientated concept. First, we find feedback from customers valuable in order to establish potential relations towards economic measures. It is neither the quality experts nor engineers that purchase or repurchase the products or services a company offers. Eventually, it is the demand in the market place that determines economic performance. We basically find it more reasonable to ask the market directly. Why should experts have better knowledge regarding customers' needs and desires rather than the customers themselves? Our understanding emphasises the core of the quality philosophy formulated by Deming, Juran and Crosby (c.f. exhibit 2.2): <u>Satisfied customers</u>.

Quality and customer satisfaction are often perceived as similar constructs. It is difficult to discriminate, one from the other (Zeithaml and Bitner, 1996). We expect that the quality of an offering will be reflected in customer satisfaction scores. Consequently, satisfaction is used as an indicator of quality (e.g. Troye et. al., 1995). Zaltman, Pinson, and Angelmar (1972) have pointed out the difference between satisfaction and quality: Products (and product elements) <u>have</u> quality, whereas customers <u>experience</u> satisfaction. However, this distinction does not necessarily affect a belief that the quality elements are reflected in customer satisfaction (e.g. Troye et. al., 1995).

Customer satisfaction scores reflect quality
The ServQual-approach (Parasuraman, Zeithaml, and Berry, 1988) assumes that attitudes, satisfaction, and perceived quality reflect different cognitive phenomena in individuals' cognitive make up. In our work we will follow the guidelines provided by Troye et. al. (1995). They argue that variables such as attitude, satisfaction, perceived quality, intentions and purchase on one side, and quality on the other, represent phenomena at different levels. Moreover, each respondent's satisfaction with the various quality dimensions is relevant for understanding each person's total evaluation, intention and behaviour with regard to the offering in question.

More specifically, the means and standard deviations of customers' satisfaction scores related to the various elements of a product, reflect the quality dimensions and acceptance in the market place. High means and low variance in customers' evaluations suggest high quality. Low means combine with high variance indicate inferior quality (e.g. Troye et. al., 1995).

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[1] See Troye, Sigurd V. (1995). Teori og forskningsevaluering: Et kritisk-realistisk perspektiv.TANO.
[2] See Troyes chapter 16, page 324 in Jacobsen & Viken (red): Turisme. Fenomen og næring. 1997.

The prosumption perspective inherent in this approach has implications for both measurement and management of quality. Not only is the customer a participant in the production process, she also represents the «expert» who informs us about the quality of the offering. In fact, the approach suggests that quality only can be properly «inspected» and monitored by asking customers to give their evaluations of the various facets of the product experience. Hence, a reasonable method of quality measurement should be customer surveys (Troye et. al., 1995).

Basically, the final understanding and measurement of quality is based on the theoretical and empirical work carried out Troye et al. (1990. 1993, 1995). Exhibit 2.8 illustrates how the conceptual link between quality and customers satisfaction is visualised.

Quality entails features related to the product. However, we assume that these are reflected in perceptions of satisfaction in the customers' minds.

Exhibit 2.8: A conceptual linkage: Quality and customer satisfaction

Troye et. al. (1995)

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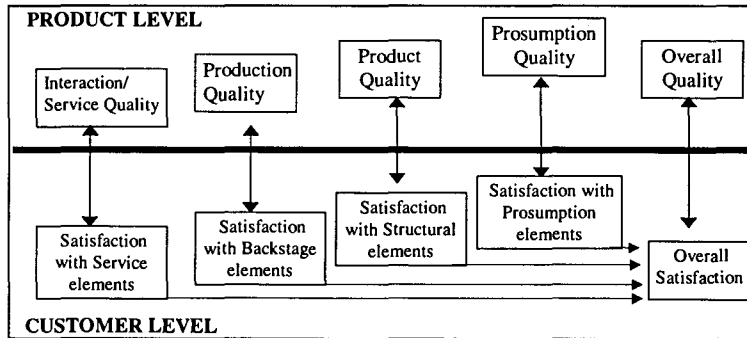
2.3   The quality construct - the offering as a multi-element product

The model presented in exhibit 2.9 has been developed by Troye (1990) and has principally been applied in the tourism industry (Troye and Henjesand, 1991, 1993, and 1994). Recently, the model has been tested and discussed in areas such as education, banking and auditing (Sandvik, 1997). We will concentrate upon examples from its application in the hotel industry. Troye (1990) gives a more thorough presentation of the typology and its underlying rationale.

Hotel accommodation represents the empirical setting of our study. The product is conceptualised as a result of interaction between traditional production factors – i.e. personnel, raw materials and production facilities (se exhibit 2.9). However, as the service literature holds (Eiglier, Langeard, Bateson and Lovelock, 1979; Levitt, 1972; Lovelock, 1988; Shostack, 1977; Uhl and Upah, 1983; Zeithaml, Parasuraman and Berry, 1985, and Alvin Tofler, 1980), a bed night is not simply consumed. Services should be conceived of as inputs into a continued production process after being purchased. This perspective presents a change in the view of the buyer. He or she is not only a consumer or user, but also receives the status of a «prosumer». A prosumer is a person who simultaneously produces and consumes (Kotler 1986, Toffler 1980, Troye 1990).

This alternative perception of the buyer also implies a changed perspective of the product and a modified view of the needs products satisfy and the values they serve. As the production process is of considerable concern to the manufacturer, the prosumption process is crucial to the prosumer (Troye et. al.). The buyer does not only receive a simple physical product consisting of identifiable, tangible properties, but the person also participates in a prosumption process.

The hotel guests participate in the production process - they "prosume"

This perspective appears particularly appealing in the case of hotel accommodation. A hotel does not only offer beds and meals. It also provides opportunities for exercise and entertainment. The latter requires participation and activity from the customers. Generally, most of the offering involves both employees and customers. Instead of the traditional view of a passive customer, the concept of an active prosumer should be appealing to the hotel industry. The success of hotels and other similar services relies on how the providers manage to motivate the guests to utilise all the product aspects and attributes available.

Exhibit 2.9 from Troye et. al. (1995) distinguishes between the various elements or sub elements that the hotel product can be partitioned into. The figure also refers the various dimensions or adjectives that the authors suggested to characterising them. They have divided the product elements that result from the production and consumption processes into four parts:

The *Service or interaction elements* are said to represent the very essence of what is normally considered «service». It is basically the outcome of customers' interacting with service providers such as receptionists and waiters. The production of the service element demands the presence of the guest to take place. Troye et al. (1995) emphasise that the interaction elements are similar, but not identical, to instances that Deighton (1992, p362) refers to as «Consumers Participate(ing) in Performances». They argue that the quality of the interaction elements may be called «interaction quality», relationship quality, or simply *«service quality»*. We will refer to this item as <u>service quality</u>.

Production
Quality Factors:
-Raw material
-Efficient equipment
-Technical skills of
employees

With the aid of raw material, and/or equipment, the employees produce the items denoted *backstage elements*. Food, written information and cleaning are typical examples. In contradiction to service quality, these elements can be produced «back stage» without any involvement or presence of the consumer (Troye et. al., 1995). The relevant operations are conducted back stage.

It is also noted that the backstage elements sometimes are produced prior to purchase and in other cases they are prepared during the purchase. Moreover, the backstage elements are not produced «once and for all», but they are a result of a production process that more or less coincides with the purchase and use experience. We therefore label them: Production quality. (Troye, 1990)

Product Quality
Factors:
-Building
-Rooms
-Swimming pool
-Physical facilities
-Maintenance

Furthermore, there are aspects that require little involvement, neither from the customer nor from the service provider. Physical facilities like lounges, guestrooms, lobbies, etc. demand presence more than activity to render utility. If the market is properly segmented, there might be little variation with respect to what is required from these facilities (Troye, 1990). These aspects and the level of satisfaction they accommodate are primarily determined by the long-term investments and maintenance attitude of the hotel. They cannot easily be changed in the short run and we have used the label: structural (Troye, 1990). According to Troye et. al. (1995), the structural elements constitute a clear-cut case of what Deighton (1992, p.362) describes as «Products Perform for Consumers». In contrast to the back stage elements, which are produced and made available more or less simultaneously with the service encounter and use experience, the structural elements have an existence independent of the individual customer (Troye et. al., 1995). Troye et. al. (1995) use the following quote from Deighton (1992) to describe the essence of structural quality: It exists as «frozen potential for performance». Structural items are said to be similar to finished products because they require limited activity from both the seller and the buyer - once they are produced and delivered. Thus, Troyes' (1990) label: "product quality" should be an appropriate notation for the quality associated with the structural elements of a hotel offering.

The prosumption elements in this framework represent a challenging area from the perspective of quality management. These elements are described as the outcome of facilities, equipment, natural resources and surroundings that are available to the guests. It requires activity rather than passive presence to exploit offers such as gym facilities, hiking trails, and various sources of entertainment. The guests have to be

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actively involved in order to benefit from these "concealed offers". The examples make it evident that the customer both <u>pro</u>duces and con<u>sumes</u> such offerings simultaneously (Tofler 1980). Consequently, Troye (1990) assigned the term prosumption quality to them. However, the fact that the tourist is expected to be actively involved introduces an additional source of variation and uncertainty. In the interaction between the customer and the service supplier (i.e. Service Quality), Troye (1990) anticipates that the service provider may be able to adjust and control the situation. However, in the case of the prosumption elements, the customers are generally left to themselves. It is proposed (Troye, 1990) that the satisfaction derived from these activities will vary both as a function of what the guests do and what they prefer. Troye et. al (1995) points to Deighton´s framework for classifying performances because the guest dependent elements both consist of cases where «Consumers Attend Performances» (e.g. sporting contest, music concerts», etc.), and where «Consumers Perform with Products» or perform with facilities made available by the firm. Troye et al. (1995) emphasise that it is the active use or the prosumption that determines the quality of this product element, hence the notation: Prosumption quality. The service provider has less control in this process.

Prosumption Quality Factors:
-Information
-Motivation
-Segmentation

We believe quality management of the various elements pose different challenges related to cost control and economic performance. The customer is the key factor of the economics of any business. Thus, we find it particular relevant to consult them in a study, which focuses on economic measures and financial success. Troye's model (1990), illustrated below, complies with these requirements.

Exhibit 2.9: A framework for understanding the elements of a product and its quality.
(Numbers in parentheses indicate which production factors each set of elements results from)
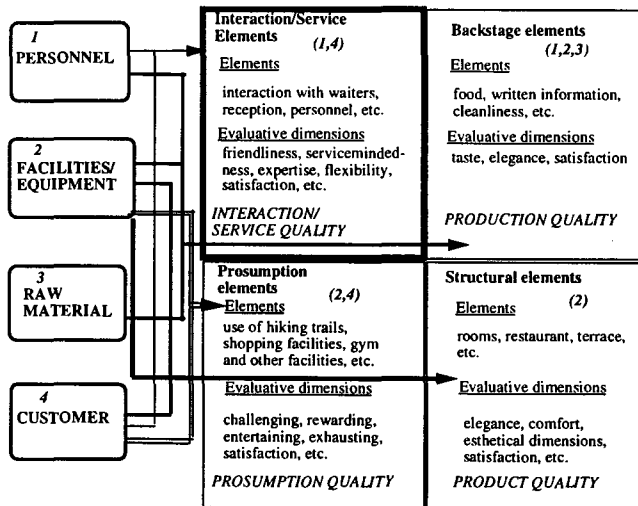
Source: Troye et. al. (1995)

Chapter 3: Economic performance

Although the importance of the performance concept is widely recognised, the treatment of performance in research settings is perhaps one of the thorniest issues confronting the academic researcher today.

Venkatraman and Ramanujam (1986)

Economic
Performance:

- for whom?
- what is it?
- measurement?

The overall objective of this survey is to assess whether successful quality has a positive impact on economic performance. Although economic performance or financial success might be less confusing than the quality construct, there are many similar issues to address. First, we have to decide who should judge the economic performance of an enterprise. Second, we have to establish a valid construct, which measures economic performance in the eyes of the relevant party. Finally, the traditional challenges concerning measurement remain. The objective of this chapter is to discuss various ways of understanding economic performance, which are appropriate to our research problem. The discussion leads to a few options that are believed to be both relevant and workable.

3.1 Economic performance - who is asking?

It should be reasonable to argue that economic performance often is viewed differently by various interest groups. The organisation or firm may be seen as a political arena where various interests compete (Robbins.1988). Efficiency or performance, measures the ability of the firm to satisfy the demands from its business environment (Pfeffer and Salancik, 1978). An outline of the traditional parties demanding financial statement information might be useful to identify such groups. The fact that they demand financial information suggests that they have a specific interest in the financial performance of the firm. Foster (1986) proposes six specified interest groups that demand financial information. The perspective and objectives of these groups differ.

Shareholders normally appreciate after tax profits and dividend payments. However, dividend payments represent cash outflow and imply less security for the lenders' credits. Managers often focus on growth because the size of the firm will boost their salaries. Employees probably prefer a steady business performance, providing few changes and high job security. The authorities should be concerned by the amount of taxes paid by the firm, its ability to create jobs, and finally the spin off effects on the economy as a whole. Jensen and Smith (1985) provide an overview of the issues in this area. Table 3.1 lists the groups Foster (1986) highlights together with an indication of a possible economic performance focus.

We have also attempted to include a quality perspective in the table. The idea is to assess how a quality strategy, blend in with economic performance and the various interest groups. A study of Phillips et. al. (1983, PIMS) suggests that superior quality provides better return on investments. Luchs (1986) claims that production of superior quality products imply better growth and higher return than the competition. Thus, both studies hold that shareholders and managers should be positive to a quality strategy. However, Rust et. al. (1995) indicate that some quality orientated firms go bankrupt. They suggest that a quality focus requires resources and investments and thus is a risky strategy to pursue. If we believe the bankruptcy cases discussed by Rust et. al. (1995) were caused by too much focus on quality, employees, lenders, suppliers, customers and governments should be more reluctant towards heavy investments in quality improvement programs. These four groups (3-6 in table 3.1) do not receive much of the upside of a risky quality investment. Still, the downside will concern all parties.

Table 3.1: Economic performance - for whom?

<table>
<tr><td></td><td>*Interest Group*</td><td>*Economic Performance focus*</td><td>*Focus on superior quality*</td></tr>
<tr><td>*No conflicts in the long run?*</td><td>1. Shareholders and investors
2. Managers and Executives</td><td>Return on investment
Sales and salary growth</td><td>No conflict:
Phillips et al. (1983)
Luchs (1986)</td></tr>
<tr><td>*All the goals will eventually coincide*</td><td>3. Employees
4. Lenders and suppliers
5. Customers
6. Government/society</td><td>Job security and salary growth
Stability, low risk of bankruptcy, growth
Stability, low risk of bankruptcy
Tax revenues, employment, growth</td><td>Conflict:
Cases of bankruptcy:
Rust et al. (1995)</td></tr>
</table>

Although, these performance focuses are not identical, a successful firm should be able to satisfy all the various groups simultaneously. There might be a potential conflict between the owners/investors on one side and the employees/management on the other side. These two groups are basically sharing the same cake - namely the value added generated from the operation. Higher compensations to the staff imply less return to investors -cet. par. Various forms of bonus schemes are frequently introduced to alleviate this short term conflict of interest. Copeland et. al. (1994; p22) writes:

> Empirical evidence indicates that increasing shareholder value does not conflict with the long-run interest of the other stakeholders. Winning companies seem to create relatively greater value for all stakeholders: customers, labour, the government and suppliers of capital.

Quality requires investments

These investments are not risk free

There is also a potential conflict between the debt and the equity holders. Often, the debt holders receive a fixed interest fee on the capital they provide. This fee is not necessarily adjusted according to the changes in operating risk of the company. The equity holders, on the other hand, get full risk compensation. Thus, the equity holders might be interested in taking on more risk than the debt holders. If we follow Rust et. al.'s view, that quality is a risky investment and not a free lunch, the debt holders should prefer a costleadership strategy. The equity holder, on the other hand, should be less reluctant to quality investments, providing a higher earning potential.

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Investment banks have designed financial instruments and arrangements, which fill the gap, and reduce the potential conflict between debt and equity holders. A flora of financial instruments, classified as something between debt and equity, has been created by analysts or so called financial engineers. These instruments are often refereed to as equity-linked hybrids or mixed securities. They are said to blur the traditional line between stocks and bonds (Ross et. al., 1996). Preferred stock, high yield bonds (junk bonds) and various convertible instruments are some examples. These securities serve as a buffer between the traditional low risk debt and the high risk equity financing. Although the instruments normally do not give the capital provider any formal influence over the company, there are situations in which the debt holders may have a strong influence on a company's future. A distressed firm is an obvious example. Thus, the contrast between equity and long term debt has been more difficult to establish. In order to avoid the problem, it is possible to view the performance in the eyes of the long term capital providers. In a well developed capital market, the interest of the long term capital providers should coincide.

Customers, suppliers and the governments' assessments of a firm's economic performance have restricted relevance in a discussion of the relationship to the service or product quality dimension. Although, they might have a strong perception on how they view the economic performance of a certain company according to their concerns, these groups have limited opportunities to influence the strategy of an individual firm. More specifically, the groups have minor control of the firms' attitude towards quality and customers satisfaction - i.e. they have limited responsibility for the variables we are going to study. Their main concern is minimal risk. Nevertheless, both authorities and suppliers will benefit from a growing company. So, if Luchs' results (1986) are valid, both suppliers and governments[3] should applaud a quality focus. If Rust et. al.'s view is more relevant, these parties should be more reluctant.

The owners are the most important group to consider

1. They have influence
2. They acquire the risk involved

The owners and other capital providers normally have the ability to make decisions affecting the economic performance of the firm. Even in situations where management dominates the firm, the capital providers still have to accept most of the risk associated with the variation in performance. Thus, in order to establish a performance construct, which is sensitive to the actual development of the company, the owners and long term capital providers should be the most appropriate groups to consider.

Our interpretation of economic performance will highlight the strategic groups of which the firm is most dependent. Copeland et. al.(1994) suggest that this strategy will benefit the other stakeholders as well. The performance focus is similar to Pfeffer and Salancik's (1978) organisational efficiency construct. They emphasised the firm's ability to satisfy the demands from its business environment and thus the significance of prioritising the most important groups.

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[3] Linking quality and government policies might seem odd. However, the quote from George Bush shows that the politicians "think" of everything, even quality.

3.2 Economic performance - what is it?

To discuss the construct of economic performance further, we will remain at the perspective of the capital providers - the most important strategic group to consider. We still believe quality programs require investments and costs.

If we ignore the time value of money, accumulated revenues (benefits) minus accumulated expenses (sacrifices) should represent the economic performance of an enterprise during its lifetime. Likewise, we could evaluate the economic performance of a quality program as benefits minus sacrifices. This position can be found in the accounting discipline where economic performance is referred to as profitability. Foster (1986) defines profitability as follows:

> Profitability refers to the ability to generate revenues in excess of expenses.

Thus, profitability is similar to economic performance for an accounting year. In fact, the traditional profit and loss account is prepared on the theory that the company was created by its shareholders and exists for their benefit (Worth, 1976). The objective of the profit and loss account is to measure the revenues (benefits) and the expenses (sacrifices) during a certain time interval. Thus, the concept should be applicable in order to evaluate the economic performance of a quality program. However, within the interval of an accounting period, the time value of money is not exposed.

The time value of money concept simply asserts that benefits today are better than equivalent benefits tomorrow.[4] From this principle it follows that a future sacrifice is preferable to an equivalent sacrifice today. Ross et. al. (1996) claim that it is one of the most important concepts in all of corporate finance. Thus, if we want to assess economic performance over a longer period, it is important to incorporate the time value of money into the understanding of the economic performance construct.

Let us assume that an enterprise has sacrificed $1 to obtain an improvement in quality at time 0. The result of this sacrifice (investment) is hopefully a stream of net benefits in the future. These benefits include changes in revenues and costs, which accrue to the firm as a result of the sacrifice (investment in quality). The flow of such net benefits at time θ can be denoted as $f(\theta)$. Thus, the relationship between the benefits (revenues) and the sacrifices (investments) can be expressed in mathematical terms as:

eq.3.1 $\int f(\theta) \exp(-r\theta) \, d\theta = 1.$

If we assume that the integral is monotonically decreasing in r, then the unique solution of r will represent the economic return of the quality effort (Fisher and McGowan, 1983). Furthermore, if we anticipate that r represents the time value of money and Q denotes the sacrifice, the economic performance can be expressed as:

eq.3.2   Economic performance $= -Q + \int f(\theta) \exp(-r\theta) \, d\theta.$

---

[4] The concept is described in most textbooks on Corporate Finance.

The mathematical presentation above is in fact a continuous presentation of a net present value and an internal rate of return calculation. Internal Rate of Return is the discount rate, which result in a Net Present Value (NPV) of zero. If we assume that the quality effort of one dollar had an economic lifetime of t-years and provided a net benefit in year i equal X_i, the internal rate of return could be found by solving the equation:

Does our quality effort increase Economic Performance?

$$eq.3.3 \qquad \sum_{i=1}^{i=t} X_i/(1+r)^i = 1$$

We don't know the appropriate discount rate, nor the proper time frame.

Accordingly, we can express the economic performance (or NPV) of a quality related sacrifice denoted Q with a time value of money equal r as:

$$eq.3.4 \quad \text{Economic performance} = \quad -Q + \sum_{i=1}^{i=t} X_i/(1+r)^i$$

The economic discipline applies this understanding of the economic performance construct. Most textbooks in economics argue that the best choice between two projects or investments alternatives is the one that offers the highest Net Present Value. However, one major problem remains. How shall we evaluate the economic performance of an ongoing quality program in a going concern?

If we had perfect and complete information about the future benefits and sacrifices from a quality project, we could just plug these variables into the equations. However, in a real life situation or in an empirical study, this is never the case. Future earnings and sacrifices are often uncertain and difficult to establish.

An alternative is to apply a performance construct that totally ignores the future. In essence, this implies that we evaluate the economic performance measure solely on the basis of historical performance and disregard the aspect of future potential.

From a practical point of view, the latter approach to economic performance is rather tempting. However, from a theoretical position, it seems to be difficult to justify that the future of an ongoing quality program is irrelevant in an assessment of its performance. So, even if future development is inherently uncertain, we rather acknowledge that a performance construct somehow needs to consider the potential benefits of a company's investments.

We advocate that the economic performance of a quality effort is based on four elements.

Table 3.2: The basic elements in the construct of economic performance

1. Benefits or revenues
2. Sacrifices or investments/expenses
3. The time value of money
4. Growth potential of future net benefits

This understanding of economic performance has formed the framework for other disciplines comprehension of the construct. Strategic management, accounting and finance normally base their economic performance evaluation on the basic elements above. Although the focus is somewhat different, it appears to be a consensus among the various disciplines regarding the understanding of the economic performance. Finally, all the disciplines face the same major challenge: How shall the future development be assessed and accounted for? This question is especially relevant in a quality investment situation. Most managers perceive quality management and quality improvement as a necessary and long term investments. Nevertheless, at some point in time these investments have to be justified by black accounting figures. Long run future potential may justify any investment, and in the long run we are all dead (Keynes 1936).

Table 3.3 indicates how various disciplines understand and measure the concept of economic performance. They all focus on benefits related to sacrifices - i.e. return (benefits) related to expenses (sacrifice).

Table 3.3: Economic performance and research discipline

	Research discipline	*Economic Performance focus*
Economic	1. Economics	Return on total capital invested.
performance	2. Finance	Return on equity/stock value.
is less	3. Strategic Management	Return on total capital invested.
confusing	4. Accounting	Return on capital invested according to provider.
than quality	5. Marketing	Return on total capital invested/Market share, Margins.

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3.3 Economic performance - how shall we measure it?

Although, the various disciplines seem to agree upon the basic principles of economic performance, there are substantial differences on how to measure the construct. All disciplines have their specific approach and thus apply these in various empirical researches.

Equations 3.1-3.4 represent a theoretical approach to economic performance and rate of return. The problem is to obtain reasonable estimates of the input variables. This is especially challenging in our study - i.e. to find reliable data which are valid to the economics of quality.

3.31 Economic performance - a market based measurement approach

In the financial disciplines, the return to the capital providers' is often the focus of interest. Hence, equation 3.1-3.4 might be especially applicable. Given that the capital provided to a certain firm can be traded in a well developed financial market, data from these trades would provide fair estimates of the sacrifices, benefits and the time value of money associated with each type of capital. Jacobson (1992) states that business performance at the corporate level is widely assessed by return, through changes in the prices and dividends to shareholders and debtors. Thus, if the market is efficient, the economic performance and returns on various capital investments can be evaluated on the basis of the trading records.

The trading records offer ex post performance information. In efficient markets, the price quotes will reflect expectations of the future development. However, the market data will normally refer to the economic performance and return at the corporate level. Our research problem requires refined information about the economic performance at lower levels, such as corporate divisions, single strategic business units, specific products and certain strategies.

Our problem requires refined measures
The divisions and strategic business units comprising a corporation are often diverse. Performance analysis, grouping these entities together, do not yield the insight needed with respect to strategic decision making (Jacobson, 1992). For instance, in order to evaluate whether IBM's PC strategy has fuelled economic performance, data referring to the market performance of the entire corporate debt and equity would provide limited insight. These numbers would not only include information about the strategic decisions implemented in the PC division, but also the effects from strategic choices concerning other products and services offered by the IBM corporation. A potential effect of IBM's quality related work would disappear into the aggregated performance measure.

Large multinational companies are probably the only companies where most of the long term debt and equity are traded on a regular basis. Consequently, economic performance of such firms could be evaluated on the basis of the information

submitted by the trading record in the capital markets. Unfortunately, these
companies are normally heterogeneous in their operations. So, even if it is possible to
calculate rather accurate measures of the economic performance for such firms, these
measures represent the economic performance of a bundle of activities. Generally, the
relevance related to strategic decision making would be questionable - especially their
ability to tune in the economics of quality.

Due to the heterogeneity at the corporate level, economic performance or profitability
analysis is often undertaken at the SBU level (Strategic Business Unit). The absence
of capital markets at the SBU levels suggests that a measurement other than those
based on security prices must be developed. Capital markets seldom evaluate the
equity and long term debt of private companies or small and medium size firms.

Finally, many studies have applied return on equity as the crucial measurement of
performance. The advantage of this approach is the easy access most countries can
offer to the trading records of a vast number of securities. However, return on equity
mixes operating performance with financial structure. Our concern is to evaluate the
economic effects of successful quality. We believe this issue is closer related to the
operating achievement of the firm, rather than the financial performance of the equity
holders.

3.32 Economic performance - an accounting based measurement approach

The lack of appropriate markets to evaluate companies' and SBUs' performance
through trading records is the reason why accounting based measures are widely
regarded. In particular, James Reese and William Cool (1978) hold that accounting
return on investments is the most useful measure and the ultimate «bottom line» test
of business performance. Accounting return on investments is both used as an
objective of management and as a dependent variable to evaluate the effect from
various factors on performance - such as for instance quality and customer
satisfaction. Despite or because of its popularity, accounting based return has been
extensively criticised as being totally inappropriate of measuring economic
performance (G.C. Harcourt, 1965; Ezra Solomon, 1971; Franklin Fisher and John
McGowan, 1983, Brealey and Meyrs, 1996). The critique is based on the fact that the
income figures in the profit and loss account do not properly relate to the investments
that produce them. The accounting earnings are caused by investment decisions made
in the past, whereas the assets can be expected to influence, not only the past and
current earnings, but also the revenues in the future. Due to these shortcomings,
some authors hold that accounting based economic performance and return estimates
are so seriously flawed that they bear little if any resemblance to the crucial concept of
internal or economic rate of return. The limitations of accounting based return on
investment are said to be so severe that its cross sectional variations can be
completely explained by the inappropriateness of the measure (Jacobson, 1987). This
critique has lead Fisher and McGowan (1983) to characterise ROI as «totally
misleading enterprises», George Benston (1985) has used the label: «of doubtful
value».

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However, given that the accounting data do not provide any information regarding the economic performance or profitability of the firms, what then? Is it possible to use equation 3.1-3.4 to calculate the economic return or performance of every item that comprise a firm or a SBU? Fisher and McGowan admit:

> The economic rate of return is difficult - perhaps impossible - to compute for entire firms. Doing this requires information about both the past and the future which outside observers do not have, if it exists at all.

Consequently, the critique of accounting data is relevant. However, the examiners do not suggest any feasible alternatives. The supporters of accounting based performance measures argue that the noise created by the accounting distortions do not need to haul out the underlying signal of economic performance contained in accounting numbers. Therefore, ROI might still be appropriate (F.M. Scherer, 1979; William Long and David Ravenscraft, 1984). Also, the literature provides substantial evidence regarding a significant correlation between accounting earnings and return on securities. In an early exemplar of such studies, Ball and Brown (1968) demonstrated that the information contained in the accounting based annual income numbers were beneficial because they are related to the stock prices. Jacobson (1987) claims that his findings suggest that accounting based ROI is a useful and perhaps best available indicator of business performance. He acknowledges that the ROI measure has serious limitations, but still provides information as to the economic rate of return.

Accounting based performance measures are not perfect, but still the best there is

We do not believe that accounting based measures are irrelevant in an investigation of the economics of quality. Most PIMS studies depend on these measures - ROI in particular. Phillips, Chang & Buzzell (1983) found that product quality had a direct impact on ROI in three out of six product areas. However, both at the company level and in certain SBUs, ROI might be disturbed by many factors apart from product or service quality. Even if we disregard the problems associated with valuation of the underlying assets and classification of revenues and costs, variation in ROI may still be caused by a rich assortment of factors. The ROI of a company or a SBU is certainly not a refined measure. It might be too general for our purpose.

3.33 Economic performance - a value based measurement approach

Value is the best metric of performance that we know

Copeland et. al. (1994)

The basic challenge in order to retrieve information about economic return or performance of an enterprise is to assess the value of the capital employed. Thus, the literature concerning the valuation of companies inherits the problem of assessing economic performance. The market value at any point in time measures perceived future value creation expectation. In a well functioning market economy, the economic performance or the net benefits provided by an operation should be completely reflected in the value. Thus, Copeland et. al. (1994) hold that value is the best metric of performance that we know.

Copeland et. al. (1994) advocate two basic frameworks for valuation which attempt to assess the performance of an enterprise. These two frameworks are denoted as the entity discounted cash flow model (DCF) and the economic profit model. Both models are said to rely on cash flows. According to the authors, they provide a more sophisticated and valid picture of the company's value, than the pure accounting based approaches. Cash flow figures are less exposed to distortion created by the ability of management manipulation (see chapter 4). They might be a reasonable alternative to the widely criticised ROI.

a) The discounted cash flow model (DCF)

The entity DCF model assesses the equity of a company as the value of its operations less the value of the debt and other investors' claims that are superior to common equity. The values of operations and debt are equal to their respective cash flows discounted at rates that reflect the riskiness of these flows. The challenges, however, is to establish the proper discount rates which reflect the riskiness of each cash flow stream. If we manage to do this, the entity approach will result in exactly the same equity value as if we directly discounted the cash flow to the shareholders. The entity model is said to be especially useful when extended to a multi-business company. It basically determines the value of the equity as the sum of the values of the individual operating units, plus cash generating corporate assets, less the costs of operating the corporate centre and the value of the company's debt and preferred stock. This framework helps to acknowledge the separate investments and financing sources of value to the equity holders. More importantly, the authors suggest that their approach help to pinpoint key leverage areas in the search of value creating ideas and activities. Thus, the approach might be helpful in our investigation of the economics of quality. However, the method does not only require the specific cash flow figures related to a quality program, but also an appropriate discount rate. This represents an ambitious empirical task.

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The main difference between a DCF approach and a purely accounting based measure of performance is basically the use of free cash flow instead of net earnings as the fundamental element in the performance evaluation. Free cash flow is equal to the after tax operating earnings of the company, plus non cash charges, less investments in operating working capital, property, plant and equipment, and other assets. The free cash flow construct does not include any financial expenses, such as interests and dividends. It is simply the cash flow that is generated by the company's operation and is available to the capital providers, both debt and equity holders. Hence, free cash flow equals the sum of cash flow received from or paid to the capital providers. The discount rate applied to the free cash flow should reflect the opportunity cost to the capital providers, weighted by their relative contribution to the company's total capital. This is called: the weighted average cost of capital, denoted by WACC. The opportunity cost to a class of investors equals the rate of return the investors could earn from other investments of equal risk. By projecting the future free cash flow of the firm and discount it back by the WACC, we obtain the value of the firm.

DCF avoids some of the problems related to timing, recognition and classification of financial items

However, we are not immediately concerned by the value of the firm, but instead its economic performance related to a quality strategy. Free cash flow should be a reasonable measure of economic performance, whereas discounted free cash flow indicates the value of the firm. Apparently, it is only the discount rate that differentiates the two measures. To ignore the time value of money does not comply with our previous discussion of the economic performance construct. We hold that discount rates are relevant in the measure of economic performance. Consequently, economic performance and value are basically the same thing.

Value depends on expectations

Economic performance is more concerned with the past and present

If there are any differences between value and performance, it might be that valuation is more focused on expectations, whereas economic performance emphasises the past and the present. Thus, firms with modest economic performance may obtain high market values based on expectations. The information technology industry provides numerous examples. In the other end we find cyclical and mature industries. Despite terrific past and present economic performance, these companies are often traded at low values.

The increase of the firms' value during a certain time period can be measured through the economic profit of the period, plus the change in the value creation expectations. Thus, measuring economic performance instead of value basically means that we emphasise the past and the present slightly more than the future potential. Nevertheless, it is reasonable to believe that the underlying drivers of these two constructs are similar.

Discounted free cash flow is referred to as a main value driver of a business (Copeland et. al., 1994). Consequently, this measure should also be of key interest when we assess economic performance. There are two factors, which are crucial to the development of the discounted free cash flow. These are return on capital invested and growth.

First, a company that earns higher profit for every dollar invested in the business will be worth more than an equivalent firm earning less profit. Second, a fast growing company will be more valuable than an equivalent slow growing enterprise. Thus, both return on capital and growth have a positive effect on value - cet. par. Both measures should be relevant in the relationship between quality and economic performance. If successful quality increases the growth rate, it should also benefit economic performance.

Copeland et. al. (1994) summarise their discussion on value drivers by pin pointing four factors which increase the value of a firm. We will argue that these factors also are key drivers of economic performance.

There are several ways to increase economic performance

1.	Increase the levels of profit it earns on its existing capital in place (i.e. boost return on capital employed)
2.	Increase the return on new capital investments.
3.	Increase its growth rate, but only as long as the return on new capital exceeds WACC.
4.	Reduced its cost of capital.

Quality might affect them all

The objective of this study is to assess whether successful quality can be perceived as a fifth factor of economic performance. Phillips, Chang & Buzzell (1983) claimed that quality fuel ROI (comply with 1.). Rust et. al. (1995) indicate that return on quality often is higher than WACC, and Luchs (1986) says quality increases growth (comply with 2 and 3.) Finally, it should be reasonable to believe that quality and satisfied customers have a positive effect on repurchase. More repeaters imply stable revenues and thus a lower risk to capital providers. Lower risks associated with a stable income will probably reduce the cost of capital (comply with 4)

Quality costs, but does it pay?

Our view is that successful quality requires resources. Furthermore, we want to find whether spending these resources is worth while.

Does successful quality have a positive influence on economic performance and the value of the firm?

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b) The economic profit model

*The Economic
Profit model is
cash flow based*

The economic profit model presents an alternative framework in valuation. This model assesses the value of the company as the amount of capital invested, plus a premium equal to the present value of the value created each year going forward. Thus, by focusing little more on the present and the past, this framework should also be relevant in an evaluation of economic performance.

Economic profit dates back to the economist Alfred Marshall who wrote:

> What remains of his (the owners or manager's) profits after deducting
> interest on his capital at the current rate may be called his earnings
> of undertaking or management.
>
> Alfred Marshall (1890)

Marshall holds that the value created by a firm during a time period must consider the expenses recorded in its accounts together with the opportunity cost of capital employed in the business. Thus, the economic profit model provides a feasible measurement of the performance for a single year. The DCF model requires a longer time horizon because the free cash flow within a short time span is heavily effected by that period's investments in assets, working capital and loan repayments. The management could easily improve DCF by delaying investments at the expense of long term economic performance. The economic profit scales the economic performance or value created in a single period of time. It is defined as follows:

eq.3.5: Economic profit = Invested capital x (ROIC - WACC)

Equation 3.5 simply presents economic profit as the spread between actual return on capital invested (ROIC) and the weighted average cost of capital (WACC) times the amount of capital invested. Thus, economic profit is an exact dollar figure and can be compared to the accounting net income. Opposed to the accounting net income, economic profit considers the total cost of capital, not only the interest paid on outstanding debt. Furthermore, the model assumes that return on invested capital is calculated on a cash flow basis. It implies that depreciation and other non-cash items are ignored. As long as the underlying cash outflows related to such estimated cost figures are continuos over time, a cash flow based approach will be feasible. However, this is rarely the case.

A hotel operation will invest in a building with an economic life of more than twenty years. The costs related to the physical facilities represent the most important cash outflow of the project. If we conduct a cash flow based economic performance evaluation on the basis of a five-year period, the initial out flows might be ignored. Depreciation reflects the accountant's estimate of the cost of equipment consumed in the production process. As long as we do not have accurate information about cash outflows and inflows, depreciation reflects an acceptable figure to adjust the mismatch between inflows and outflows.

*Cash flow based
measures require
long time series of
data*

A cash flow based performance approach requires complete information about
relevant cash inflows and outflows during the <u>entire</u> life of the enterprise. Thus, cash
flow based measures require that we consider a long period of time.

Empirical data typically comprise one or two years. In such cases, pure cash flow
based measures will be misleading. Accounting figures represent an imperfect
solution.

The economic profit model offers an appealing framework. An alternative application
to overcome some of the shortcomings would be to focus on <u>changes</u> in economic
profit before and after a quality effort. Thus, the economics of quality should be
evident through a shift in economic profit. Nevertheless, we still need to assess
alternative explanatory variables as well as establishing suitable discount rates. The
main advantage of economic profit is probably that it considers the cost of equity.
However, to ignore all sorts of estimated cost items suggests that we need a rather
long time sequence of data points. This is a serious drawback.

c) Residual income

Residual income is said to be a performance measure which avoids some of the
weaknesses inherent in other return based measures. It is an old performance indicator
which the consultants has reintroduced as a revolutionary analytical tool under the
name: Economic Value Added, EVA (Stewart, 1991). Residual income is defined as
follows:

Residual income = Cash Flow - Depreciation - Hurdle rate * Opening balance

Thus, residual income equals cash flow less an estimated cost of capital employed at
the beginning of the period. The estimated cost of capital employed consists of both
depreciation and a calculated cost of interest (on the opening balance).

*Is return on
quality greater
than the hurdle
rate?*

Through simple algebra, we can show that the residual income is positive, if and only
if, the actual rate of return is greater than the hurdle rate. It follows that all projects
with a positive net present value will fuel the residual income. As such, the hurdle
rate might as well be expressed as a requirement to a positive residual income. In
other words, if a quality program shall be implemented, its actual rate of return should
be greater than the hurdle rate.

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From the owners' perspective, it will always be in their interest to maximise residual income. However, it is not easy to compare residual income across companies or over time in the same company. Residual income will intend to increase with the size of the company or as the company grows (cet. par.).

The residual income will also be affected by the cost of depreciation. Thus, the procedure we select to depreciate the assets will alter the size of the residual income. However, if we are able to consider a longer period of time, or preferably the lifetime of the company or the project, this problem will diminish. The following theorem can be proved. It is independent of depreciation policies (see Edwards & Bell, 1961):

> The present value of the residual income during the life time of a project equals the net present value of the project.

If you have calculated the residual income of a project for each year, this theorem implies that it is possible to find the actual value of any project at the end of its lifetime.

Consequently, residual income includes the same disadvantages as most of the others measures of performance - i.e. it eventually requires complete information of all inflows and outflows during the lifetime of the project. This will never occur in the case of a going concern. It also represents an unrealistic situation in most empirical surveys.

Residual income or EVA is often applicable in cross sectional analysis

Economic Profit and DCF require time series.

On the other hand, residual income includes estimated costs. Even if such items involve more judgmental information than pure cash flow numbers, they allow us to make more meaningful assessment of the performance within a shorter time span. The DCF and economic profit model assumes that the cash flow figures represent a reasonable proxy of the consumption of capital. Given that the firm renews and maintains its assets continuously, this would be a reasonable hypothesis. However, if an enterprise is characterised by irregular investments, the cash flow number could provide odd information regarding performance. The residual income model would not be perfect, but still preferable to pure cash flow based frameworks such as Economic Profit and Discounted Cash Flow.

3.4 Economic performance - is there a feasible approach?

In this chapter we have provided arguments which state that a market based approach towards an economic performance measure is preferable because of the availability of reliable data from the financial markets. However, complete trading records from companies' debt and equity securities are normally restricted to large companies comprising a bundle of activities. Thus, even if this information is reliable, it is not valid to our specific purpose.

Alternatively, we might concentrate our attention towards the value creation related to the equity holders as a measure of economic performance. Such course would avoid the complications arising from information concerning the company's debt. However, it would be difficult to assess how to handle the equity/debt hybrids. Where shall we draw the line between debt and equity? How do we treat new financial instruments, such as warrants and convertible bonds? Finally, a liquid equity market does not exist for small and medium sized companies. Thus, the information in this case would also be far more reliable than it would be relevant to our purpose.

Furthermore, we discussed the accounting based approach towards an assessment of performance. The purpose of accounting is to establish estimates that mirror various aspects of a firm's financial performance during a specific period in time. The main challenge of this procedure is how to distribute the costs and revenues, which not only concern the period in focus, but also have affected the past and will influence future economics. The obvious examples are investments that are paid for in one period and benefited from in others. Depreciation represents the accountants' estimate of capital cost.

Finally, it has been stated that value is an appropriate metric of performance. This point of view leads us into a value-based discussion of economic performance. The value-based approach is valid because it comprises complete information. However, as we do not have complete information, the concept has limited value. Nonetheless, the value-based approach represents a useful theoretical perspective in our work to establish a sound performance measure. The value-based models we presented were said to be cash flow based - a major advantage if we fear arbitrary accounting manipulation, window dressing or insufficiencies in the accounting estimates.

Nevertheless, a cash flow based performance evaluation requires a fairly long time horizon, preferable the entire economic life of the company or the project under consideration. Thus, practical concerns related to data availability force us to incorporate some accounting based adjustments into the cash flow based framework of the value-based approach. This leaves us with a more uncertain performance measure - but in return: a feasible procedure.

The theoretical foundation of the concept: *economic performance* appears to be relatively indisputable. The construct basically compares economic sacrifices to economic gains. Our objective is simply to evaluate whether a quality effort produces gains that outweigh the sacrifices involved.

Crosby (1979) claims that there are no sacrifices involved in a quality strategy. Still, the gains are substantial. Consequently, our task could be reduced to demonstrate that the gains exist. However, if we assume that the markets are competitive and the players are sane and rational, it is hard to believe that many of the participants would avoid Crosby's invitation to a free quality ride.

There is no such thing as free quality!
We recall that Crosby, Deming and Juran basically understand quality as a cost saving strategy and thus a safe profit contributor. This perspective makes our survey tautological. We do not dislike or disregard the idea of free quality. Nonetheless, the perspective contradicts one of the most famous quotes in corporate finance: "there is no such thing as a free lunch" (Weston and Copeland, 1988). Besides, free quality makes most economic models redundant.

The "free quality perspective" is more or less meaningless from our point of view. We believe that there are costs or sacrifices involved with any quality strategy or effort. Our view is rather that these sacrifices are more complex to capture and measure than other more tangible investments or costs.

Although economic performance is a simple idea, it is not equally simple to implement the construct into an empirical setting. The value-based approach seems closest to the theoretical idea, whereas an accounting based procedure ignores some vital issues. Finally, an equity-based procedure will provide vast amounts of accessible data, but the trading records do not necessarily contain relevant information regarding our study.

We recognise that there exists a trade off between the validity of a certain measurement framework and the accessibility and reliability of the information required. Thus, there is not any obvious and convenient formula for the true economic performance. It will depend on the amount of time and resources we find relevant and necessary to invest. Figure 3.1 summarises the trade off and denotes some of the measures according to each category described in this chapter.

1. Market based
2. Accounting based
3. Value based

Figure 3.1 Economic performance - a trade off matrix
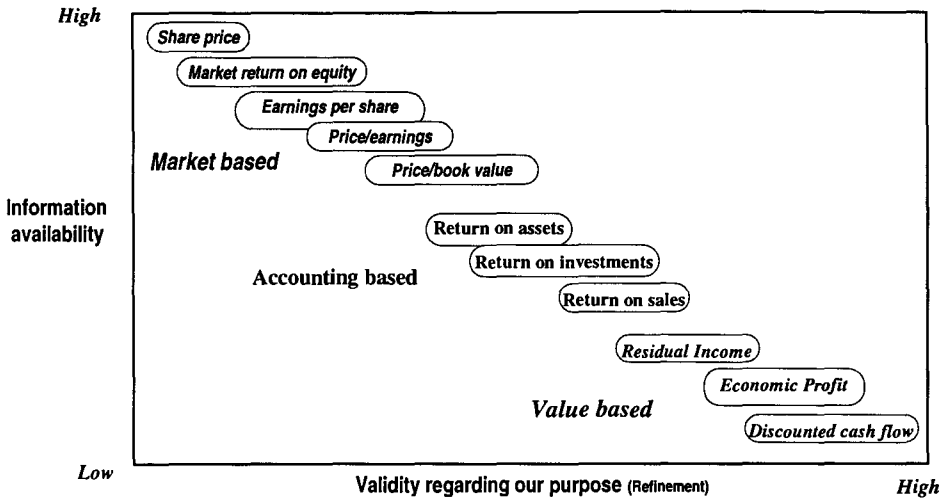
Figure 3.1 illustrates that measures based on data from financial markets rely on fairly easy obtainable and accurate data. However, these measures are general and comprehensive. We do not know if they are able to capture our specific issues of interest.

At the other end we find the value-based approaches. These measures are both very accurate and refined. However, the information required to conduct a value based performance evaluation is hard to fulfil, if the data exist at all. Such evaluations must eventually include substantial subjective judgements.

A refined economic measure has to involve some subjective judgement

Finally, the accounting based framework represents a compromise. Accounting data are widely used and often available on a number of levels such as: the group, the corporate, the division, the SBU, the department and the product level. It was under these circumstances that Jacobson (1992) and others have advocated the accounting return on investments. Unfortunately, many scholars suggest that accounting based adjustments and procedures remove the true economic information from internal accounts and annual reports (G.C. Harcourt, 1965; Ezra Solomon, 1971; Franklin Fisher and John McGowan, 1983). Others have emphasised the practical problems in using ROI to measure firms' performance. (Ayadi and Obi, 1994; Brealey and Meyers, 1996)

Unfortunately, the critics of estimated accounting adjustments do not suggest any superior alternatives. This reduces the value of their contributions. We acknowledge that accounting based measures do not represent a perfectly objective assessment of true economic performance. However, most of the options are neither established on pure and objective facts. We hold that refined economic measures are bound to involve subjective judgement.

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Chapter 4: Accounting data and economic performance

> As all of this makes clear, there is no way one can look at accounting rates of return and infer anything about relative economic profitability ......
>
> Fisher and McGowan (1983)

So far we have discussed the construct of economic performance and its relevance to the economics of quality. From a theoretical point of view, we argued that it is a fairly indisputable construct. Still, it appears difficult to measure. The equity-based approach is reliable, but does not necessarily provide valid information. On the other hand, the value-based framework appears to be almost perfect, but the information required is unobtainable. Thus, a compromise has leaded us towards an accounting based approach. The accounting based approach offers fairly easy access to a vast amount of detailed information. Although the accounts may contain dubious cost estimates and data manipulation, we simply do not have any feasible alternatives. Investigating a number of consecutive periods will alleviate some of these problems. Sooner or later the truth will come out.

4.1 Do the accounting data tell the truth?

Financial statements provide information about the assets and the liabilities of the firm and the income and cash flow generated by them. The impact of transactions and other events are recorded in the relevant financial statement. The balance sheet and the profit and loss account are the most important accounts. The balance sheet statement shows assets, liabilities and the equity accounts, whereas the income statement reflects revenue, expenses, gains and losses.

In a perfect world, the user of financial statement could only look at the bottom lines of financial reports, i.e. the net income and stockholders' equity. This implies that financial statements were completely comparable across companies, consistent over time, and finally reflected the economic position of the firm. However, accounting entries and economic events diverge across the dimensions of timing, recognition and measurement.

Financial evaluation of quality will involve subjective judgement   Furthermore, the corporate management issues accounts. They are responsible for their form and content. The management selects accounting methods, compiles accounting data and prepares the financial statements. In most firms, both management and auditors conduct the preparation. Thus, the presentation of costs and revenues may vary according to management and auditors' judgements. These issues are especially relevant in a study of the economics of quality. Both the potential income and the possible cost involved in a quality effort are complex and laborious to measure. Financial evaluation of a quality program has to rely on subjective judgements.

a) Timing and recognition

The financial reporting system is based on data generated from accounting events. An event has to meet certain criteria to be recognised as an accounting event - normally the exchange of cash for a different asset to create or settle a liability. However, the exchange of cash is not sufficient for the recognition of revenue or expense event. Under accrual accounting, revenues are recognised when goods are delivered or services are performed, and expenses are recorded as goods and services are consumed. Accrual accounting rests on the matching principle. The matching principle states that performance only can be measured if the related revenues and costs are accounted for in the same period.

Accounting events may also include passage of time (e.g. accrual of interest) and the impact of contractual arrangements (e.g. leases). Thus, economic events and accounting recognition of those events often take place at different times.

The capital gains and losses of a hotel facility might serve as a relevant illustration. Appreciation of a hotel investment, which has taken place over a period of many years, will normally not be accounted for before the management chooses for its disposal. Although the accounting legislation in some countries allows the management to adjust the assets according to the market value, there are few incentives to do so. In the Norwegian system, you are not allowed to report appreciation of fixed assets as income. Thus, the profit and loss account will not reflect this economic event before the hotel is sold. It is also likely that an impairment write-down of fixed assets will be reported in a fiscal period carefully chosen by the management. This fiscal period is not necessarily the period of recognition, nor the period in which the impairment took place.

There are many economic events that do not receive accounting recognition. Some companies negotiate large contracts, which may have significant economic consequences for the firm when entered into. The accounts, however, do not approve of this before some transactions take place. Likewise, a favourable or a non-favourable investment will not be accounted for until the investment is disposed of.

According to Crosby (1979), investments or efforts related to quality improvements will not show at all. We believe there are some costs involved, but we are not sure how these sacrifices are incorporated in the accounts. It is also uncertain when and how the proposed profit from superior quality will appear in the accounts.

Investments in improved physical facilities might serve as a relevant example. In our quality concept, such efforts are assumed to create better evaluations and satisfaction with the physical elements of the hotel. Our hypothesis suggests that such improvements eventually will result in increased demand, sales, profit etc. However, in accounting systems the sacrifices involved will either be recorded as costs (maintenance) or it may partially be activated as investments. The first alternative will be preferable in order to reduce the net present value of the tax bill. The latter option will spread the sacrifices over a longer time period and make the accounts more

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appealing to potential financial suppliers. Thus, a profitable hotel might choose to charge the entire effort against their income, whereas a hotel with less earnings could prefer to activate most of the cost to the balance sheet. If the hotel charges all their expenses related to improvements in product quality directly towards income in a specific period, these expenses will probably decrease in the following periods. If the hotel chooses to activate as much as possible, the economic performance in the following periods appears less favourable. Basically, the timing and recognition of income and expenses will influence our study of the economics of quality. Nonetheless, we are forced to assume that the accounting legislation and general rules in management accounting systems prevents this source of error to disqualify our empirical analysis.

Finally, goodwill represents one of the most controversial subjects in all of accounting. Accounting related goodwill arises as a residual in a purchase method acquisition, and it represents the proportion of the purchase price that cannot be allocated to other tangible assets (Rudges, 1983). Thus, accounting goodwill will reflect the premium paid for the target's reputation, brand names, or other aspects that enable it to earn an excess return on investments. However, accounting goodwill will only be recognised in an acquisition process and not in the period in which it has been created. Besides, most accounting standards require the companies to depreciate the acquired accounting goodwill, even though the economic rational for this procedure is problematic.

The accounting standards imply that the acquiring firm has to deplete the intangible assets of the target firm after the acquisition. Thus, the accounting based goodwill is often independent of the economic goodwill, or the true goodwill. Basically, accounting standards do not really attempt to measure the true economic goodwill.

The Norwegian chain of hotels in our sample was taken over in 1997. The purchase price included a substantial amount of goodwill. One might argue that some of this goodwill was related to successful quality management. However, there are also other aspects which decide the bid such as: willingness to sell, strategic location of a hotel, negotiation climate/technique, luck etc.. Moreover, research in mergers and acquisitions concludes that the sellers normally win, while the buyers often pay to much (Meyer, 1997). Goodwill and purchase values are often exaggerated and do not necessarily provide valid information regarding performance. Our survey does not recognise changes in goodwill. Unfortunately, we are forced to disregard the information hidden in this construct.

b) Measurement of values

Financial statements are designed using a monetary unit to measure the operation of a firm. Transactions are normally measured at their historical cost, the amount of cash or other resources exchanged for the assets or liabilities. Most accounting regimes, including the Norwegian, have chosen to ignore changes in values subsequent to acquisitions. Thus, the market values, exit values and repurchase values are seldom considered in financial reports. Historical cost has dominated accounting mainly because it is objective and verifiable. Compared to the alternatives, historical cost data are simple to implement and easy to control. If inflation is moderate and the transactions are fairly recent, historical costs provide an objective proxy of the market value of the assets.

Historical values are often far from the "true" values

However, the relevance of historical cost figures decline as specific prices or the general price level changes (White et. al., 1994). In such cases the analyst may choose to use information outside the financial reporting system to make the data more useful. For instance, the current market value of a hotel property can be highly relevant in order to evaluate the real economic performance of the operation. To base a return calculation on a 20-year-old depreciated historic value, obviously provide little information about the true economic performance. Especially for a city hotel, the true value is often far above the book value. On the other hand, the book value of a new hotel in a rural area might supersede its selling price

We believe that the book values of the properties are of limited usage to our study, whereas the historical costs of other assets are more relevant. Alternatives such as insurance values or estimated values of the property will be considered. We may also avoid this particular problem by focusing on operational performance.

Finally, most accounts fail to consider the value of intangible assets, such as contracts, brand names, quality and reputation.

Historic costs are reliable, but irrelevant

Nevertheless, a general problem with market values versus historic costs is the opposite qualities of relevance and reliability. Information on the current market value or the recognition of intangible assets can be highly relevant but may only be accurate (or reliable) to a limited extent. Transaction based historical costing will normally be reliable, but sometimes have little relevance. It is the old argument as to whether it is better to be «precisely wrong» or «approximately right».

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c) Classification

The items in the balance sheet are mainly classified according to liquidity. Thus, the conversion to cash in the case of assets and the time to maturity in the case of liabilities rule the categories of classification. Current assets are expected to be used or converted into cash within one year, whereas current liabilities are obligations the firm expects to settle within one year. Long term assets and liabilities are expected to provide benefits and obligations of more than one year. This classification scheme is important in the development of indices and financial ratios. Recent development of financial instruments, including leasing and rent agreements has made the distinction between short term and long term investments and debt more difficult to discern (White et. al., 1994).

The income statement reports the performance of the firm, and is especially focused on the results of its operating activities. It explains most of the changes in assets, equity and liabilities between two consecutive balance sheets.[5] The income is classified into revenues from the sales of goods and services generated by the firms' primary recurring operations. Most accounts separate income from other activities, such as interests and dividends from investments, and gains and losses from sales and disposal of assets. The costs and expenses related to these revenues are generally reported in the order of relationship to the underlying revenues. Thus, the cost of manufacturing or merchandising the goods sold is reported first and classified into the category: cost of goods sold. Then the various cost of labour, such as cost of administration, marketing, selling, and R&D follows. Before the gross profit from operations is calculated, most accounting systems deduct items like other operating expenses, changes in stock and losses on customer credits. In order to calculate the net profit, net interests and net extraordinary income are incorporated.

The classification of income and expenses in the profit and loss account depends on management judgement and auditor's approval. Issues of classification are often difficult, and also paramount to some financial ratios. A general problem is the distinction between ordinary and extraordinary items (Smith, 1992). A recent and growing challenge is how to handle various leasing and rental agreements. New financial instruments have fuelled the creativity towards off balance sheet financing. In the hotel industry, such arrangements are common and may confuse an analysis of economic performance.

A hotel company renting all assets will normally classify the rental cost as other costs of operation. A company that owns the assets has these costs incorporated into depreciation and interest payments on long term debt. Although the two companies have identical operating performance, their gross profit margin will differ.

Between the two cases, their might be a mixture of various financial schemes and arrangements to finance the long term assets, providing even more confusion to the

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5 Revaluation of assets and tax allowances carried forward do not influence the profit in Norwegian accounts.

ambitious financial analyst. The rental agreement could be 10 or 20 years with options of extension for another X years. The rent could be tied up to the turnover of the hotel operation, its gross or net profit, or maybe the number of bed nights. Some contracts could only include a fixed annual amount, with or without rules of adjustments during the contract period.

By ignoring the classification of cost and simply focus on the net profit, some problems seem to diminish. However, the net profit figure normally does not take into account the cost of equity capital. Given the same level of economic performance, the net profit in an all equity company has to be higher than an equivalent firm with a high gearing ratio (i.e. mainly financed by debt). In the previous chapter we discussed various value based performance measures which acknowledge this specific problem. The reintroduction of residual income as Economic Value Added (EVA) is directed towards it.

Table 4.1 summarises how the use of different financial sources influences classification of costs in the profit and loss account, and thus the effect on gross and net profit respectively.

Table 4.1 Classification of costs - influence from financial structure

Financial source	*Net profit*	*Gross Profit*
Equity	Cost of capital is ignored	
Debt	High interest expenses	
Rental agreements		Cost of capital in "Other expenses"
Financial leasing	High interest expenses	
Operational leasing		Cost of capital in "Other expenses"

The traditional performance measures from the profit and loss account will be affected by the financial strategy of the firm.

The hotel industry in most countries includes a mixture of pure operational companies, real estate businesses and combined enterprises. Furthermore, there is a tendency towards sophisticated off balance sheet financing strategies, making it increasingly challenging to relate the accounting numbers to economic performance.

In large hotel companies, the headquarters normally operate an internal accounting system to monitor the performance of its hotels. Hotel companies may consist of wholly owned, leased, franchised and associated properties. We believe the challenges regarding classification of cost items is more manageable within a management accounting system, than across different independent hotels. However, the fundamental issues related to classification still remains. It all depends on how the Head Quarter manages these questions.

d) Window dressing

Since the corporate management prepares accounts, it is possible to include some biased subjective judgement to manipulate the costs, revenues and thus the bottom line. Such activities are often referred to as «window dressing». The motive might either be to delay or soften a fall in profit, or maybe to maximise a crises in order to create larger room for improvement.

A short-term manipulation would be to overvalue the inventory and thus reduce the cost of goods sold. This procedure would delay a proportion of the cost of goods to the next accounting period. Underestimating the cost of depreciation represents a long-term manipulation. The duration of this kind of manipulation depends on the economic life of the relevant assets.

The most common manipulation is to activate cost and depreciate them over a period of time. Expenses related to research and development represents a classical example. A distressed company might like to push these items to the balance sheet in order to improve the operating results in a certain period. A relevant question is how to treat expenses related to quality. Rust et. al. have already stated their opinion by introducing the Return on Quality concept. However, they are neither accountant, nor do they emphasise the accounting perspective.[6]

Is quality an expense or an investment? In most accounting regimes, the handling of quality expenses will more or less depend on management judgement. A company which activates all expenses related to their quality work, will probably be accused of window dressing. On the other hand, if a company carries the entire amount related to an important "quality revolution" against the income, the result in that specific period would be undervalued.

However, it is not possible to hide the truth forever. Accounting manipulation is not a durable strategy. By conducting an investigation over several consecutive periods, the analyst will reveal much of the true economic performance. The problem of window dressing falls along with the length of the period under consideration.

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[6] You are not supposed to read all the footnotes

4.2 How do we use the accounting data?

In an empirical analysis of the economics of quality it is paramount to establish measures which enable us to compare the economic performance of companies of various sizes and in different industries. One approach is to use common-size statements in which the components of revenue, costs and investments are standardised by expressing them as percentage of some base. For example, different income and cost figures in the profit and loss account can be computed as a percentage of sales. Bench marking analysis of crucial ratios from the P&L account is common in the hotel- and restaurant industry. During such analysis, it is important to consider issues regarding classification of various cost items discussed above.

Ratio analysis, in general, is a technique that involves standardising the performance of firms of different sizes, operating in various industries. However, most ratios will vary according to industry. Selling and Stickney (1989) examined Return on Assets (ROA) and its components[7] Profit Margin and Asset Turnover for 22 different sectors of commerce from 1977 to 1986. Exhibit 4.2 reveals their results.

Exhibit 4.2: ROA of a sample of firms[8]
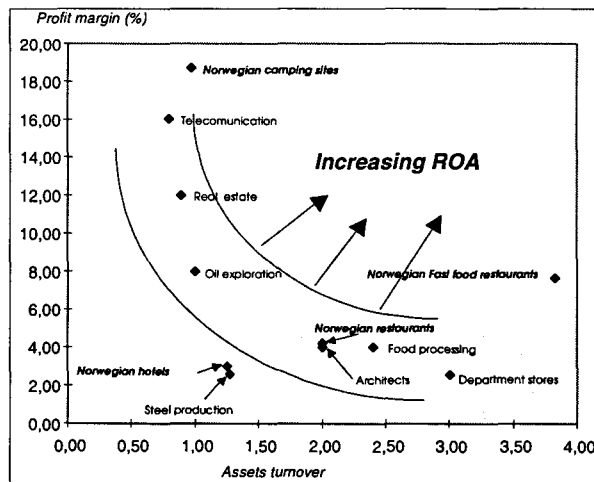
Source: Selling and Stickney (1989)

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[7] cf. the well known Du Pont formula

[8] The position of the Norwegian examples is based on calculations from a database developed through a corporation between Dun & Bradstreet Norway and Norwegian School of Economics and Business Administration.

The authors noted that an infinite number of combinations of turnover and profit margin could lead to the same level of ROA. For example, real estate and grocery stores both had a ROA of around 6%, although their profit margins were 1.6% and 12.1 % respectively. The explanation is simply that the grocery stores turn around their assets much faster than a real estate company. In fact, Selling and Stickney illustrate that the profit margin is not sufficient as a cross-industry performance measure.

However, for time series analyses and between companies in the same business, profit margin as a performance measure has considerable advantages. First of all, the sales figures are difficult to manipulate or window dress (Kinserdal, 1994). Secondly, profit margins are simple and well understood among practitioners and theorists. Finally, we avoid the complications of evaluating tangible and intangible assets in the balance sheet.

The problems around estimating the cost of depreciation, however, are included in the Profit Margin. Thus, we might find it useful to add on the depreciation and instead compare cash flows from operations to sales. Cash flow from operations is a fairly popular performance ratio in the hotel industry. However, from the discussion of classification of the various cost items in section 4.1c), we argued that cash flow from operations might discriminate against firms, which rent or lease their assets. Such firms do not have any valuable assets to depreciate. The cost of depreciation is normally included in the fees paid to the leasing or real estate company. Thus, even if these companies perform well, their cash flow from operation might not reflect it.

However, most of our data on performance will be collected from internal reporting systems. These systems are particularly designed in order to control and compare performance among the properties. Thus, the sources of error related to these issues will depend on how the central unit has managed to overcome them.

Economic performance is not decided by a single indicator

More information is required

Kaplan and Norton (1996) illustrate the challenge of applying accounting in general and specific accounting measures in particular as the prime mechanism for communicating the results of a business operation. They suggest that nobody would be safe in a modern jet aeroplane containing only one single instrument in the cockpit. Consequently, a performance evaluation system also needs to involve many different measures in order to lead the company on a road to success. Their solution is "balanced scorecards" - considering different sources of information, both from the accounts and elsewhere. Our objective is not to create such a system for the hotel industry. Instead, we argue that many different pieces of information from a company have to be evaluated before a conclusion regarding its performance is reached.

We do not believe there is a single measure from the accounts, which represents a robust and valid performance indicator with respect to assessing the economics of quality. Our task is rather to find some of the most relevant measures and evaluate these with regard to the purpose of our study.

4.3 Which accounting measures are the most relevant?

The literature supplies a rich variety of different ratios based on numbers from management and financial accounts. White (1994) writes that a complete list of ratios from the annual reports will contain more than 100 different ratios. Horrigan (1965) emphasises that the ratios are strongly correlated. It is not efficient to consider them all. Thus, the process of selection represents a significant challenge.

> The presence of collinearity is both a blessing and curse for financial statement analysis. It means that only a small number of financial ratios are needed to capture most of the information ratios can provide, but it also means that this small number must be selected very carefully.
>
> James O. Horrigan (1965)

Gibson (1987) provides some guidance with respect to the importance of various ratios. He asked 52 financial analysts to classify 60 ratios according to their ability to measure profitability, liquidity and debt. Exhibit 4.3 shows how the respondents ranked a selection of profit ratios.

Exhibit 4.3: Classification and Ranking of Ratios

	% Classifying in primary Classification	Degree of significance
Return on equity after tax	96%	8,21
Earnings per share	69%	7,58
Net profit margin after tax	100%	7,52
Return on equity before tax	94%	7,41
Net profit before tax	100%	7,32
Return on assets after tax	94%	7,06
Return on total invested capital after tax	94%	6,88
Return on total invested capital before tax	92%	6,40
Degree of operating leverage	58%	6,36
Return on assets, before interests and tax	90%	6,04
Return on assets before tax	92%	6,00
Return on operating assets	94%	5,96
Total asset turnover	61%	5,50
Sales/operating assets	65%	4,96
Sales/working capital	50%	4,63
Retained earnings/Net income	58%	4,49
Sales/Fixed assets	64%	4,25
Sales/net worth	53%	4,04
Return on working capital	92%	4,02

In a similar study in Sweden in 1994, Sjøholm asked managers in four large companies to rank the priority they put on various performance measures. This survey further emphasises the popularity of the familiar measures such as operating profit and return on assets. Furthermore, the rate of return figures in general appeared to be less in focus than absolute numbers. One reason might be that the capital base and the sales target of these companies are well known to the managers who are set to

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evaluate them. Thus, the management does not need to relate the various numbers to capital, sales, equity or stock price. Besides, a company cannot invest or pay out dividend on the basis of a high return or an impressive profit margin. At the end of the day, it is the absolute amount of profit that matters.

Nonetheless, exhibit 4.4 reveals that surprisingly little emphasis is put on cash flow numbers. This implies that the managers rely on the estimated cost of utilising capital equipment - i.e. depreciation. They seem to judge the consumption of capital as a significant component of performance judgement. This somewhat contradicts Copeland et. al. (1994) which more or less emphasise cash as the king of success. However, Copeland et. al. (1994) had a long term perspective in mind. This implies that depreciation will be reflected indirectly through the inflows and outflows of assets trades.

Exhibit 4.4 Priority of performance measures

Measure	Priority 1	Priority 2	Priority 3
Operating Profit	19	6	2
Profit after financial items	12	13	7
Net Profit	0	0	0
Return on Assets	18	17	8
Turnover	1	8	3
Net Margin	0	0	2
Market Share	0	1	2
Capital Turnover	0	4	4
Cash Flow	0	1	10
Non respondent	0	0	11
Sum	50	50	50

If cash is king, he is not very popular

Sjøholm (1994)

More uncertainty arises when we review another survey from Gibson (1982). In this study he analysed 100 annual accounts. Out of the 21 companies that chose to report a measure of return on capital, Gibson discovered 12 different ways of calculating the ratio. Exhibit 4.5 reveals the number of definitions he found for three popular performance measures.

Exhibit 4.5 Calculations of performance measures

	# definitions in Gibson(1982)
1. Operating Margin	8
2. Return on Equity	5
3. Return on Assets	12

Finally, we have to consider the period of time in which the expenses and revenues are referred to. For tax purposes or with a motive of window dressing, some companies may deliberately report profits, which do not reflect a real picture of the firm's performance. Analysing the performance over consecutive periods can alleviate this problem.

4.4 Summary

The measurement of economic performance through accounting data is an unsolved academic challenge. First, accounting data are exposed to management's manipulation. Secondly, accounting procedures and principles are developed under many constraints. These might lead to a divergence between accounting based performance and true economic performance. A transaction based historical costing system is easy to verify but does not guarantee a true reflection of relevant economic issues. Unrealised capital gains and various forms of goodwill will often be ignored. On the other hand, unrealised capital losses are more often accounted for. Besides, acquired goodwill has to be depreciated. Such asymmetric accounting practices are often referred to as accounting conservatism. It implies that the income figures, cost data and assets values may have doubtful economical meaning.

Even if accounting numbers did reflect true values, it still remains difficult to establish a reasonable measure of economic performance. The challenge is to create a performance measure that both reflects economic performance and is stable and invariant across industries. Analyses of ratios derived from the companies' accounts have been used for such purposes. However, previous work has not yet provided consistent guidelines to what specific financial ratios to consider.

Economics of quality requires refined measures

Our objective is to evaluate the economics of quality. However, we do not expect the potential relations to be strong. Thus, we need a very refined performance measure in order capture possible changes in our variables. Accounting data provide a relevant starting point. However, it is important to be aware of the limitations of such information. The theoretical concept of economic performance is based on a simple idea that the benefits shall supersede the sacrifices. There are numerous of ratios from the company accounts, which provide valid information regarding this idea. Our challenge is to consider the most relevant measures or ratios with respect to our specific problem: The economics of quality.

Chapter 5: The economics of quality

> The success of the Malcolm Baldridge National Award has demonstrated that government and industry, working together, can foster excellence.
>
> Robert Mosbacher (Secretary of Commerce, 1991)

> The Wallace Company won the Malcolm Baldridge National Quality Award in 1990. However the high levels of spending on quality that enabled them to win the Baldridge also produced unsustainable losses, and within two years they were bankrupt (Hill 1993).
>
> Rust, Zahorik & Keiningham (1995)

So far we have discussed issues concerning the operationalisation of the two main constructs in this thesis, namely quality and economic performance. Our objective is to assess whether these constructs are linked together, or more specifically: If and how quality influences economic performance. Exhibit 1.1 illustrates that a potential relationship between quality and economic performance does not necessarily have to be simple and direct. The service quality of a certain product might as well affect other variables such as the occupation rate, prices, costs of production etc. In this chapter we'll discuss these matters on the basis of existing literature.

5.1 Introduction

There are many scholars who have discussed the economics of quality management. Most authors prefer to advocate that quality implies a bundle of financial advantages. Few find it necessary to verify the proposed relationships through empirical studies.[9]

Nevertheless, the relationship between price and quality represents an exception. This association has been emphasised by the empiricists. The purpose of most studies of the price-quality relation has been to evaluate if the consumers use the price as an indicator of product and service quality. There are far fewer studies, which investigate if the superior quality product enables the companies to charge a higher price for the products they supply.

There is also very little empirical work on the relation between quality and profitability. The few articles that exist are often originated from the PIMS database (Profit Impact of Marketing Strategy).

The purpose of this chapter is to revisit the literature that focuses on the economics of quality. Figure 5.1 provides a summary of the articles in this area. We have described the various definitions of the quality, the method used and the results.

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[9]Phillips et al. (1983): "....there is little convincing evidence that quality and cost leadership are successful business strategies in the first place".....The only evidence for a positive relationship between product quality and ROI is that provided by the PIMS studies (Buzzell, Gale and Sultan, 1975; Schoeffler, Buzzell, & Heany 1974).

Table 5.1 Selected studies of the economics of quality

Relationship/author	Quality construct	Method/ sample	Result
Quality, Return on investment Return on Sales, market share price, growth (Buzzell & Gale 1987)	Relative perceived (cf. definition in PIMS)	MR CT PIMS	Quality is not a cost driver but increases price, growth, ROI/ROS
Quality, Return on Investment Return on Sales, price (Luchs 1986)*	Relative perceived (cf. definition in PIMS)	MR CT PIMS	Quality drives ROS/ROI and price
Quality, Return on investment costs, market share (Phillips, Chang & Buzzell 1983)*	Relative perceived (cf. definition in PIMS)	LISREL PIMS	Quality is not a cost driver but increases ROI
Quality, Return on investment, market share, R &D etc. (Craig & Douglas 1982)	Relative perceived (cf. definition in PIMS)	MR PIMS	Quality and R&D have a positive effect on ROI and market share.
Quality, market share, growth. (Buzzell & Wiersema 1981)* (Flaherty 1982)	Relative perceived (cf. definition in PIMS)	MR PIMS	Quality increases market share and growth, but do not effect costs of marketing.
Quality, Return on investment (Buzzell, Gale & Sultan 1975)* (Schoeffler, Buzzell & Heany 1974)*	Relative perceived (cf. definition in PIMS)	CT MR PIMS	Quality increases ROI
Quality, costs, (Crosby 1979)	Conformance to requirements	cases studies	Quality implies savings
Quality, productivity (Garvin 1984)	Production errors customers complaints	Median/mean all producers in Japan/USA of air condition m/c	Japan makes far less mistakes both internally and externally

MR = multiple regression   CT = Cross Table   *studies referred to in more detail in this chapter

Table 5.1 (cont.)

Relationship/author	Quality construct	Method/ sample	Results
Quality, productivity employees satisfaction absence, employee turnover, strikes (Takamiya 1979)	production errors	Median/mean TV manufacture 2 Japanese one American one British.	Japan best UK last High quality is positive
Quality, repurchase, competitive advantage, price elasticity (Hall 1980, Porter 1980)	customer orientated	theory/cases examples	Quality provide advantages, but higher costs
Quality, productivity costs, competitive advantage. (Tribus & Tsuda 1985)	both production and customer orientated	theory examples concepts	High quality ⇩ positive effects
Quality - price (Scitovszky 1945)	customer orientated	observed friends /acquaintance	price is used as an indicator of product quality
Quality - price (Levitt 1954)	brand choice satisfaction	investigated a sample of products i.e. razor blades floor vacs	price is used as an indicator of product quality
Quality, brand, price (Jacoby, et al., 1971)	perceived quality	experiments on beer	brands influence quality perception
Quality-price (Shapiro 1973)	perceived quality	Investigated carpets, chairs, stockings sweaters, etc.	price correlate with quality
Quality-price (Oxenfeldt 1950) (Morison & Bronson 1969) (Sproles 1977) (Riesz 1979)	"Objective quality" ex. from "Consumers' Report scores"	Investigated a large number of products/ product classes	Mixed results Variations across products/classes
Quality-price (Garvin 1988)	technical quality	investigated cooling systems	weak relations
Quality-price (Monroe, Dodds 1988)	Various concepts are discussed	discussion of concepts for improved research on the price-quality relation.	
Quality - price-value (Zeithaml 1988)	perceived quality	suggestions of concepts and relationships	

5.2 The Economics of Quality – a review of empirical studies

Return On Investment (ROI) is one of the most popular performance measure in the strategic management literature (Hofer, 1983). It has certainly dominated the studies originated from the PIMS data. Nevertheless, in a PIMS study from Buzzell, Gale & Sultan (1975) the disadvantages of ROI is considered:

> When the plant and equipment used in a business have been almost fully depreciated, for example, its ROI will be inflated. Also, ROI results are effected by patents, trade secrets, and other proprietary aspects of the product or method of operation employed in a business.
>
> Buzzell, Gale & Sultan (1975)

Some PIMS studies realise that Economic performance is not decided by a single indicator

The authors recognise the problems of accounting conservatism, especially the negligence of goodwill (c.f. chapter 4). Return on investments tends to favour companies with hidden goodwill and depressed book values. Thus, Buzzell & Gale (PIMS 1987) later argue that Return on Sales (ROS) or operating profit margin might be a supplementary measure of "business performance".[10] However, most PIMS studies focus on ROI. The reason is probably the broad acceptance of ROI as a crucial performance measure in the corporations that comprise the PIMS database.[11] The PIMS studies are typically conducted across industries. This will further emphasise return on investments as a valid economic performance measure. However, the PIMS studies have received criticism for their reliance of ROI as a viable performance measure. Many authors remind of the fact that ROI punishes new investments and necessary product development (Kirchoff 1975; Kirchoff 1977; Winter 1977). In the short term, old depreciated equipment will provide better opportunities to inflate ROI.[12] Companies that think long term and try to develop a competitive advantage through investments in new equipment, product development, R&D, and quality, might be considered as poor performers. By including return on sales (ROS), we could avoid to punish companies for updating the production facilities. On the other hand, investments in capital equipment will increase cost of depreciation and thus reduce ROS. However, the more efficient equipment should also imply less cost per unit and then compensate the incremental cost of capital.

The Du Pont formula describes the relationship between ROI and ROS.[13] Thus, ROS will incorporate some of the variance of capital based performance measure, such as ROI. Buzzell, Gale & Sultan (1975) hold that the relationship between market share and ROI generally is caused by the variance in ROS (Return on Sales). ROS also increases along with the market share, however, this increase appears to be rather weak and unsystematic. (cf. figure 5.3).

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[10] Buzzell & Gale (PIMS 1987) argument are based on empirical results - i.e. to use ROS instead of ROI does not alter the conclusions of their study.

[11] PIMS mostly comprise large corporation from North America..

[12] Historical cost ignores the effect of changes in prices. In times of inflation the assets will normally be undervalued in the balance sheet. This implies less amount of capital in the numerator of the ROI ratio.

[13] The Du Pont formula: Return on Assets = Profit/sales x sales/assets = Gross Profit x Asset turnover.

The studies originated from the PIMS database are the most well known empirical work published on the economics of quality. These studies regard quality as one of several factors fuelling business performance. The main focus of interest is market share.

"PIMS quality" is defined according to the <u>management's beliefs of customers' perception</u> of the <u>relative</u> quality of the product provided. Basically, the management is asked to view their customers' opinion of the quality of the company's product, related to the quality of the competitors' products.

One might wonder if this measurement procedure provides construct validity, i.e. does it really measure what it is indented to? We believe it is likely for the management in a profitable company with a strong market share to automatically assume that their customers perceive the quality of their products superior to the competition. This represents a rational and simple explanation of a high market share. Moreover, it should be reasonable to assume that a healthy profit margin is a sign from the customers that the quality is appreciated. Besides, it would probably be peculiar for a manager in a loss making operation with a small market share to hold that his customers rate the product he offers superior to the market leader.

We will argue that both market share and financial performance may influence the management's opinion of their customers' quality perception.[14] Table 5.1 comprises a summary of the most important PIMS studies.[15] However, we will discuss some of them in more detail.

Based on the information in the PIMS-database, Schoeffler, Buzzell and Heany (1974) asked the following questions:

- What are important to profitability within a certain industry - and how much?

- How does return on investment vary according to changes in strategies and markets?

Based on economic theory and the "beliefs of experienced executives", the authors hold that 37 factors explain 80% of the variation[16] in the Return on Investments for 620 Strategic Business Units (SBU). The most important factors were market share, product (service) quality[17], marketing expenses, research and developments, investments and degree of diversification in the product portfolio. The results from the analysis of quality are described in table 5.2.

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[14] Nevertheless, we note that Apple Computers might represent an exception to these lines of arguments. Their customers are said to be excited by the product quality offered, despite that the company continuously looses market share and normally presents red numbers. The managers would probably blame Bill Gates for their miserable situation, rather than poor quality.

[15] The PIMS database was established in 1972 and started off with quantitative and qualitative information from 36 companies comprising 350 business units. In 1987, the data base had grown the sample to 450 companies and 3.000 business units.

[16] The authors applied multiple regression and cross table analysis.

Table 5.2 Quality and profitability (ROI) according to market share

Market share	Quality			
	low	medium	high	# of companies
Less than 12%	4,5%	10,4%	17,4%	169
12-26%	11%	18,1%	18,2%	176
More than 26%	19,5%	21,9%	28,3%	176
			Source: Schoeffler, Buzzell, Heany (1974)	

Why does anyone produce low quality?

Table 5.2 indicates that companies offering superior product quality relative to their competitors achieved a higher return on invested capital (ROI). Market leaders offering high quality products obtain 28,3% return, while companies with low quality and a market share less than 12%, only manage to return 4,5% on the capital they employ. Bass and Wittink (1975) have shown how parameter estimates of causal paths may be seriously distorted when observations across heterogeneous industries are pooled together. They argue that industry specific forces will act as background variables. Failure to take these into account may represent a serious "omitted variable problem". The authors point out that the relationships they study may vary according to industry. However, this issue is left for further research. We will argue that the magnitude of the differences in ROI, found by Schoeffler et. al (1974), suggests that some important variables are overlooked.

Do we have an "omitted variable problem"?

A potential relationship between quality and market share is not promoted. Schoeffler et. al (1974) conclude that a strong market share <u>combined</u> with superior product quality will fuel the firm's profit. The study, however, does not discuss whether this might be a spurious correlation. Research design is not an issue in focus. Finally, they do not debate the uncertainty in measuring the two constructs of quality and profitability (or economic performance). The following quote emphasises an exploratory focus:

> Whatever the reasons, the data in exhibit III clearly show that it is very profitable to have a high share of the market
>
> Schoeffler, Buzzell, Heany (1974)

However, the authors also claim that empirical exploration is the only way to find the truth about the factors that influence profitability.

80% explained is almost too much

Is it too good to be true?

> Whatever economic theory of business mens' opinion may suggest, however, the ultimate test of whether and how a given factor is related to profitability is an empirical one. To make such a test, we have constructed an equation that explains more than 80% of the variation in profitability among the 620 businesses in the PIMS data base
>
> Schoeffler, Buzzell, Heany (1974)

54

The latter quote indicates that the authors have applied a procedure that is inappropriate, unless the study is replicated on a different set of data. If the fitted equation does not reveal a high explaining power in another set of data, there shouldn't be any reason to challenge existing theory. Anderson & Paine (1977) have criticised Schoeffler et. al. of ignoring aspects related to causality, multicollinearity and axiomatic relationships. Schoeffler, Buzzell, Heany (1974) basically overlook other relevant factors.

The article from Buzzell, Gale & Sultan (1975) does not seem to have considered these issues either. The authors made the following statement:

> It is now widely recognised that one of the main determinants of business profitability is market share.

The chief purpose of the article is to explain why market share is so important. Table 5.3 illustrates some of the principal results. The study from Buzzell, Gale & Sultan (1975) is based on a somewhat larger sample, compared to the former study from Schoeffler, Buzzell and Heany (1974).

Table 5.3 Market share vs. ROS, Sales/capital and quality
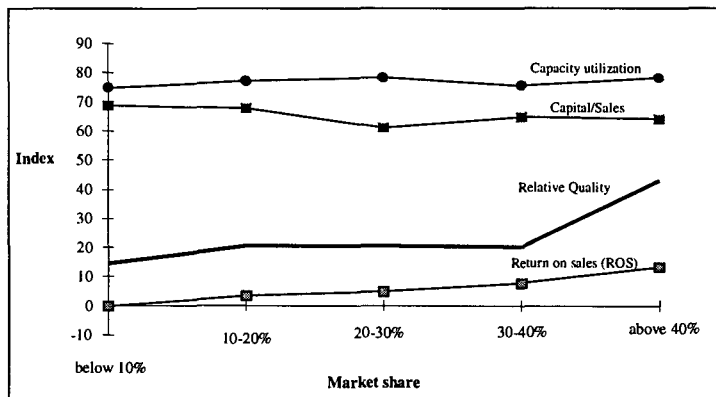
Table 5.3 indicates that profitable companies are selling products with superior quality. Based on the correlation between the measure of quality and a measure of profitability, the work from Buzzell et. al. (1975) supports the hypothesis that quality is a profitable strategy to pursue. Their study shows that there exists a positive correlation between quality and profitability. Companies with superior product quality both achieve higher gross profit margins and a superior return on investments.[18] Buzzell et al. (1975) only apply a simple cross table analysis. Thus, issues concerning causality and spurious relationships are still not debated.

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[18] The study is based on "PIMS quality" as discussed earlier.

In 1983 the LISREL[19] framework is applied on PIMS data (Phillips, Chang & Buzzell, 1983). The authors seek to verify whether high relative product quality indirectly fuels profits through market share (Buzzell & Wiersema, 1981). This hypothesis partly contradicts the established theories in strategy.

In the literature there are two generic strategies: (Porter 1980; Hall 1980): *costleadership* and *differentiation*. There are a number of aspects that separate these two generic strategies, but superior quality is usually a central part of a differentiation strategy (Kiechel, 1981). Differentiation through superior quality protects the companies from competition via improved customer loyalty and less price elasticity. (Porter, 1980, pp. 34-46). A *Cost leadership* strategy implies that the price is the chief strategic competitive weapon. The companies that implement a costleadership approach have to focus on high volume by offering the products at a better value than the competition. According to Porter (1980), Kiechel, (1981) and Hall (1980), it is not possible to mix these two strategies. The companies which try to get the best of the two worlds by combining low costs, high volume and superior quality will be *"stuck in the middle"* (Porter, 1980).

In Hall (1980) we can find the following statement:

> In-depth study of 64 companies reveals success comes from those that achieve either the lowest cost or the most differentiated position.

Phillips, Chang & Buzzell (1983) basically attempt to challenge this way of thinking by applying path analysis and LISREL on the PIMS data. Table 5.4 presents their model.

Table 5.4[20] Quality, market share, prices and profitability.
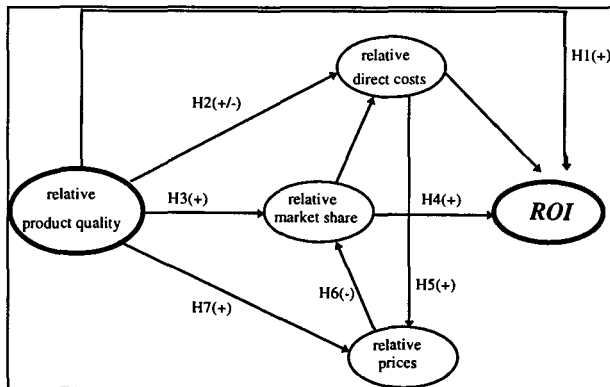
Source: Phillips, Chang & Buzzell, 1983

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[19]See Bagozzi 1980; Jøreskog & Sørbom (1981).
[20]H(+) indicates a presumed positive relationship while H(-) denotes a negative relationship. Finally H(+/-) indicates that the authors do not have any specific opinion concerning the relationship.

The model proposes that the relationship between quality and profitability is separated into an indirect effect through market share (H3) and a direct effect (H1). Phillips et al. are challenging the conclusions from other PIMS studies which postulates a positive direct relationship between quality and ROI (cf. H1 in table 5.4). Furthermore, the data are split into six product categories. The purpose is to evaluate whether the hypothesised relationships are valid across different types of products. Phillips et al. (1983) conclude that quality influences profits directly in 50% of the product categories they studied, and indirectly via market share in all the six lines of businesses. However, we note that market share only revealed a positive impact on ROI in four out of the six businesses. Basically, a combined path from quality to market share and then to profit only showed significant in four out of six industries. Table 5.5 emphasises the results concerning the quality variable.

Table 5.5:   Quality, ROI, market share, costs and prices
Parameters estimates (β) and critical values (T-values)

Effects of quality on:	Product area					
	Durable Consumer goods	Non Durable Consumer goods	Capital goods	Raw material semi-finished goods	Industrial components	Supplementary products
ROI (H1)	0.02 (0.31)	0.22* (2.80)	0.19* (3.07)	-0.09 (1.49)	0.16* (3.75)	0.03 (0.57)
Direct costs (H2)	-0.08 (0.93)	0.20 (1.94)	0.40* (5.18)	0.15 (1.63)	-0.12* (2.02)	-0.06 (0.76)
Market share(H3)	0.17* (2.24)	0.38* (4.39)	0.15* (1.96)	0.30* (3.22)	0.16* (2.51)	0.38* (5.50)
Prices (H7)	0.19* (2.33)	0.40* (5.77)	0.27* (4.71)	0.33* (4.62)	0.41* (8.21)	0.48* (7.73)
*significant at 5% level t-values ( )				Source: Phillips, Chang & Buzzell, 1983		

The controversial "PIMS Quality" is still applied

Thus, product quality appears to influence performance, either indirectly or directly, within most of the industries. We note that the study only considers the manufacturing sector. The authors chose to omit the trade and service sector because they felt it would make the comparison somewhat more difficult. Finally, the results are generally more inconsistent compared to previous work related to PIMS data.

Nevertheless, Phillips et al. (1983) present a well documented study. The paper both includes control variables and it discusses issues concerning causality. Still, the controversial "PIMS quality" is applied. The authors measure quality twice, at one-year interval. They find the results to be reliable. However, they admit that the results and the measurement procedure do not guarantee construct validity – i.e. reliability is independent of validity.

Phillips et al. (1983) have created hypotheses on the basis of other empirical studies and anecdotal material. Table 5.6 provides an overview of the central hypotheses in their survey.

Table 5.6: Supporting arguments of the model in Phillips et al (1983)

Relationships	Contribution, references
Quality - RIO	"Niche theory": Quality $\rightarrow$ avoid price-competition which depress profits (Gale & Swire 1977) Quality$\rightarrow$ "occupy a niche where you can command superior margins" (Porter 1980) Empirical research of direct effects between Quality-ROI: Buzzell (1978), Schoeffler et.al. (1974).
Quality-market share-ROI share	Quality - influences preferences - influences market share (Buzzell & Wiersema,1981). Market share influences profits via economies of scale /scope, market power. (Scherer 1980, Rumelt & Wensley 1981).
Market share - costs	High market share $\rightarrow$ low costs $\rightarrow$ higher ROI (Henderson 1979, Porter 1980)
Quality-costs	Quality - low cost, "quality learning curve" (Fine 1983)

In 1986, Luchs introduces more arguments to debate the trade off between *costleadership* and *differentiation*, advocated by Michael Porter (1980). Luchs (1986) uses the complete database from PIMS and conducts a cross table analysis. He divides the data into five groups of equal sizes according to the scores on the quality variable. The results indicate that quality has a positive impact on both return on sales and return on investments. Luchs also claims that higher quality improves the ability to achieve higher prices than the competitors. Table 5.7 illustrates his results.

Luchs (1986) concludes that there must be a very strong and positive relationship between offering high quality products and services, and average profitability. The magnitude of the differences he discovers explains his confidence. Table 5.7 indicates that companies offering superior quality are more than twice as profitable as low quality producers. Consequently, Luchs regards quality as the sharpest competitive weapon available to most businesses.

But why and how is this possible? Luchs suggests one "obvious" reason and another "less obvious". According to Luchs, the data "obviously" show that higher quality businesses tend to get, on average, better prices than their competitors for similar products. On the other hand, Luchs finds it "less obvious" that there is no simple or direct correlation between relative quality and direct costs.

We find it obvious, at least likely, that other factors such as economies of scale/scope, learning curve, reputation, image, etc. must play an important role in explaining the huge differences in profitability. Furthermore, both the studies from Luchs (1986) and Schoeffler et. al. (1974) could be interpreted as empirical evidence of the tautological aspects present in the relationship between "PIMS quality" and profit, i.e. managers in profitable companies tend to believe their quality is superior to the competition. We do not think this should come as a surprise. Research that recognise and apply PIMS as measures of perceptions, are more honest and benefiting (i.e. Kotabe et al., 1991).

Table 5.7 The relationship between quality, profit and relative prices.
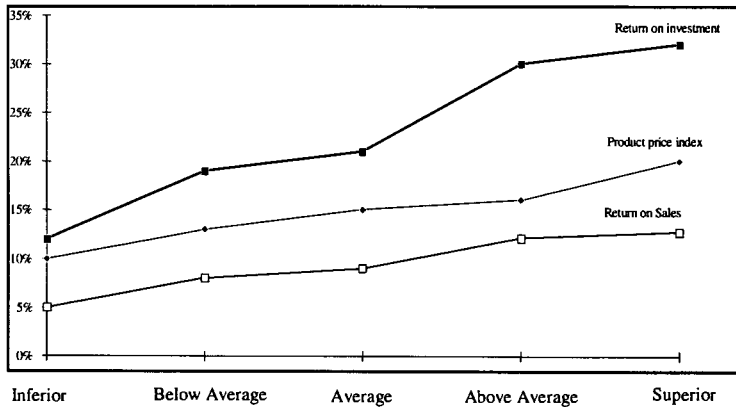
Categories of quality   Source: Robert Luchs, 1986

Porter (1986) says that a combination of product differentiation and low cost is the exception and not the rule within the law of corporate strategy.[21] Luchs, however, suggests that this is not necessarily the case. Many companies in his analysis appear to combine the two strategies. A combination seems to reveal similar levels of profit as a pure cost leadership strategy. However, the companies combining costleadership and high quality, experience stronger growth.

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[21]Porter (1985) writes that a combination of differentiation and cost leadership rarely succeed, *"often for cultural reasons"*

Luchs uses his results to credit Crosby's (1979) statement: *"Quality is Free"*.
However, he does not mention the fact that Crosby finds «PIMS quality» irrelevant –
"if it has anything to do with the construct of quality at all" (Crosby, 1979). The
survey from Luchs is based on contingency tables. He ignores problems of causality.
Thus, it is possible that the results he presents are spurious. Table 5.8 provides a
summary regarding Luchs' survey of quality, profit, prices and growth. His main
conclusions are highlighted.

Table 5.8 Summary of Luchs (1986)

Rust et. al. (1995) represent a recent contribution to the relationship between quality
and economic performance. They view quality as an investment and introduce return
on quality (ROQ) as a new measure. The ROQ approach is based on four important
assumptions:

1. Quality is an investment
2. Quality efforts must be financially accountable
3. It is possible to spend too much on quality
4. Not all quality expenditures are equally valid

However, Rust et. al. do not really investigate whether quality drives performance.
Their objective is to construct an analytical framework, which makes it possible for a
company to evaluate whether their quality related improvement efforts are financially
accountable. A general disadvantage of their framework is the vast demand of detailed
information that it requires. The authors provide a list of 18 management input items
that have to be estimated in order to operationalize the ROQ approach. Although
some of these items already are estimated in a well-run company, most businesses will
find the list exhausting. Furthermore, many of the items are extremely difficult to
measure. The information required is very detailed. It has to rely on vague projections
and subjective evaluations.

If Luchs is right,
some managers
must be really
stupid!

60

To calculate a ratio based on detailed but still unsure information will make the final measure disputable. If the management tried to establish an error margin on the final ROQ number, it could turn out that the whole exercise of making service quality accountable is best kept as a theoretical framework.

Nonetheless, Rust et. al. apply their concept in a hotel and find an ROQ of 44,6%. However, this result is only valid for the cleanness of the bathroom - a small aspect within what Troye (1990) referred to as *«Product quality»*. To apply this model on aspect throughout the service element or backstage dimension offers a completely new set of challenges.

From an accounting point of view, it is somewhat peculiar to perceive an increase in the cost of cleaning as an investment. If the question were to modernise the bathroom facilities, an investment perspective would be less debatable. Rust et. al. perceive increased cleaning cost as an investment which pays off immediately through higher revenues. The presence of fixed costs ensures that higher revenues imply improved profits, lower costs to revenue and hence better margins. Thus, the article basically advocates that increased resources in specific areas (i.e. higher cost) are profitable. The costs in these areas will rise, while the total cost to revenue will fall. According to Rust et. al., a three year time span is sufficient to reveal these effects in the case of bathroom cleanlines.

The article from Rust et. al.(1995) is relevant to our study due to the four assumptions quoted above. Quality is perceived as an investment in a higher absolute cost structure. According to the article, this investment immediately pays off by increasing the profit margin. The authors claim that quality is a profitable strategy if conducted in an appropriate manner. Thus, a quality program and high emphasise on quality does not alone guarantee superior economic performance.

On the basis of the literature, it seems likely to expect a positive relationship between quality and profitability. Crosby (1979) has strongly argued that his quality is not only significant to the profit of manufacturing firms, but also to the service industry. Even though some authors suggest that it is difficult to evaluate and secure the quality of services, (ex. Zeithaml 1988), quality might be even more effective within services than in manufacturing (Crosby 1979). Finally, Rust et. al. (1995) admit that misplaced quality efforts may reduce profits. However, if the quality budget is spent correctly, they promise a quick payback and a healthy return.

5.3 The cost of quality

The relationship between quality and costs depeı ds on our perception of the quality concept. Quality understood as number of product attributes normally implies a positive relationship between the cost of production and quality. In economic modelling, where the quality variable is included (Brems 1948, Dorfman and Steiner 1954, Brems 1957, Rosen 1974, Leland 1977, Leffler 1982), such interpretations have been dominant. Many authors have even measured quality through variations in costs of productions. These models, however, lack empirical support. This is also the case for Bill Crosby, the «quality guru» who wrote the famous book: «Quality is Free» (Crosby 1979). His arguments rely on practical experience, logical reasoning and a number of supporting case studies. Crosby (1979; 32-33) claims that the costs related to poor quality varies from 2,5 to 20% of sales. Juran (1988) suggests that the costs are even higher, somewhere in the interval from 20-40%. Other authors have announced high but uncertain estimates related to the costs of inferior quality (Dale and Plunkett, 1995; Pike and Barnes, 1994; Moen, 1997).

We have suggested that the relationship between "Crosby's quality" and economic measures could be tautological. Besides, there are a number of research papers originated from the PIMS database, apparently supporting Crosby's statement. (Luchs, 1986). However, Crosby has criticised PIMS for their way of measuring quality.[22] In the previous section we argued that "PIMS quality" and performance might be tautological.

The relationship between quality and costs is by no means a simple matter. The analysis of cost must be related to our earlier discussion of the quality construct in chapter 2. Quality is not free. The cost of providing it will vary according to the dimension of the quality construct in focus. Furthermore, there are elements in quality management that could be viewed as investments, rather than direct costs. The initial expenses related to designing and implementing a quality program might be capitalised, whereas incremental costs of maintaining the program should be classified as direct costs.

Are quality expenses costs or investments?

A relevant example is whether to redecorate and modernise the rooms in a hotel. This is likely to increase the guest evaluation scores of the product quality dimension, or the structural elements. The initiative would require investments, normally increasing the calculated cost of depreciation. We expect these investments to influence the level of interest payments and costs of capital. Lower costs of maintenance and cost savings on cleaning are aspects that are relevant to incorporate into our decision process. Finally, we expect the higher level of product quality to attract more repeaters and new customers. Thus, revenues will increase.

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[22] The PIMS quality - labelled relative perceived quality - is originated from asking product managers and executives to evaluate the quality of their own product relative to the quality of the competitors.

Another example would be to invest in training courses to educate and motivate the staff to be more service minded. Such programs might require initial costs, but also need ongoing expenses to maintain the skills. Hopefully, such training transpires to the guests, making them more satisfied with the service element. This could increase repurchase, revenue and perhaps reduce the need of traditional marketing (i.e. satisfied guests will substitute advertising through word of mouth).

In order to make quality improvements financially accountable, we have to differentiate between quality-related costs, cost savings, investments, and incremental income. This represents an ambiguous management accounting operation. As long as the construct of quality is hard to understand and define, we cannot expect companies to measure and specify all the financial items related to it. Rust et. al. investigated a specific aspect of a certain dimension within a quality strategy. They emphasise that a more complete study will take years to complete.

Exhibit 5.9 outlines some of the general cost elements and savings potentials relevant to a quality program.

Exhibit 5.9 Cost and quality - "the cost of quality"

The costs of producing quality is complicated to assess

a) **Higher costs**	
- prevent errors	Technical quality
- the cost of control	Technical quality
- repairs and guarantee	Market driven quality
- motivate/qualify staff to produce service quality	Market driven quality
b) **Reduced cost:**	
- less internal errors (reduces scrap and rework)	Technical quality
- less external errors (reduces scrap and rework)	Technical quality
- satisfied customers (less complaints, less repairs, more repeaters)	Technical/market driven quality
- cost efficient marketing (more repurchase and "word of mouth")	Market driven quality

The relationship between quality and cost depends on whether the advantages expressed as reductions in costs and/or increased income, outweigh the necessary investments and higher costs of control. The value chain in exhibit 5.10 illustrates that the investments and direct expenses will accumulate in the early stage, whereas the saving potential becomes more evident as the product approaches the consumer. Thus, the marketing and strategic dimension inherent in the quality construct makes an analysis of quality and cost even more complex.

Exhibit 5.10 Quality focus in the value chain

The process of production the value chain

| | | | | | |

The costs of quality get more complicated along the value chain

Inspection of input products

Cost can be shared with the suppliers

Pre-fabricated products

Inspection of work in progress

Finish goods

Inspection of Finish goods

Consumed products

Inspection conducted by the customer

Prosumed products

Inspection conducted by the customer and the producer

A special case
1. The cost of customisation

Internal cost of errors:
1. find the error
2. Make it right

Technical quality

Eksternal cost of errors
1. Lost repurchase
2. Lost goodwill/image
3. Repairs
4. Garantee/service

Technical and marked oriented quality

Source: Prepared on the basis of Troye and Henjesand (1995)

Kaplan and Atkinson (1989) describe quality and manufacturing costs in a management accounting concept. Through different case studies and theoretical reasoning, the authors emphasise the high costs of neglecting quality management. A change in management from optimal to maximal quality is highlighted. There are many studies within the theory of production [Dorfman and Steiner (1954), Brems (1957); Garret and Silver (1973), Lundvall and Juran (1974), Riggs (1981)] which advocate that improvements in quality only increase profits to a certain level. Exaggerated perfectionism may not be a profitable strategy. Rust et al (1995) say it is possible to spend too much on service quality and Garret and Silver (1973 pp 647) submit the following statement - having a more technical quality perception in mind:

> A firm can generally earn greater profit by allowing the shipment of certain minimum levels of defects than by striving for the elimination of all defects.
>
> Garret and Silver (1973 pp 647)

However, modern technology has made reworks and repairs relatively more expensive, compared to the cost of implementing and improving quality control systems. The earlier in the value chain an error is detected, the more cost effective it is to alleviate the problem. Exhibit 5.11 illustrates how Kaplan and Atkinson view the two perspectives.

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Exhibit 5.11 Traditional vs. modern view of Quality-Cost trade-off

Total manufacturing
   costs

*Should
quality be
optimal or
maximal?*

The traditional view

The modern view
Maximal Quality

Quality measures

Optimal Quality

Source: Kaplan and Atkinson 1989 (p. 376)
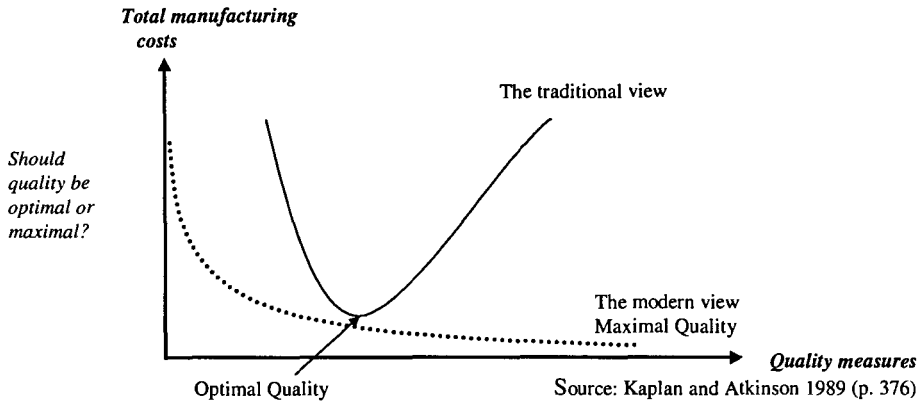
The review of the literature on quality and costs seems to produce limited guidance related to a research design of an empirical study. The following quotes underline the problem:

> In twenty years of researching the economics of quality, I have come across virtually nothing on the economics of producing quality.
>
>   Bowbrick (1992)

> ....it was noted that there is virtually no information available on the cost or economics of common quality-related engineering practices.
>
>   Plunkett and Dale (1986)

Thus, a simple and direct relationship between quality and cost does not represent a befitting approach to our research question. It is necessary that we recognise the various dimensions of the quality construct. Also, we have to consider the differences between quality investments, direct costs of quality and cost savings due to improved quality.

We have chosen the hotel industry as our empirical setting. Thus, questions related to how quality management differs according to distinct products are avoided. Nevertheless, we anticipate that our design will be transferable to other services such as education, dentists, hairdressers, banks, insurance etc. For traditional consumer products like automobiles, televisions, computers and so on, certain adjustments might be necessary.

Table 5.12 illustrates the costs, the cost savings and the revenues related to the two specific examples from the hotel industry. The first effort is directed towards improvements in product quality. The second emphasises interaction skills, or service quality.

Table 5.12 Cost of quality – two examples - effort, sacrifices and benefits

Quality effort	Costs	Costs savings	Revenue effect
Redecorate the rooms	Investment in upgrading	Easier to clean and maintain	Higher prices Satisfaction
Service Training Course	Cost of training course. Loss of man hour	More competent and satisfied employees Word of mouth marketing	Satisfied customers. Higher repurchase

The costs of quality represent an unsolved empirical challenge

Our view implies that quality requires some kind of efforts and thus fuels short term costs. Hence, an inflated cost item could indicate a quality effort. However, quality also implies positive effects through cost savings and an improvement of the income potential. Finally, inflated cost items often signalise mismanagement and operational blunders. In an empirical study comprising hundreds of hotels, it is impossible to know whether a diversion in costs is caused by an efficient investment in quality or operational problems and mismanagement. The potential confusion concerning causality could explain why Bowbrick (1992) did not find empirical work concerning the cost of producing quality.

Quality both increases and reduces cost. Besides, it also increases revenues. If all these effects occur simultaneously, most accounting measures will be too comprehensive to capture the different aspects of this process.

5.4 The price-quality relation

The relationship between quality and price has been exposed to far more empirical interests than quality and costs. However, the results do not indicate any specific direction concerning the relationship. Monroe & Dodds (1988) summarise their literature survey as follows:

> Despite over 30 years of empirical investigations, it remains unclear whether (1) there is an actual positive relationship between price and product quality, and (2) whether buyers perceive a positive relationship between price and quality.

The authors argue that it is necessary to establish a better conceptual framework, in order to fully understand the relationship between quality and price.

Quality
⇩
charge higher prices

It should be useful to divide the empirical work on the price-quality relation into two different perspectives. First, there have been studies focusing on quality as a strategy of obtaining higher prices in the market place. From a supplier's point of view, it is reasonable to increase the prices due to improvements in the quality of the offering.

Quality perception
⇩ ⇧
charge higher prices

Yet, researchers in the consumer behaviour area have had a slightly different perception of the relationship. In their view, it is fair to believe that the consumers anticipate the price as an indicator of product quality. Thus, if the consumers see the price tag as a quality pointer, and the suppliers assume that quality makes it possible to demand higher prices, a positive association between quality and price should be apparent. Nevertheless, Luchs (1986) maintain that companies in the PIMS database are able to combine superior quality and competitive pricing.

Exhibit 5.13 illustrates the two perspectives of the price-quality relation.

Exhibit 5.13 Perspectives of the price-quality relation

The supply side:
Positive: Quality makes it possible to charge higher prices.
Negative: Superior quality combined with low pricing will fuel growth without deteriorating the profit (Luch 1986)

+(-)

Quality   Price

+

The demand side:
1. The price indicates the level of quality.   2. Quality increases utility.

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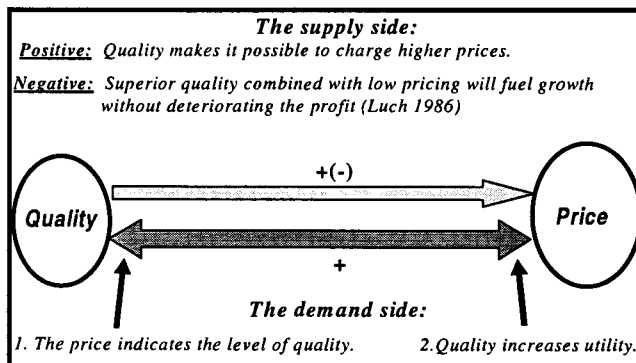
It is clear that superior quality represents a competitive advantage for a company. One option is to utilise this advantage through charging higher prices and thereby fuel the short-term profit. To keep the prices stable and receive the reward of superior quality through higher growth and increasing economies of scale represents to some extent a long-term strategic alternative. Luchs' survey advocates this dimension of the price-quality relation. The companies are reinvesting the higher margin into efficient equipment and modern facilities to maintain their cost leadership.

Chapter 6: Hypotheses and models

A hypothesis (model) is important if it explains much by little.

Milton Friedman

6.1 Introduction

In this chapter we will describe and develop hypotheses concerning the economics of producing quality. Our main objective is to assess the potential links to economic performance. The literature does not seem to recommend any specific models or procedures regarding our research question. Empirical work in the area is scarce.

How does successful quality relate to economic measures?

Nevertheless, the intention of our study is not to test if quality is a profitable strategy. Instead, we are interested in how various indicators of superior quality in some companies are related to economic measures.

Hence, the rational behind our hypotheses is how fulfilment of quality may be related indirectly and directly to economic measures. The chapter culminates in a discussion of various models suitable for testing the proposed relationships.

Input
⇓
Quality
⇓
Output

Our strategy is to decide the factors, which influence the quality scores. How do hotels obtain superior quality ratings from its customers? What are the most important determinants? The next step is to find the implications of the premium ratings. The analysis does not only include pure economic measures, but we will also discuss variables comprising market information and other quantitative features related to supply and demand.

6.2 Is quality a profitable strategy?

Why should we focus on quality? What are the potential benefits from a successful quality strategy?

The literature does not offer a straight answer to this question. Considering the many alternative concepts of quality together with the difficulties of measuring performance, it is probably more surprising that we find statements at all, announcing quality as a sure profit driver. Crosby (1979) does not reveal any empirical evidence to substantiate his faith in quality. Nonetheless, we have argued that a quality philosophy, as defined by the three gurus (see exhibit 2.5), has to be a profitable strategy. The challenge is rather how to accomplish quality.

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The PIMS studies[23] represents a well known, but a widely criticised series of empirical research (Anderson and Paine, 1979; Ramanujam and Venkatraman, 1984). Although some of these critical remarks are caused by the impressive attention PIMS has obtained in academic and popular journals, we find the reluctance and scepticism towards their measure of quality relevant.

Porter (1980) gives another conceptual contribution to the discussion on the economics of producing quality. He advocates quality as a way of differentiating the products from the mass market. The results are higher prices and superior profits.

However, you will also be able to earn acceptable profits by producing lower quality items at cheaper prices. Porter warns against being stuck between the two approaches. According to Porter, a mixed strategy will demolish profits.

Rust et. al. (1995) represent a more realistic view of the effect from focusing on quality. They advocate that it is possible to spend too much time and money on quality related work. Thus, the companies offering the best quality in the market are not necessarily the most profitable ones. Rust et. al. advise companies to conduct thorough research to uncover specific areas where quality efforts will contribute to the overall return on capital in the company.

So, the literature mostly advocates quality as a profitable strategy - as long as you do it right. This would not be a controversial statement describing any strategy or effort.

Sir Royce said that there is nothing more wasteful than doing efficiently that which is not necessary (Talley, 1991). Quality basically represents the opposite strategy – doing the right things efficiently.

Nonetheless, there are not many empirical studies analysing the relation between quality and performance. Certainly, articles concluding that there exists a negative relationship between quality and performance are rare. On the other hand, what journal would print such studies?

We acknowledge the uncertainty concerning the relationship between quality and performance. However, the different quality perspectives applied probably cause the confusion and disagreement. We do not dispute that a quality strategy implemented according to advice from Crosby, Deming or Juran would be profitable. Their understanding of a quality strategy more or less coincides with a strategy to fuel profits. Our question is basically whether indications of successful quality in some companies lead to excess performance. Thus, our main research proposition will be formulated as follows:

Proposition 1:   *Successful quality has a positive effect on firms'*
                       economic performance

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[23] Phillips, Chang & Buzzell (1983), Buzzell (1978), Schoeffler et. al. (1974), Luchs 1986, etc.

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Previously, we argued that growing companies are more valuable than stagnant enterprises. We also referred Copeland et. al. (1994) who wrote that value is the best metric of performance there is. Growth will typically increase the absolute amount of profit made by a company. Consequently, growth is an element in, or a driving factor of economic performance. Previously, we argued that successful quality is reflected in the minds of satisfied customers. If we still maintain that satisfied customers fuel sales, quality should lead to higher sales. Our subordinate proposition concerning quality and performance may then be formulated as follows:

Proposition 1a: *Successful quality has a positive effect on firms' growth*

Keeping the various dimensions of quality in mind (c.f. chapter 2), we specifically believe the service quality element to be of crucial importance to the growth potential of a company. Successful personal interaction will fuel both repurchase and have a positive effect on word of mouth. These two aspects lead us to supplement our analysis with the following proposition:

Proposition 1b: *Service quality has a positive effect on firms' growth*

In fact, we believe service quality to be cheaper and more powerful than both product and production quality. Hence, we like to propose the following hypothesis:

Proposition 1c: *Service quality has a stronger positive effect on firms' performance than product quality*

We anticipate that quality is a causal factor, influencing economic performance and growth. Thus, quality in period t will affect economic performance and growth in period t+1.

We will emphasise the uncertainty related to the length of these periods. In other words: We do not really know how long it should take before a quality related effort pays off. One year certainly represents a data driven guess, but hopefully a sensible one.

6.3 Is quality free?

Even if quality proves to compliment economic performance, it does not have to be free of charge. Our research proposes that successful quality ratings are decided by certain factors – some are related to financial aspect whereas others involve information associated with market strategy and equipment applied.

Quality is not free!

Instead it may represent a profitable investment.

According to Rust et. al.(1995), quality expenses are investments although most companies treat them as direct costs. Thus, an effort to improve the quality could increase cost in one period and then return the expenses via various cost savings in sequential periods. Furthermore, we have advocated that certain elements in the work related to improved quality require resources, whereas other aspects reduce costs (cf. table 5.9). The relationship between costs and quality depends on our perception of the quality construct. The modern view holds that the cost savings of preventing errors and dissatisfied customers more than outweigh the related expenses of such activities (Kaplan and Atkinson, 1989). Crosby (1979) who bluntly told the world that «quality is free» repeats this view.

Nonetheless, Rust et. al. (1995) represent a recent contribution to admit that it is possible to spend too much on quality. More importantly, they argue that quality requires resources. Quality is not free, but represents an investment opportunity with a healthy return.

Thus, quality improvements are generally assumed to increase costs in the short term, and cause reductions in the overall costs in later periods. Quality improvements can be considered as investments. The main challenge is when and how these investments pay off. Our hypothesis may be formulated as a general research proposition:

Proposition 2:   Successful quality requires economic resources

We have described various dimensions of the quality construct and referred to a multi-element product concept (Troye, 1994) in chapter 2. Is it possible that specific cost items from the account are related to various dimensions of the quality construct?

The *Service or interaction element* represents the very essence of what is normally considered «service». It is basically the outcome of customers interacting with service providers such as receptionists and waiters. The quality of the interaction element may be called «interaction quality», relationship quality, or simply *«service quality»*. We will refer to this item as service quality. Thus, this item typically relies on the performance and motivation of the employees. It should be reasonable to consider the cost items related to wages and training courses. Unfortunately, it is difficult to gain specific information about the latter item, although it is specifically relevant to our research problem. Figures related to the overall costs of wages are easier to obtain. However, these numbers involve more irrelevant information.

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The costs of wages do not have to be related to service quality. High costs of wages may be caused by mismanagement of the work force - i.e. poor planning and little control of staff. This situation does not necessarily give the customers an impression of superior service quality. Lots of employees hanging around doing nothing might as well annoy the guests. Basically, dissatisfaction and poor moral among the employees could also cause higher costs of personnel. High turnover of personnel, absence because of illness and stress, will inflate the costs of wages. Consequently, high costs of wages are not an obvious benefit to the service quality element.

Service quality requires investments in human capital

On the other hand, high costs related to personnel often imply that more resources are allocated to this area. Moreover, it may reflect skills and qualifications among the employees. We believe the number of people and their qualifications have a positive impact on service quality. Other factors kept equal, this will fuel salary-related costs. Thus, we propose the following relationship concerning service quality:

Proposition 2a: *Cost related to personnel will have a positive impact on service quality*

However, the arguments above, revealing two contradictory effects, imply that we do not expect strong effects from cost of personnel onto service quality. A positive relationship will testify that more resources spent on the staff may neutralise the potential inefficiency comprised in these figures. If the empirical test reveals a negative relationship, we conclude that the presence of inefficiency in staff management outclasses the potential positive effects from resources spent on maintaining and acquiring qualified employees. Exhibit 6.1 illustrates our dilemma.

Exhibit 6.1 Cost drivers of cost related to personnel
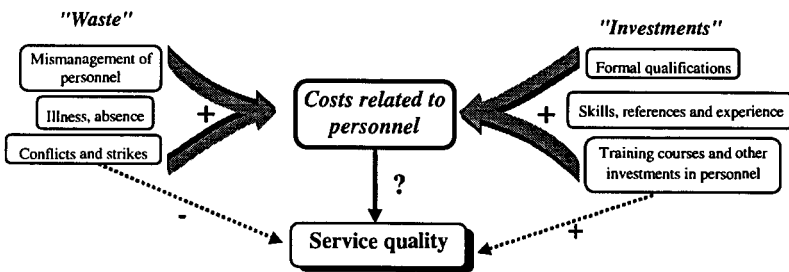
Furthermore, we will consider the product aspects that require little or no involvement - neither from the customer nor from the service provider. Physical facilities like lounges, guestrooms, lobby, etc. demand presence more than activity to render utility. If the market is properly segmented, there might be little variation with respect to what is required from these facilities. The level of satisfaction they provide is primarily determined by long-term investments and maintenance strategy. They cannot easily be changed in the short run and we have used the label: *«structural»*. Deighton (1992) describes it as «frozen potential for performance». The items are similar to finished products because they require limited activity from both the seller

and the buyer - once they are produced and delivered (Troye, 1994). The term «*Product quality*» is suggested as an appropriate label for the quality associated with the structural elements of a hotel offering.

Maintenance is necessary to obtain successful Product Quality

We believe maintenance cost is the most relevant cost item to consider for the evaluation of product quality. Nevertheless, the challenges are the same as before: High maintenance costs might just as well comprise mismanagement, instead of reflecting a successful and intended quality effort. If we assume that the level of mismanagement is equally distributed among the hotels, the variation in maintenance costs might be cause by variations in quality strategy. Our research proposition is formulated as follows:

Proposition 2b: *Costs related to maintenance will have a positive impact on product quality*

High maintenance costs: ⇒ *Inefficient workers. OR High maintenance costs:* ⇒ *Skilled workers.*

Again, the association between a cost item and a quality dimension reveals two contradictory effects. Consequently, we do not expect to uncover a strong effect in our empirical investigation. A positive relationship will indicate that more resources spent on maintenance outweigh the potential inefficiency hidden in these figures. If the empirical test reveals a negative relationship, we could conclude that the maintenance work has been produced inefficiently.

New hotels⇒ *Better Product Quality?*

Furthermore, we believe the evaluation of product quality to be better in a brand new and expensive facility, compared to a well-maintained old building. We have claimed that historic book values do not represent valid information regarding the net worth of a hotel facility. Thus, we find it more appropriate to investigate alternative sources of information. The age of the property and the insurance details are likely to provide information regarding the actual value of a hotel. The value or net worth represents the total investment and a potential exit payment to the capital providers. Thus, the higher the value, the more money should be required in return to the capital providers. We believe that the value of the hotel, i.e. the economic resources tied up in buildings, equipment, etc. will have a positive influence on the ability to obtain superior product quality ratings. The relationship between value and product quality is less dependent on employees' performance. Thus, the disturbance related to mismanagement, illness, absence and waste is less. We formulate the general proposition as follows:

Proposition 2c: *The amount of capital employed will have a positive impact on the ability to obtain superior product quality.*

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The items denoted *backstage elements* are produced by the employees with the aid of raw material, and/or equipment. Food, written information and cleaning are typical examples. In contradiction to service quality, these elements can be produced «back stage» - without any involvement or presence of the consumer. The production takes place back stage.

In certain situations the backstage elements are produced prior to purchase and in other cases it is prepared during the purchase. From the customer's perspective, the backstage element is not produced «once and for all», but is rather a result of a production process that more or less coincides with the purchase and use experience. Thus, the label *«Production quality»* is applied (Troye, 1994)

The customers appreciate sophisticated meals, including lots of expensive alternatives.

In the case of backstage or production quality, we expect that the costs of raw material make a difference. Thus, we assume that the guests are able to appreciate high quality (and expensive) ingredients in the servings. We also anticipate that high quality food costs more than simple meals. Our general concern about the relationship between quality and costs is also relevant to this relationship. Mismanagement of the kitchen and/or purchase department can easily provide a situation combining high costs, poor food quality and unhappy guests. However, we believe it is easier to manage purchases of raw material than people. Consequently, this relationship will involve less disturbance than the hypothesis comprising costs of labour. Our postulate regarding the production dimension simply states that higher cost of goods implies better possibilities of successful meals. The success of the serving will be reflected in the production element.

> *Proposition 2d:*   *Cost related to raw material will have a positive impact on production quality*

Marketing ≈ recruit satisfied customers

Marketing expenses represents an effort to attract customers with the proper qualification to appreciate the product offered. Hence, marketing costs should be positively related to guest satisfaction. (Troye, p33, 1996)

> *Proposition 2e:*   *Cost related to marketing will have a positive impact on quality perceptions*

Smiles are "cheap"?

Our final question concerning the cost of quality is to judge between the two alternatives: Service and product quality. Is it possible to tell which one of the two dimensions to prioritise? Our initial view is that most hotels tend to put more emphasis on the physical aspects, than investments in human capital. Nevertheless, service quality efforts may be more efficient and cheaper than a product quality focus. We believe the interaction between customers and staff involves more risks regarding quality and satisfaction, compared to the use of physical facilities. A charismatic receptionist could make you forget a tacky bathroom, but a beautiful and clean jacuzzi hardly makes up for an impolite maid. Besides, we anticipate that it is cheaper to correct, train or replace the maid, than to redecorate all the bathrooms. Thus, we propose: *Service quality is cheaper than both product and production quality*

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6.3 Does quality imply higher prices?

Superior quality should be of value to the consumers and thus enable the firm to charge a premium on its supplies. However, the company might also want to keep its prices in line with competition and instead utilise its qualitative advantage to obtain higher growth and improved economies of scale. This approach represents a long term strategic alternative. Luchs' (1986) survey appears to have captured this dimension of the price-quality relation.

To understand how consumers arrive at quality judgements, we need to know how the customers form their quality attribute beliefs. Steenkamp (1990) distinguishes between quality cues and quality attributes.

Quality cues are defined as "informational stimuli that are, according to the consumer, related to the quality of the product and can be ascertained by the consumer through senses prior to consumption". This perspective complies with consumer research indicating that the customers use the price as an indicator of quality.

Quality attributes are instead functional and psychological benefits of the product. They represent what the product is perceived as doing for the customer. Hence, quality attributes are unobservable prior to consumption. This view complies with the literature, which claims that quality is judged in conjunction with the price.

In other words, some people automatically tend to believe that expensive products offer superior quality. They create this perception prior to purchase or independently of the experience with the product. The other view implies that customers need to experience the product or service in order to qualify for a valid evaluation. Basically, we argue for a conceptual difference between

1. price $\Leftrightarrow$ experience   *Attributes*
2. price $\Leftrightarrow$ expectation   *Cues*

In our research setting, we measure quality after the product is consumed and paid for. Thus, the setting is not compatible with the definition of quality cues. We are measuring experienced quality or quality attributes.

Luchs argued that successful companies selling high quality products at competitive prices sustain a high market share.

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Generally, the empirical research on the price-quality association provides contradictory results [Steenkamp (1989); Troye (1990)]. The literature supplies evidence of a strong and positive relationship, a weak but positive association, and finally some articles refer to studies that propose a negative relationship between quality and prices (Troye and Nes, 1995). Consequently, Rietz (1979) has stated that a weak positive relationship is realistic.

However, in a perfect market, one should expect a strong and positive relationship between product quality and price (Gerstner, 1985). In an imperfect market, as for instance the hotel market, a weak positive relationship is what we find reasonable to anticipate. We are measuring the average price obtained per unit sold together with the quality experience. Proposition 3 formulates our general hypothesis.

Proposition 3: A positive quality experience implies higher prices per room sold

The service marketing literature suggests that services are more difficult to evaluate than goods (Breivik, 1995). Applied to the price-quality relation, we believe this might imply that the product elements reveal a stronger association to price than the service element.

Thus, the price - quality relation might be stronger for the tangible elements such as product and production quality, than in the case of the more intangible service quality element.

Proposition 3a: Product quality is more strongly related to
prices than service quality

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6.4 Summary hypotheses

Our overall research question <u>is not</u> whether quality is a profitable strategy. The most common quality definitions and perspectives described earlier makes this relationship tautological. The purpose of our empirical work is rather to study whether companies obtaining superior quality evaluations inherent certain economic characteristics. These relationships are neither obvious, nor simple.

It is possible that companies are using too many resources in order to please their customers and thus obtain superior quality scores. Consequently, the quality strategy is more costly than the market is willing to pay.

A general answer to whether quality pays off or not depends on how we operationalize the construct. We have chosen to divide the construct into various dimensions according to a framework suggested by Troye (1990). We believe this setting is fruitful in order to allocate and measure the resources spent on quality. Thus, we do not only intend to study how quality relates to economic measures. We also want to find if any of the various dimensions deserve special focus.

Are we studying something that doesn't exist? Nevertheless, if the customers really do not know what quality is (Pirsig, 1974), how shall we expect the companies to know? Finally, how do we measure the effects of something nobody seems to understand?

Although we have formulated specific propositions, there are many arguments and references in the literature, which point out other possibilities. The crucial issue is how we understand the quality construct and how we measure and manage it.

Table 6.2 summarises our main hypotheses and provides references for alternative directions of causality, or lack of association.

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Table 6.2 Summary of alternative directions of hypotheses

Relationship	positive	negative	no direction
Quality and performance	Quality does not drive costs. Higher prices increased repurchase growth-economies of scale, learning curve (PIMS). Cost of control outweigh cost of rework losses and complaints. *"word of mouth" (PIMS)*	Quality drives cost, (Troye) small effect on prices low volume-inefficient operation Significant costs of control, dissatisfied customers have no economic impact Customers appreciate high quality, but high prices reduces re-purchase, differentiation imply low volume (Porter, 1980)	Cost driver and increased prices *costleadership vs. differentiation* Models from micro economics theory suggest that there is an optimal level of quality. Differentiation implies low volumes whereas higher repurchase works the other way.
Quality and costs	Economic theory assumes that quality increases costs	Empirical work from PIMS and conceptual work from Crosby (1979) and Gummesson (1993) The chief reason for high costs is mismanagement. Superior quality comes with well managed and cost efficient companies.	Strategy literature Porter (1980) Hall (1980) How can we know if high costs are caused by mismanagement of resources allocated to quality efforts?
Quality and price	Willing to pay more for quality, lower price elasticity (Porter), price indicates higher quality, Quality provides utility and increases consumers' willingness to pay	Evaluate sacrifice and utility vs. price (Troye 1990) Is the quality worth the price? (=empirical question)	Evaluate sacrifice and utility vs. price Does quality comply with price. 30 years of research show divergent results.

Who is wrong?

Who is right?

6.5 How do the variables interrelate?

This section attempts to establish a framework in order to study the economic consequences of quality related work. Although, our main focus is to emphasise certain relationships, formulated on the basis of the propositions above, the constructs in this study are obviously interrelated. In a proposed research model, we will discuss and illustrate how the various constructs might be related.

Models seek to represents a simplified understanding of reality. The objective of a research model is to establish an understanding of some empirical phenomena, including their components and the relationships between the components, logically arranged among concepts (Nachmias and Nachmias, 1981)

A conceptual model suggested by Gummesson in 1993 will only serve as a starting point in our discussion. Gummesson does not consult the input which improved quality requires. He only emphasises the anticipated advantages from quality improvements. Even though the model is not tested empirically, it illustrates the complexity of the second part of our research problem: The output of successful quality.

Exhibit 6.3   The conceptual model from Gummesson (1993)

Illustrates a start
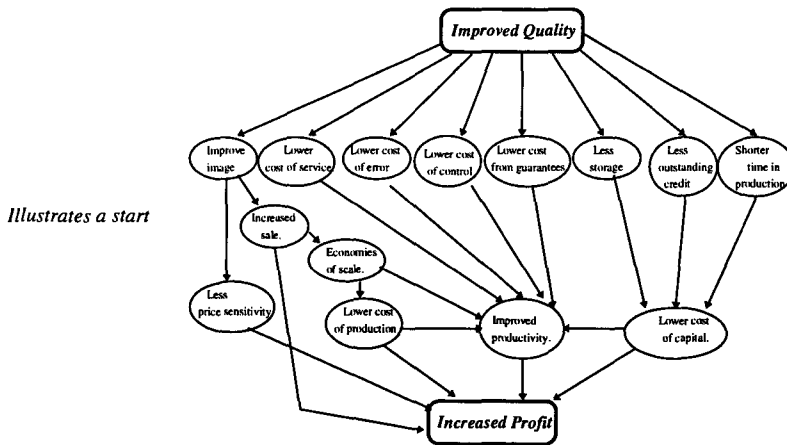
Gummesson's model initially represents a convincing framework. However, to operationalize the model appears to be rather difficult. Furthermore, to analyse all the relationships we would need a detailed and large database of company information. Such information is a scarce resource in the "real world". Finally, Gummesson's model is more in line with Crosby and the PIMS studies - i.e. quality reduces cost. Based on economic theory, we do not find it reasonable to perceive quality as a free lunch that few people know of. Such view would make our research tautological. We want to investigate the determinants of successful quality and then its economic consequences.

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Phillips, Chang & Buzzell (1983) represent a simpler alternative than Gummesson. The authors have operationalized the proposed model and conducted an empirical test (cf. chapter 5).

Rust et. al.(1995) describe a recent attempt to model the association between quality and economic measures. Their study is rather similar to ours with respect to empirical setting and constructs in focus. Rust et. al. also anticipate that quality requires resources, i.e. some efforts (input) are necessary. However, the authors do not test their framework empirically. Neither do they discuss the possible impact from omitted causal factors. Exhibit 6.4 shows the framework they used.

Exhibit 6.4 A model of service quality improvement and profitability

Illustrates a managerial concept, not an empirical model
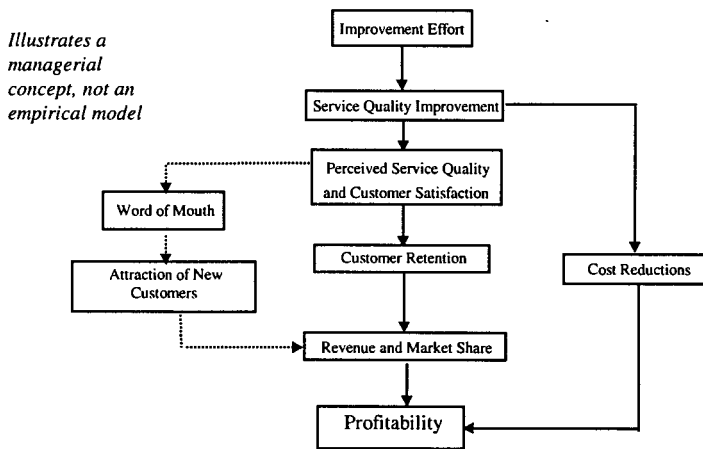
Rust, Zahorik & Keiningham (1995)

The model from Rust et. al. does not include prices explicitly. Neither is it developed to conduct an empirical analysis, but rather to be a management tool. This might explain the lack of control variables considered.

Our objective is to create a research model, which is suitable to the purpose of our research problem - i.e. to empirically test the relationship between quality and economic measures. Initially we seek a simple model. However, the model might be extended if found insufficient. Exhibit 6.5 displays our proposed framework and denotes the specific relationships discussed in this chapter.

Exhibit 6.5 A suggested research model - The framework
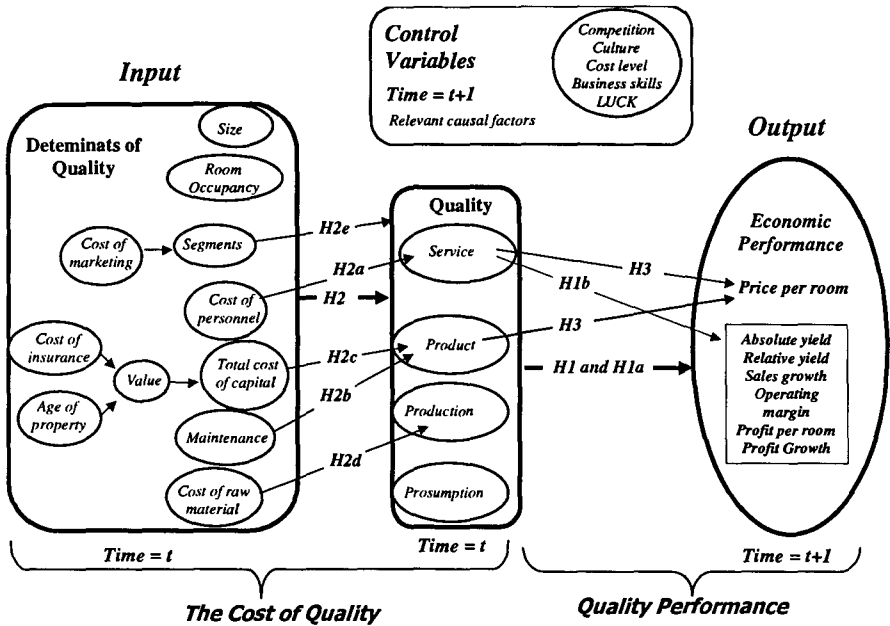
The model suggests a direct link from quality to economic performance. Furthermore, we also believe improvements in quality will fuel prices, which again drives profit. The direct relationship between cost and quality is somewhat uncertain. This does not imply that our opinion coincides with Crosby - i.e. quality is free. Crosby's quality is probably free. Still, our understanding of superior quality performance implies that quality requires investments.

How do we measure quality investments? We emphasise that the level of specific cost items will not necessarily prove that a company is allocating resources efficiently into quality related efforts. High costs might as well indicate overspending, waste and mismanagement. The challenge is to obtain precise and relevant cost information.

However, our main concern is to find whether indications of successful quality drive economic performance. Thus, even if we do not manage to quantify all the specific resources and efforts related to quality, superior quality could still have a positive impact on performance. A final question is which one of the quality dimensions to prioritise.

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Chapter 7: Methodology

> You cannot manage what you cannot measure.
> You cannot measure what you cannot operationally define.
> You cannot operationally define what you do not understand.
> You will not succeed if you do not manage.

<div align="right">Defence System Management College[24]</div>

This chapter contains a discussion of a research design related to the proposed hypotheses. Our intention is to develop empirical tests of the relationships between quality and various economic measures. This requires a decision concerning the direction of the relationships between the constructs. Furthermore, there are issues related to external validity, sample strategy and experimental design.

7.1 Is quality a causal factor?

The theory mostly suggests that quality have a positive impact on prices and economic performance. Furthermore, we anticipate that quality requires resources, which are reflected in specific cost items (Troye et. al., 1995, Rust et. al., 1995).

Most studies assume causal links between quality and economic variables such as prices, costs and profitability. Causality can not be proved. Hume said that causality relies on the fact that we observe some systematic variations between objects or phenomena. Nevertheless, there is nothing concrete in these objects or phenomena, which actually link them together. Repeated correlations among two objects will strengthen our beliefs about causality. Blalock (1971) says that there exists a gap between theory and method because we think in casual models, but are only able to observe correlations. Although, causality has alternative definitions (Cook and Campbell, 1979), the social science literature frequently emphasises three main criteria. First, the direction of influence has to be established. Second, there has to exist an association or correlation between the objects. Finely, isolation against other effects is crucial in order to rule out other alternative explanations (Hunt, 1991; Bollen, 1989; Cook and Campbell, 1979). In our research design, all of these criteria are relevant to address.

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[24] Referred from Talley (1991)

a) The direction of influence

If the relationship between two variables is to be defined as causal, the direction of influence requires the occurrence of the independent variable to proceed in time to the occurrence of the dependent construct - i.e. the cause must be observed before the effect. In most studies it is possible to find arguments for the relationships to be opposite, reciprocal, or non-causal. With regards to the hypothesised relationship between quality and economic performance, two options are evident:

1. Hotels which obtain superior quality (scores) <u>will have</u> better economic performance
2. Superior quality (scores) <u>will lead to</u> better economic performance

Strictly, we are testing the first option, but anticipating that it implies the second. Thus, we <u>assume</u> that quality, the way we observe it, has a causal influence on economic performance. To follow the criteria of direction of influence, we have to measure quality prior to economic performance.

We suggested that the efforts devoted to quality will be reflected in certain cost items. Hence, we have to measure the cost first, and then the effect on quality. However, we believe the cost related to a quality effort will be reflected in the quality indicators within one year. Annual data makes it difficult to observe the cause (ΔCosts) before the effect (ΔQuality) within this time frame.

Formally, our research may be expressed by two equations:

Quality is a function of costs!

$$eq.7.1: \quad Quality_t \Rightarrow Q_t(..C_t..) \qquad\qquad dC_t/dQ_t > 0$$
$$eq.7.2: \quad Economic\ performance_{t+1} \Rightarrow E_{t+1}(..Q_t...) \qquad dE_{t+1}/dQ_t > 0$$

Economic performance is a function of quality!

The equations postulate that changes in quality are related to economic measures in a certain way. The first equation formulates quality as an effect (dependant variable) of resources (costs$\Rightarrow$independent variable) spent in specific areas. The second equation states that quality causes (quality$\Rightarrow$independent variable) economic performance (dependant variable). In fact, quality is both a cause and an effect in our study. It is caused by certain input variables and influences certain output variables.

Nevertheless, the result of an empirical analysis will never be sufficient to prove the direction of influence. Even if the model provides strong evidence for our hypothesis, we find acceptable arguments for alternative directions.

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For instance, superior economic performance might provide better possibilities to
invest in a quality program. In contrast, a distressed financial period should lead the
firm to reduce their quality-related expenses. Nevertheless, this does not prove that
economic performance causes the quality ratings. Instead, the financial state of the
company influences how they emphasise quality and customer satisfaction.
Figure 7.1 illustrates the possible relations.

Figure 7.1 Economic Performance influence quality?
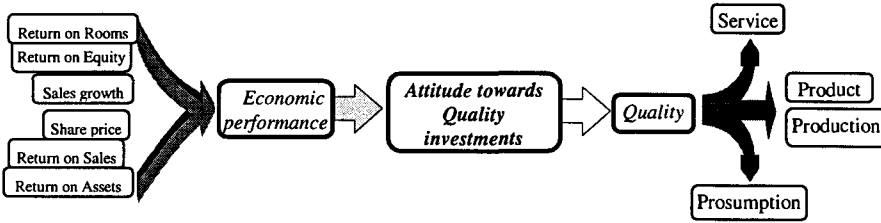
Moreover, the central management will normally pinpoint low quality ratings from the
customers of a specific hotel in a chain. Low ratings will then cause the local manager
to act and perhaps put more resources into staff training and physical maintenance. On
the other hand, high quality scores could be an argument against further investments
in physical upgrading and staff training courses. Hence, it is possible to argue that low
quality ratings indirectly cause higher costs as illustrated in figure 7.2.

Figure 7.2 Low quality ratings influence costs?
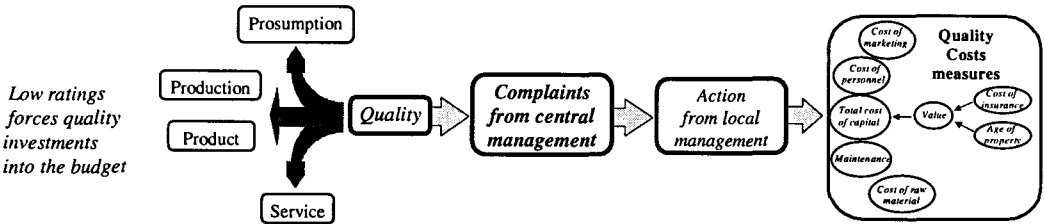
Finally, it is also possible that quality and economic performance are not linked at all,
but only spuriously correlated. Hence, the association is caused by a third construct -
presently unknown and unidentified.

In economic modelling, it is usually assumed that quality and costs are positively
related (i.e. Brems 1957; Rosen 1974). Thus, improved quality requires higher costs -
just as exhibit 6.4 suggests. The firm decides to invest in quality routines, quality
programs, service courses, upgrading and maintenance, which increase the costs.

The marketing and strategy literature (i.e. Rust et. al, 1995, Crosby, 1971, PIMS) also acknowledge that higher quality initially requires some sort of capital outlay. After a brief period, the quality strategy will reimburse these expenses through cost savings. Thus, the direction of influence is first cost, then quality and finally cost savings.

The traditional economist anticipates that improved quality implies higher cost of production. The modern strategists and marketers believe the initial cost related to quality efforts represents a profitable investment.

Higher quality produces increased utility. The economic axioms state that consumers are willing to pay more when utility rises. Thus, the direction of influence concerning the price-quality relation should first be quality, then price. We have noted that the view does not receive strong empirical support in the consumer behaviour literature (Monroe & Dodds, 1988). Some studies actually suggest an opposite direction of influence, arguing that many customers use the price as an important cue of evaluating quality.

Given that a causal relationship exists between quality and economic measures such as performance, costs and prices, the underlying theoretical direction of influence is clear. The theory mostly substantiates that quality has specific economic implications, and also that quality is influenced by the amount of resources spent. Nonetheless, we argue that the effects illustrated in exhibit 7.1 and 7.2 may mask the direction of influence.

Panel design is a way of testing the direction of influence empirically (Narver, Jacobson and Slater 1993; Engel and Reinecke, 1996). A panel design makes it possible to assess whether the independent construct is a stronger cause of the dependent construct, than the opposite way (Cook and Campbell, 1979). Thus, we would like to investigate if the quality at time T has a greater influence on the economic measures in time T+1, than the economic measure at time T has on the quality at time T+1. We need observations from at least two points in time to conduct this type of analysis.

At the theory level, the direction of influence is clear

Even though a causal design should be applied to a causal model, theoretical support may be used to assess the direction of influence (Hunt, 1991). The significance of a causal design is less if the proposed directions of the hypotheses are consistent with the literature and logic. This implies that the burden of proofs lies with the researcher of new non-fitting theories (Hunt, 1991). We will argue that the empirical and logical arguments related to the proposed directions of influences between quality and economic measures are logical and conceptually well documented in the literature.

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b) Association

If an independent variable is caused by a dependent variable, then changes in the level of the independent variable must be systematically associated with the changes in the level of the dependent variable (Hunt, 1991). Absence of association will then be a strong argument to reject a hypothesis of a causal relationship. Equation 7.1 and 7.2 reveal that quality is both an independent and a dependent variable in our research design. The costs items are independent whereas economic performance is a dependent variable in our model.

In order to detect an association, it is preferable that the variables have a certain level of variance. If the customers' perception of the quality of a given product were invariant, then it would be difficult to know if quality had any association with performance. If all the cost items were constant, it would be equally impossible to find a potential link from costs to quality. Likewise, if the sampled economic measures of our survey were close to constant, it would be hard to study any association to the quality variable. We do need variation in the measures of the constructs in order to be able to analyse a potential association. The crucial issue is to design a sampling procedure that captures the relevant variation. If we have applied a sensible and valid sampling procedure, invariance is an argument against a potential association.

Random sampling error can cause false association or a lack of association. A reasonably large sample will be able to produce significant information regarding the presence of no results. Based on the Central Limit Theorem, this will also be the case in field studies (Mohr, 1990). Particular relevance to this study is the likelihood of omitting others factors (cf. background factors, see e.g. Calder, Phillips and Tybout, 1981). This will increase the standard error. Thus, the choice of probability level of rejecting a false Ho should be based on balancing the consequences of rejecting a true Ho (type 1 error) and the costs or possibilities of increasing the sample size.

There are two critical issues related to the association criteria of this study. One is to obtain variation in the quality construct (i.e. the independent variable). The other is to acquire a sufficient sample size. The quality measures from the U.S. hotels reveal less variance than we desire. The sampled hotels are homogenous and thus obtain similar feedback from the customers. A way to alleviate this problem is to include hotels with less similarity into the sample. However, this strategy would further enhance the challenges related the criteria of isolation.

Finally, the number of Norwegian hotels probably does not represent a sufficient sample size for our research problem.

c) Isolation

If the independent variable causes the dependent variable, then there must be no other variables or constructs - if introduced into the model - would affect the systematic association between the independent and the dependent constructs. Restated, this condition asserts that a causal relationship between X and Y requires that the covariance between X and Y remain when the effects of confounding variables - those variables causally prior to both X and Y, are removed. Thus, the criterion of isolation seeks to avoid that the results are based on spurious and masked (i.e. suppressed) associations. This requires that we rule out all other possible causal factors.

On what grounds can we do this with any degree of confidence? In the case of firms' performance, there is a potentially infinite universe of variables that might influence it - including quality. Unfortunately, there is no statistical test of coefficient that can tell us whether we have made a correct decision concerning omitted variables.

At some point we have to "assume away" remaining uncertainty

Yet, at some point we must establish a closure in our model and examine the relationships among a finite number of measured variables. The choice of which variables to include is a function of substantive and theoretical insights into the problem under investigation. A rule of thumb says to use the control variables presented in the literature and applied in previous studies (Berry, 1993). The challenge is to identify confounding variables and incorporate these (measures) into our model. However, all relevant variables cannot be considered. At some point we have to proceed on an «as if» basis. In other words we proceed «as if» omitted confounding variables do not represent any problems. Asher (1976) warned the researcher to go too far and be paralysed by data analyses. Blalock emphasises the point as follows:

> No matter how elaborate the design, certain simplifying assumptions must always be made. In particular, we must at some point assume that the effects of confounding factors are negligible. Randomising helps to rule out some of such variables, but the plausibility of this particular kind of simplifying assumption is always a question of degree.
>
> Blalock (1964)

The criterion of isolation requires absence of feedback effects in our model. A feedback effect or a non-recursive effect occurs when the independent variable affects the dependent variable, and vice versa. We have already suggested that economic performance could make the company able to invest in a quality program, whereas increased quality will fuel profits. We argued that the relationship between price and quality could be either way. A panel design will help to alleviate these challenges.

Finally, to propose an incorrect functional form of the relationship between two variables can cause masked effects (Narver and Slater, 1990). The literature in economic modelling suggests that the quality-performance relation is an optimisation problem. Thus, the relationship might be curve linear. The strategy literature, on the other hand, suggests that quality should be maximised - zero defects. This would favour a linear model.

7.2 Research design

Our main objective is to study a potential causal relationship between quality and economic variables. An ideal research design would require manipulation of an assumed causal factor followed by a study of the changes in various effect variables. The challenge of most research problems is to acquire control of other potential causal factors and their influence on the hypothesised relationships. The classical experiment presents the best procedure in order to ensure that the criteria of causality are fulfilled (Cook & Campbell 1979; Nachmias C. & Nachmias D. 1985). The classical experiment is an ideal model of testing causal relationships.

Keeping the classical experimental design as a model of logical proof, a number of alternative quasi-experimental designs have been developed (Cook & Campbell 1979). A quasi-experimental design differs from a classical experiment because they seldom occur inside a laboratory and never involve the random assignment of units to be studied. Their structure typically involves one or more treatments, measures taken after the treatments, and often, more than one unit receiving each treatment. Quasi-experiments can be described as random field experiments, except that the treatment assignment is by self-selection or administrated rather than by chance (Cook, 1983).

However, manipulation of treatment is often difficult in studies where companies and customers are the units of analysis. We had to create a situation where some hotels agreed to ignore quality-related efforts, whereas the other group emphasised such work. After a few years, we could measure the effects on the chosen economic parameters. Obviously, this operation would require substantial resources, way beyond a normal research budget. In modelling a causal research design, we have to consider a trade-off between the design's ability to test the theory and the resources available.

In our research problem there are two kinds of correlation designs to consider. The best alternative is the *panel design* to meet the requirements of isolation (through control variables), association (through variance in independent variables), and direction of influence (through two or more observation periods). The less attractive alternative is a *cross sectional correlation design*. The former design alternative requires observations from two or more periods, whereas the latter design can be accomplished through a single data collection operation. Consequently, the latter design is the most popular, although it does not provide any guidelines with respect to the direction of influence. The panel design requires more data, but offers some guidelines concerning the direction of influence.

With a panel design, we can assure that the quality measures proceed the measures of the dependent economic performance variables. Furthermore, it will enable us to investigate and compare the reciprocal effect from the economic performance measures and back to quality. In our research problem, we can possibly rule out that customer based quality influence cost. Furthermore, it is difficult to argue that economic measures should affect the response from a quality survey. Nevertheless, if we consider a possible pressure from the central management and the general faith that customer opinions matter, we might argue that low ratings will force the local hotel management to action (cf. exhibit 7.1 and 7.2). This does not imply that the relationships are reversed, but instead suggests a possible feedback effect through a third variable. The panel design represents a significant advantage related to the existence of feedback effects.

Finally, our research design will lead to an empirical test which in fact confounds two issues; first whether quality leads to profit and second whether the management makes optimal quality decisions.

7.3 Empirical setting

Although we find many reasonable arguments together with case studies and gurus promoting quality as a sure profit driver, the relationship between quality and economic measures has received little empirical attention. Thus, there are few guidelines in the literature to model the relationship. However, quality related work would not make much sense if our hypotheses were reversed. Since the effects from quality presented in chapter 6 have not been proved, the empirical study should be classified as a theory test (Cook and Campbell, 1979). In this type of research, internal validity and statistical conclusion validity represent crucial aspects when we select the empirical setting. A theory describing the economic effects of quality should hold for firms in general. Calder, Phillips and Tybout (1981; 1982; 1983) state that a theory, proposed to apply for organisations in general, should be rejected if it is falsified for any subgroups of organisations. On the other hand, if the theory is confirmed, subsequent studies may explore the external validity of the proposed hypotheses. Our study involves accommodation services in the upper band of the market. Thus, even if we find support for the proposed hypotheses in this segment, the results are not necessarily valid for other types of accommodation offerings or to the hotel industry in general. In any empirical setting, there are two requirements, which deserve attention.

Variance in the independent construct is important in order to be able to test the proposed theory. Thus, we need different values or levels of quality in order to be able to test whether there exist any relationships.

Companies within a certain industry and/or subgroup will probably adapt themselves to an interval which is far less than the hypothetical range of the quality variable. Given that the proposed theory is valid, the company might get feedback from the market regarding the quality they offer, and adjust it accordingly. Hence, companies will secure the quality within certain intervals. Exhibit 7.1 and 7.2 illustrates feed back effects. Such mechanisms will prevent us from studying the effects from extremely high and low levels of quality. However, extremely high or low quality does seldom occur in practice. Thus, we can argue that the effects from such values have minor interest.

Furthermore, it is important that the empirical setting is homogenous with respect to all factors outside the model. This will improve the statistical power of the tests through less random error variance (Cook and Campbell, 1979). A higher level analysis will normally improve the criterion of homogeneity. The industry may serve as a higher level unit of analysis for companies. Thus, by selecting a certain industry for our study, we might rule out the industry effects. The importance of quality is likely to vary according to industry, (Porter, 1980,1990) and these industry effects are not easy to determine a priori. We have chosen to focus on a particular industry in this study. Although external validity will suffer, the strategy will strengthen the statistical power of the tests involved.

The hotel industry is our empirical arena. The reason for this choice is more practical than theoretical.

Our study is more a theory application than a theory test

The hotels in our study are members of two hotel companies. Both companies emphasise homogeneity and product consistency as important parts of their strategies. This is an advantage concerning statistical power of the tests due to less random error variance (Cook and Campbell, 1979). However, the external validity of the study might be seriously questioned. Nevertheless, empirical work on the economics of quality is limited. The narrow scope can be defended by the lack of sufficient groundwork. We want to contribute by exploring the association between quality and economic measures in a restricted empirical setting. In fact, the empirical setting implies that our study is better described as theory application, than theory test.

7.4 Data collection

The purpose of data collection is to gather valid information regarding the measures included in the hypothesised model. Two independent sources of data are relevant. The independence of the data sources will be beneficial in order to avoid common method variance.

U.S. and Norwegian hotels represent the empirical arena

A study of the relationship between quality and economic measures requires detailed company information. Ideally, the sampling frame in a study of quality and economic measures should comprise all products and services supplied in the economy. This is obviously an unrealistic perspective. In fact, very few companies collect and store the type of information our research problem requires. Theoretically, it could be possible to collect primary data relevant to measure our constructs. From a practical point of view, this is not a tempting strategy. A general survey of the relationships would be close to impossible or at least require resources far beyond our abilities. Thus, we have limited the sampling frame to a specific industry - namely the hotel industry. Unfortunately, we have not been able to meet the requirements to external validity within this industry. Our work is based on data from two specific chains of hotels in Norway and the U.S. Due to the many factors influencing economic measures apart from quality, we find it reasonable to emphasise internal opposed to external validity.

From these particular chains of hotels, we have collected information from guest surveys measuring various aspects of quality. The Norwegian study comprises separate quality surveys in three segments: holiday makers, conference participants and business travellers. The U.S. survey is conducted across segments, but respondents are requested to denote the nature of their stay, either business or pleasure. This information is only available at the hotel level.[25]

The quality survey in the Norwegian hotels started in 1990 and was completed in 1996. During this period, approximately 10.000 guests have evaluated the quality of around 40 different hotels. The U.S. survey is significantly larger. Its comprises 800 hotels and almost ½ million respondents. Parallel to these surveys, we have access to management accounting information from the hotels. The data from are described in chapter 8.

Our study is based on customer's surveys and detailed financial information from two significant hotel companies in Norway and the U.S.

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[25] This means that we only know the fraction of tourist at each hotel.

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7.5 Measurement

Measurement is how a concept is connected to one or more latent construct, and how these are linked to observed variables. According to Bollen (1989), the process of measurement is to give the meaning of each concept, identify the dimensions and latent variables (i.e. constructs) to represent it, form measures, and finally specify the relation between measures and the latent variables (i.e. constructs).

A measurement model may be viewed as a structural model in which the observed indicators are related to the latent constructs. A crucial issue is to decide the relationship between the indicators and the construct. Determining the direction of causation is always a troublesome topic - the relationship between the indicators and constructs being no exception. According to Blalock (Namboodiri, Carter, and Blalock, 1975) one should distinguish cause (formative/induced) indicators and effect (reflective) indicators. Cause indicators are observed variables that are assumed to cause a latent variable. In the case of effect indicators, the latent variable causes the observed variable. Effect indicators are the most popular within the social science. Cause indicators are relatively rare despite their obvious appropriateness in many instances.

Figure 7.3 illustrates the differences between the two measurement procedures. We have chosen to use variables from our specific research problem as examples.

Figure 7.3 Reflective and formative measures

Quality is reflected by indicators whereas economic performance is formed by indicators

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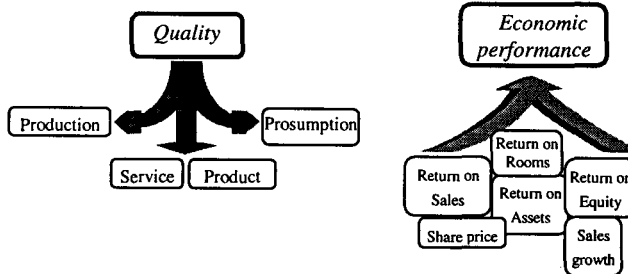
It is necessary to establish a causal priority to determine whether an indicator is a cause or an effect of a latent variable. In our example, we use customers' evaluation of product aspects as indicators of quality. Since it is hard to argue that the customers' opinion of the quality changes the quality, it should be reasonable to perceive these measures as effect indicators. However, it is possible that poor feedback from the customers forces the company to improve its offering. Thus, we cannot disregard the presence of feedback effects. Finally, it is possible to assume that the quality dimensions are formed by the sum of scores from various questions.

In studies of economic performance, the analysts often measure variables of importance to the economic performance of a firm. These observed variables might be viewed as causes, influencing the economic performance of the firm. However, it is theoretical possible that there exists a simultaneous reciprocal caution between an indicator and a latent variable. For instance, we can never prove that economic performance causes better return on assets. However, it is likely that strong economic performance reduces the cost of capital and thereby influences return on assets.

Economic performance may also increase the stock price of a company. Again, there are other reasonable arguments that the stock price influences economic performance.

7.6 Control variables

The control variables represent effects where variation is not desirable (relevant causal factors). They are important to include, meeting the requirements of isolation. This is a crucial issue in order to decide whether the variation in the dependent variables are actually caused by the variation in the independent variables, and are not a result of variation in omitted variables.

Control variables are important in order to ensure that we are analysing what we think we are analysing!

One solution to this problem is to select cases (hotels) which do not differ much with respect to the possible control variables (matching). The matching principle implies that the control variables are kept constant. This will limit the validity of our survey because the procedure does not enable us to analyse how the control variables effect the associations we are studying. The alternative is to incorporate the control variables into the model as explanatory variables.[26] However, more variables imply less degrees of freedom. Increased sample size can solve this problem.

The choice and measurement of control variables is crucial with respect to internal validity. The control variables are important in order to decide whether the observed relations may be considered as causal (Calder et. al. 1981, Cook et. al. 1982, Nachmias, & Nachmias 1985). In social science, we often experience that parallel phenomena will influence the relationship we try to study. In our particular survey, there are many possible factors that will influence the relationship between economic measures and quality.[27] By including other relevant casual factors, the internal validity of the survey will improve. Lack of internal validity implies that there exist alternative explanations of the relationship between cause and effect (Mitchell 1985). The most reasonable alternative is to include such variables into the model. Matching is a second possibility. However, matching removes some of the information provided by the control variables.

We have proposed a general interest in the factors that determine and influence the quality ratings. Consequently, we choose to include the control variables as part of the analysis. We believe our strategy provides more knowledge than if these effects are left to the error term.

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[26]Multiple regression (MLS) and ANCOVA enable us to incorporate control variables.
[27] For instance the fraction of leisure guests, occupation rate, location (see Larsen and Troye, 1997)

7.7 Description of specific variables

In this section we will discuss practical and theoretical issues related to operationalization of the specific variables included in our study.

7.71 Economic performance

Previously we have discussed the concept of economic performance and showed that there are several ways to measure it. Whether these measures should be perceived as formative or reflective is a question without an exact answer. In this survey, we will argue that the various measures of economic performance influence the construct and thus are formative. Empirical tests (Skalpe, 1997) suggest that a significant correlation exists among the various indicators of economic performance. This implies that different indicators do not measure separate aspects of the economic performance construct, but rather that there exists a significant overlap of what they measure. Moreover, each of the economic indicators comprises little unique information. By concentrating on one single indicator at a time, we would loose some information with respect to the true economic performance, but still gain a lot in simplicity. It is easier to interpret the results from an analysis of observable single indicators, compared to models comprising latent variables formed by multiple measures. The use of one indicator assumes a 1:1 relationship between the indicator and the construct. In the case of one indicator, there are no practical differences to whether the measures are reflective or causal.

Our database involves management reporting systems, measuring a number of accounting items for around 40 Norwegian and 200 American hotels. The Norwegian data are collected three times a year and cover a period from 1988 to 1996. The American data are reported annually, and we have obtained figures from 1995 and 1996. Finally, we have collected information related to the insurance values (Norway) and the age (USA) of each hotel. Thus, the information enables us to estimate operational efficiency and return on capital employed.

The hotel industry often focuses on cash flow from operations as a measure of performance. Cash flow from operations represents cash available to cover cost of debt, owners' income, loan repayment and investments (Kinserdal 1994).

In Norwegian full service hotels without any rental or leasing agreements involved, a cash flow from operations below 20% of sales is considered poor, between 20 and 25% is described as medium performance, whereas a cash flow above 25% of sales is characterised as superior performance.[28]

Table 7.4 illustrates how the cash flow margin is calculated in a full service hotel:

Table 7.4 Cash flow from operations in a full service hotel - in percent of sales

Sales of goods	*60%*
Revenue from rooms	*40%*
Turnover	***100%***
Salaries	*40%*
Costs of goods	*25%*
Other costs	*20%*
Sum costs	*85%*
Cash flow from operations	*15%*

However, cash flow from operations neither reflects the cost of capital nor depreciation. If a company invests in modern and efficient equipment, the cost of capital and depreciation will normally rise. Thus, the company would need more cash from its operations in order to maintain its net profit margin.

If we apply the net margin as a performance measure, the cost of investments will be better reflected. However, we acquire an additional problem: the gearing ratio moves the net margin because the profit and loss account does not reflect the cost of equity. The gearing ratio within the Norwegian hotels industry reveals high variance. In fact, there are many hotels with negative equity (Mathiesen et. al., 1994; Skalpe, 1994, 1995; 1996; 1997).

RevPar assumes comparability

Instead of relating income to turnover, the real estate industry often compares revenue to square foot, number of offices or physical units. These ratios are related to performance because the cost structure in real estate is simple and stable. It mostly depends on the size of the rental area. Thus, the income per square foot may be equally relevant as profit to sales or investments. The hotel industry is comparable to a short-term real estate business - letting out shares of the property on a daily basis. Thus, revenue per room has been adopted as a common performance measure. If the costs in the accommodation department are fixed and the same per room across all hotels, revenue per room available (RevPar) is a valid performance measure In a chain of homogeneous hotels, such an assumption might be more realistic than it appears.

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[28] These are rules of thumb from Knut Sevalsen, managing director of Norway largest consulting firm on tourism.

Given that the costs per room available are more or less constant, increased RevPar will imply higher profit. The management is left with two alternatives. One is to increase the price per room sold and the other is to stimulate the occupancy rate. An easy and dishonourable[29] way to achieve the latter is to offer discounts. However, RevPar acknowledge the trade off between the occupancy rate and the price per room sold.

RevPar does not reward expansion through heavy discounting. Neither is RevPar sensitive to issues related to the classification and recognition of costs. It assumes comparability and ignores costs all together. This makes RevPar less appropriate across hotels in different areas and segments. The major advantage of RevPar is that it is based on two rather indisputable figures: the gross income over the number of rooms. Unfortunately, the measure disregards valuable information comprised in the cost structure. An extremely cost efficient operation needs lower RevPar than an expensive and high-class hotel. RevPar is only comparable among hotels with almost identical cost structure. Both our U.S. and Norwegian hotels are spread around the respective countries. Even if these hotels are rather similar, we believe that the cost structure will vary according to location. A rural hotel is likely to experience lower cost than a city centre facility. RevPar only focuses on the price per room and occupation rate. A rural hotel might deliver a healthy bottom line, despite reasonable pricing and a moderate occupancy rate. In order to meet the criteria of identical hotels, we will consider changes rather than levels of RevPar. However, low RevPar in one year might make a high percentage improvement more likely. Growth in RevPar does not necessarily imply either high absolute RevPar or superior profits.

Our U.S. data also enable us to relate RevPar to RevPar of the nearest competitors. This relative measure avoids some of the disturbance from the variance in the cost structure. Finally, we will substitute revenue in RevPar by profit. We have denoted this performance measure as *ProfPar*.- i.e. profit per room available

There is no perfect measure of economic performance

Various economic performance measures have their strength and weaknesses. It is hard to find the best measure available. By choosing the industry's favourite: Cash flow from operation and RevPar, access to data will be less complicated. It will be easier to communicate the results back to the participants. Furthermore, we avoid problems around valuation of assets and influence from differences in capital structure. Cash flow from operation basically overlooks these issues. RevPar goes further by also ignoring the information concealed in the cost structure of the operations. By comparing changes in RevPar, relative RevPar and ProfPar, we avoid judging lean and mean, low priced operations as inferior performers.

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[29] Sigurd Troye (1996, p. 109) describes discounting as a simple, non-profitable and dishonourable strategy to increase the occupancy rate

If inflation is moderate and the transactions are fairly recent, historical costs provide an objective proxy of the market value of the assets (White, 1994). Historical cost of a hotel facility is not relevant because the transaction could easily be twenty years old. Thus, we will estimate value through the cost of insurance and the age of the building. Finally, we will relate this number to profit. The measure will serve as a proxy of return on capital employed. Exhibit 7.5 provides an overview of our measures of economic performance.

Exhibit 7.5 Measures - Economic Performance

Yield based   *Accounting based*

Revenue per room available

Change in Revenue per room available

Revenue per room available relative to competition

Economic performance

Cash flow from operations to sale

Profit related to the value of the property

Profit per room available
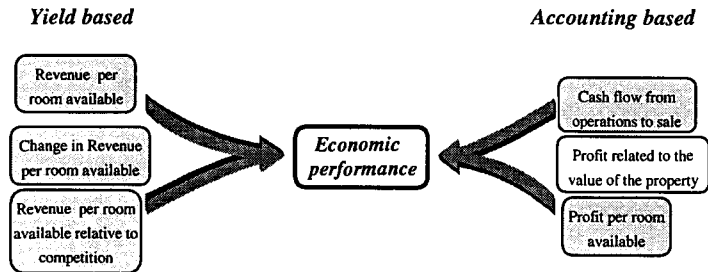
7.72 Costs

In economic modelling, it is often assumed that superior quality implies increased utility and thus higher costs. However, general economic theories do not provide guidelines with respect to the specific cost component that the improvements in quality will affect. Chamberlin (1953) suggests a positive correlation between the costs of advertisement and quality. These results comply with our hypothesis related to costs of marketing and quality perception (H2e). Brems (1957) assumes a relationship between the level of quality and total costs of the firms, whereas Dorfman and Steiner (1954) focus on quality and the average variable costs.

Costs signalise resources spent, but also wasted

The advantage with the quality cost relation compared to the association between quality and economic performance, might be that the constructs are closer related. The challenge of analysing economic performance is the many other factors apart from quality, which simultaneously influence the construct. It may be somewhat easier to analyse specific cost items and their relation to the quality construct. However, high cost may denote mismanagement and waste of resources, instead of efforts and increased spending related to an efficient quality strategy. A distressed firm will normally reveal higher relatively cost than its competitors. If we assume that high costs signalise quality, we run the risk of mixing the costs of mismanagement, distress and waste with the costs related to a quality strategy. Mismanagement, distress and waste will probably have a counteractive effect on quality. It is reasonable to accept that you need resources to create and maintain superior quality perceptions among the customers. However, we do not know whether incremental costs are caused by a quality effort. It might just as well be caused by negative events with an opposite effect on quality perceptions.

Based on the literature and previous studies, it should be reasonable to analyse the association between quality and costs. Our operationalization of the quality construct enables us to consider various aspects of the construct and relate these to specific cost components reflected in the management accounting system. The availability of an internal accounting system makes it possible to conduct detailed analyses. The service element might for instance be compared to the wages of the service personnel. We also anticipate a correlation between product quality, cost of maintenance, and value of the facility. Finally, it is possible to argue that the production element should be linked to cost of raw material (cf. exhibit 6.4). Exhibit 7.6 illustrates the costs items we expect to reflect the resources invested in quality.

Exhibit 7.6 Quality and related costs
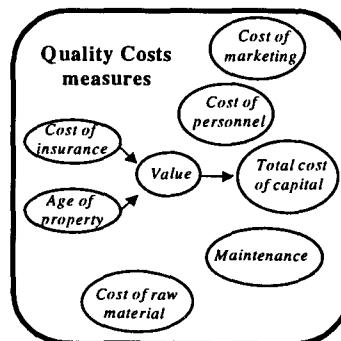
7.73 Prices

The prices within the hotel industry vary according to season, segment, weekday, etc. (Horwath, 1997). A single business traveller pays a much higher price per room than a tour operator. Furthermore, the players in the hotel industry negotiate various agreements with the tour operators, companies and single customers, leading to diversity in the prices and conditions offered. This picture makes it difficult to establish the relevant prices in order to investigate the relationship between the quality and the price of a bed night. We know that weekend tourists pay less and simultaneously tend to be more positive towards the quality offered. Business people pay more, but are more demanding or generally harder to satisfy. The differences in prices are a result of classical price discrimination (Lipsey and Steiner, 1981).

Business people pay more than tourists, but are less satisfied
If we apply the average price per guest night aggregated over all types of customers, the hotels focusing in the business segments will reveal higher average prices than the typical tourist hotels. The discrepancy in prices does not necessarily imply that the guests perceive the quality superior, but rather than the business segment pays more. Besides, we suspect business people to be more critical in their quality response, compared to the panegyric tourist. In order to control for the various strategies concerning the focus of segments, it is possible to include variables measuring the percentage of customers within the different groups.

Seasonal and daily variations in prices are another important issue to consider. Some hotels focus on weekend tourism while others do not offer any discounts to attract this segment. Hotels normally vary their prices according to the season, or time of year. This seasonal pricing is often opposite for winter and summer resorts. By using annual averages, the issue is avoided.

Finally, it is important to consider how many people on average occupy a room. The price per person in a single room is higher that the price hotels obtain per person in a double or triple room. If our hotels differ substantially concerning the number of guests occupying each room, the internal validity of our survey will be questioned. We assume that the sales mix of double and single rooms is relatively equal in our sample of hotels.[30]

We do not know if quality perceptions are affected by the fact that the guest stays alone or together with other people in the room. As long as quality does not depend on the number of people staying in each room, the issues concerning the sales mix of double and single rooms can be left to the error term. We will focus on the average price per room sold.

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[30]Revenue per guest in a double room is often lower than the revenue per guest in a single room. The chains of hotels we are studying are fairly homogenous - also concerning the distribution of single and double rooms.

7.74 Quality in the Norwegian and U.S. hotels

The operationalization of the quality construct will be managed according to the description in chapter 2. Thus, the measurement procedure will reflect the customer's perception of the various elements: backstage, service, structure and prosumption. This operationalization is based on research in Norway conducted during several years.[31] The model has been applied and tested on a number of hotel chains such as Inter Nor Hotels, Best Western and IACC. Questionnaire surveys have been used to measure the various dimensions. Exhibit 7.7 illustrates the underlying structure in the questionnaire, while appendix 7.1 provides an example of how the results are reported. The data from the U.S. also enable us to follow the ideas from this concept.

Exhibit 7.7 Measurement of quality

Source: Henjesand (1991)
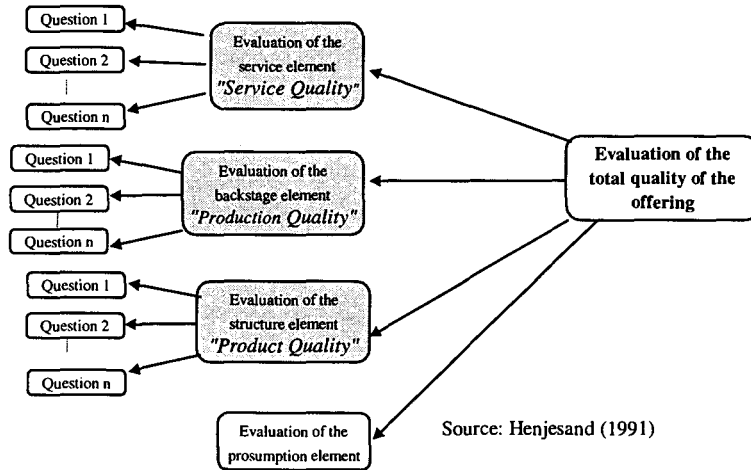
The exhibit above and appendix 7.1 show that the evaluations of the various product elements are reflected through a sample of questions in a questionnaire. The measurement scale mostly has a range from -5 to 5 in the Norwegian survey and 1 to 5 in the U.S. study.[32] The higher value the better quality. Thus, the quality construct will be given a distribution that can be described by level (mean) and the variation (variance). The norms, which form the basis for evaluation of product quality, provide the level for the various elements. Variance around the level tells us how reliable the product is compared to the level. The level provides information about the average perceptions of the product, while the variance may be interpreted as consistence of the product quality. (Henjesand, 1991).

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[31]See Troye and Henjesand (1991), Delrapport I; Henjesand (1991), Delrapport II; Henjesand (1991), Delrapport III; Troye og Henjesand (1991), Delrapport IV; Henjesand (1991), Delrapport V, for a review.
[32] The U.S. survey applies A,B,C,D,E, where A is best and E is the worst. We have converted this scale to a numeric scale by letting A=5, B=4, C=3, D=2, E=1.

Henjesand (1991) treats the measures of the quality elements as continuo variables. The customers' evaluations are generated from a sample of questions, which are assumed to reflect the various dimensions within each product element. The measure of the value of a product element for a certain hotel is decided by the arithmetic mean of its customer's evaluations. This procedure results in four quality indices on each of the product elements for the hotels.

The backstage and service elements vary in the short term. The elements are likely to be influenced by the changes in the customer base and customer density. Thus, measurements of the backstage and service elements will only be valid within a certain time span. In a survey covering many years, these indices should be frequently updated.

The structural and prosumption elements are assumed to be more stable. The measurements of these elements might be more consistent over years. The need for continuously updating should be somewhat less. Unfortunately, the U.S. data do not include information regarding the prosumption element. We are therefore forced to disregard it from the study.

7.75 Size

The theories from microeconomics suggest that company size influences economic measure through economies of scale and economies of scope.[33] If the hotel industry has substantial fixed costs and the variable costs per room are reasonably stable, the average cost will be decreasing. Thus, the cost per guest night should be less in large hotels compared to small pensions, cet. par. The high fixed costs related to investments in buildings, equipment and maintenance, make economies of scale likely in the hotel industry. Neither should economies of scope be irrelevant.[34] The frequency of alliances, chains and franchise agreements indicates that economies of scope are recognised. The size of the firm also affects the market power, and thus might affect profits and prices as well as costs.

Size might influence both quality and economic measures

The crucial issue, however, is whether the size of a hotel will affect the quality perceptions from the customers. Although, this does not occur as an obvious relation, we cannot be sure. Some of the elements in our quality construct (service) might be better taken care of in a small hotel, whereas large hotel might provide a better structural impression (product quality). Thus, the size of the hotel cannot be ruled out as a possible causal factor, systematically disturbing the relationship between quality and economic measures. The possible effect will be controlled through various measures of company size. The following alternatives seem to have satisfactory face validity:

1. Turnover
2. Number of guest nights
3. Number of rooms
4. Number of employees

At the empirically level, these variables will probably be strongly correlated. This will ensure convergence validity. Thus, the question is which one of the four alternatives that is most relevant to our research problem.

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[33] Economies of scale and scope are discussed in many elementary textbooks i.e. Munthe: Markedsøkonomi, Universitetsforlaget 1982, side 31-38.
[34] The advantage of company size is often expressed through the constructs Economies of scale and Economies of scope.

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Gross revenue is a common measure of company size. The reason is not necessarily that it represents the best measure of size, but rather that revenue data are easy to obtain.

The sales figure is a product of price and quantity sold. Higher prices will therefore increase sales. However, prices are normally not related to company size. In a market with approximately perfect competition, it is assumed that prices are similar for the same products. Thus, the sales figure or the number of units sold could be equally valid as measures of company size. We expect the prices to vary according to competition, local price level and marketing strategy. This variation might be controlled through geographical location and segment. Thus, the sales figure should be a fair control of the size effects.

If we instead apply the number of guest nights or room nights to measure size, the variations in prices will not disturb our measure. On the other hand, this measure of size will be influenced by the firm's ability to utilise its capacity. A hotel with few beds but a high occupancy rate will be defined as bigger than a hotel with more beds but less guest nights.

If we use number of rooms as a size measure, we avoid the problems of separating the two possible control variables: economies of scale and occupancy rate. Economies of scale will depend on the amount produced, i.e. if the beds are occupied. Thus, the number of rooms measures the potential economies of scale. Potential economies of scale might not influence economic measures. To measure size based on number of rooms, we ignore the level of production in the measure of economies of scale construct. Number of rooms may measure potential economies of scale, but is not equally valid to measure actual economies of scale. The advantage, however, is that the number of rooms neither includes prices nor customer density (i.e. occupation rate). This represents a significant advantage regarding divergent validity related to the other variables in the analysis.

Number of employees also represents a reasonable proxy to measure the size effects. However, a measure created to reflect economies of scale should be linked to the volume of production, instead of to the consumption of certain production factors. It is the level of production, which both causes the reduction in fixed cost per unit and gains due to specialisation. Thus, capacity and employees do not alone ensure economies of scale.

Both sales (1) and number of guest nights (2) reflect company size. The sales figure denotes the value of the production as the product of the average room price and the number of rooms sold. The number of guest nights or room nights indicates the level of production. If we choose the sales figures as size control, we include the price level into the control variable. This means that the price-quality analysis will utilise the price variable on both sides of the equation. The price variable will also be present in the profit. The companies' abilities to obtain higher prices do not appear as a relevant aspect of economies of scale. Thus, we might prefer to use the volume of production to control for the size of the firm. The number of guest nights or rooms sold is

assumed to reflect the possible effects from economies of scale. However, this measure will also be included as a factor in the room revenue figures and hence have a strong impact on profit.

Economies of scale postulate that large hotels are more profitable than smaller hotels - due to the fact that they are large (Lipsey and Steiner, 1981). Hence, we incorporate size as a control variable. The number of rooms does not mix prices, activity and customer density into the measure of economies of scale.

Is it really optimal to be big?
In many businesses however, it is advocated that there exists some optimal firm size. Discrepancy from this ideal greatness will imply higher cost per unit. The optimal size will vary according to industry[35]. Maybe there does exist an optimal size of a hotel operation? This would make our discussion of the size variable irrelevant and worthless. Finally, it is not obvious that the size of a hotel will effect the customers perception of the quality. If not, the size effect could be left to the error term.

We cannot disregard the size of the hotel operation as a relevant variable to consider in our study. On the other hand, we really do not know if it matters. We are basically forced to let the empirical data decide. Even if the number of rooms only measures potential economies of scale, it includes less disturbing information such as price and activity level. This represents an advantage regarding divergent validity against the other measures we intend to incorporate in the analysis. Finally, the number of rooms has satisfactory face validity.

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[35]See for instance "A review of Monopolies and Merger Policy, Cmnd. 7198. London 1978, s 87-88.

7.76 Occupancy rate

Many studies show that the occupancy rate is a relevant factor to the profitability of hotels (Granseth, 1992; Skalpe, 1997). Furthermore, it is normally assumed that the hotels can increase the occupancy by discounting. Finally, it is reasonable to anticipate that the occupancy rate will influence the guest perception of quality. (Fladmark Larsen, 1993; Fladmark Larsen and Troye, 1997). Thus, the occupancy rate cannot be excluded as a potential causal factor, disturbing the relationships we are studying.

The occupancy rate measures the hotels' ability to utilise its production capacity. The Norwegian Bureau of Statistics reports occupancy rates according to number of rooms and beds. A double room is often sold as a single and thus the occupancy rate per room is higher than per bed. Tom Granseth (1992) applied occupancy rate per room in his survey on occupancy rates and profitability. Thus, we have two options to consider.

Table 7.8 Measurement of occupancy rate

1. Room occupancy
2. Bed occupancy

The following example illustrates the differences between the two measures. If a hotel has 100 double rooms and sells 80 rooms as singles, the room occupancy will be 80%, and the bed occupancy only 40%. However, by selling the same number of guest nights in double rooms, the occupancy rate will by 40%, both by bed and by room. Thus, both measures will depend on the number of beds per room. The two measures will coincide, only for hotels selling singles rooms. Most hotels have single rooms, double rooms, family rooms and suites. The occupancy rates measured by bed or room will depend on the distribution of the various room categories. The more beds per room, the less likely it is to achieve high bed occupancy.[36] Occupation rate per room will be exaggerated in hotels, which often are forced to sell their suites and family rooms to single customers.

Thus, the two measures have their pro and cons. None of them appear to reflect the occupancy rate in a perfect manner. In our study we want to include occupancy rate as a control variable. This means that we apply the occupancy rate to control for variations in the economic measures, which at the same time influence the customers' perception of quality. (cf. a relevant causal factor).

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[36]Average number of beds per room for 4 members of the Inter Nor: Hotel Saga   2,38
                                                                     Hotel Klubben   2,07
Source: Hoteller i Norge 1994, Reiselivsutvikling   Gardermoen Airport 1,65
                                                                     Olavsgaard Hotel   1,60

It is reasonable to assume that the number of beds per room will decrease the average price per bed night.[37] Whether the number of beds per room will effect quality is more uncertain. If we believe the customers' perception of quality does not depend on the number of guests per room, the effect can be left to the error term.

Does an empty bed in a taken room represent excess capacity?

However, we should choose either occupancy rate by bed or by room. The bed occupancy will be low if the hotel often sells double rooms as singles. Nevertheless, this might result in a high average price per guest night and also lead to an acceptable performance.[38] The room occupancy should be more relevant in order to measure the possibilities of improvements. Occupancy by bed will perceive empty beds in an already taken room as surplus capacity. Nonetheless, spare beds in occupied rooms do not represent a business opportunity in our samples of hotels. Empty rooms do.

However, neither of these measures are reflecting spare capacity or occupancy rate in a perfect manner. The room occupancy appears to have a slightly better face validity compared to occupancy by bed. Furthermore, the room occupancy seems more appropriate in order to control the relationships we are analysing. Tom Granseth (1992) used the room occupancy in his study of the relationship between profit and occupancy rate. The author has also applied this measure in a recent study (Skalpe, 1998).

In the U.S. sample, we only have information about occupancy rate per room. The discussion above does not provide convincing arguments to acquire additional occupancy measures. Based on theoretical and practical point of view, we will concentrate on occupancy rate per room.

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[37]More beds per room is likely to result in more guests per room. The price per person in a double room is normally much less than the price per person in a single room. Consequently, the more guest per room, the lower price per guest night.

[38]Business and conference travellers are likely to sleep alone in double rooms. These segments normally pay a higher price than others.

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7.77 Market segment

In this study we have decided to apply a market oriented understanding of the quality construct. Thus, we find it relevant to investigate if the importance of quality varies according to segments. Variation in prices, costs and performance between the hotels might be caused by divergence in strategic focus on segments, such as holidaymakers, conference participants or business travellers. It is reasonable to assume that a hotel specialising in the business segment would manage to satisfy business people better than tourists. Furthermore, we anticipate that the professional travellers are more critical in their responds - i.e. they are more demanding customers. Finally, the business market pays more than the holiday market. Consequently, the strategic focus with respect to customer segment meets the requirements of a relevant causal factor.

The National Bureau of Statistics in Norway manages three segments: Holiday travellers, conference participants, and business. In 1996, the holiday segment accounted for 55% of all guest nights. The business segment comprised 28,4%, while conferences occupied the remaining share of 16,6% of the hotel capacity.

It should be reasonable to split the two largest segments into smaller sub segments.

Private and public sectors have different systems concerning reimbursement of travel expenses. In the private sector, the expenses are often reimbursed according to the documented out of pocket expenses. In the public sector standard rates are applied. The rates depend on the destination and the duration of stay. Thus, the public system provides incentives to "go cheap" and obtain a surplus from the journey. We suspect that the system in the public sector stimulates price consciousness. This split is not equally important in the conference market.[39]

Likewise, we might separate the leisure market into individual travellers and organised groups/package tours - the former being less price-sensitive and more profitable to serve than the latter.

The split into market segments is based on an assumption that the price elasticity varies according to the type of customers. The price elasticity is lowest in the business segments, and highest in the (group) holiday market (Mathiesen et. al., 1994).[40] A reasonable operationalization of the segment variable should control for the following segments:

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[39] Both public and private sector will often be invited by their own or other organisations to a fully arranged conference package. Thus, their ability to go "cheap" is restricted.
[40] See SNF rapport 95/94 for empirical documentation.

Table 7.9 Market segments in the hotel industry

Segment	Economic aspects	Quality perception
1. Business: Private sector	*Prices less important*	*More critical*
2. Business: Public sector	*Prices matter*	*More critical*
3. Individual tourists	*Prices matter*	*Less critical*
4. Groups holiday	*Prices are important*	*Less critical*
5. Conferences	*Prices less important*	*Moderately?*

To obtain a detailed segmentation as illustrated in table 7.9, we would need substantial resources. Most hotels restrict their number collection to the three segments already required for the reports to the National Bureau of Statistics. This segmentation procedure represents an operational simplification. In order to implement all the segments we have describe in table 7.9, a separate analysis is necessary.

Our data enable us to incorporate an index, which measures the fraction of tourist and pleasure-related stay per hotel. This index denotes the market strategy according to two different segments:

1. Holiday and leisure related
2. Business and work related   } Index: Fraction of tourist per hotel

Even though a more refined division might be useful, it will require resources and reduce the degrees of freedom. Furthermore, it is not certain whether there are any differences related to the quality perception of the five segments stated in table 7.9. We are not certain how fruitful a further segmentation would be, or if it would benefit our analysis at all. Hence, we find it sufficient to split the market into pleasure related and work related demand.

7.78 Geographical location

Geographical location influences both economic measures and quality

Fladmark Larsen and Troye (1993,1997) analyse the relationship between customer-based quality and the geographical location of hotels. It seems likely to assume that some of the dimension in the quality construct will vary according to location - for instance the prosumption element.

On the other hand, it is probably more obvious that the costs, prices and performance may differ according to location (Skalpe 1994). Geographical location, thus, appears interesting as potential control variable. Both the U.S. material and the information from the Norwegian hotels allow a geographical analysis. We believe the most obvious differences will be evident between city centre hotels and hotels in more remote areas (Skalpe, 1998). The information contained in the data will on the other hand restrict the analysis regarding this control variable. However, creating too many subgroups reduces the degrees of freedom.

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7.8 Summary

There are many potential variables that might influence the relationship between quality and economic measures. These factors can mask the relationship we are studying. Thus, it is necessary to include control variables into the model. The control variables provide increased certainty that the observed relations are caused by variation in the variables we are studying, and not other variables outside the model.

Multicollinearity is an important consideration in our study

There are many possible measures that provide satisfactory face validity of the variables that are relevant to our study. The discussion has left us with a sample of alternative measures. The criterion of divergent validity provides some restrictions concerning the choice of measures. Divergent validity is important in order to avoid multicollinearity in the independent variables. Most of the control variables appear to be strongly correlated to variables such as: price, cost, and economic performance.

The relation to the quality variable is more uncertain. This indicates that we should consider leaving some of the control variables to the error term. However, it is more serious to leave out a possible causal factor, than to include one that is irrelevant. (Gujarati, 1988). This is an argument to include all the control variables.

Some variables may control several aspects simultaneously

Finally, we will underline that the operationalization of the control variables will have implications with respect to how we in practice shall consider them. In some instances it might be possible to create one control variable that simultaneously controls several effects. If for instance the size of the hotel depends on its location, a location variable might also control the size factor.[41]

Table 7.10 provides a summary of potential constructs and possible measures relevant to our study.

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[41] This argument is based on the fact that hotels are smaller in rural areas.

Table 7.10: Operationalization of variable - summary of possible measures

Variable The economic measures:	Measures	Advantages	Disadvantages
Economic Performance	Return on Equity	Relevant performance measure to the owners Easily accessible for listed firms	Not easily accessible for unlisted firms Subjective valuation will be necessary Many hotels have negative equity in their balance sheets. Various leasing and rental agreements makes valuation complicated. Sensitive to gearing ratio.
	Return on assets	A favourable success measure of resource allocation.	Not easily accessible Subjective valuation will be necessary. Ignores the effect from the gearing ratio
	Cash flow from operation	Less exposed to subjective valuation. Focuses on the operation of the hotel and not on the financial structure Easily accessible	Ignore the effects from investments which offer possibilities of a more efficient operation, but higher cost of capital Sensitive to classification of costs The rental expenses of a management company is often included in «other costs», while the some of the costs caused from the assets in a combined company often are reflected in financial items or non reported costs of equity.
	Net profit margin	Not exposed to subjective valuation. Focuses on the operation of the hotel and not on the financial structure Easily accessible	Ignore the effects from the costs related to equity. Sensitive to classification of costs
	Yield based 1. RevPar 2. Growth in RevPar 3. Relative yield	Not exposed to subjective valuation, nor classification of costs. Easily accessible and internationally acceptable. Focus on changes and relative yield will remove disturbance from other relevant causal factors.	Ignores the cost structure all together. Efficient cost management can provide acceptable profits despite low yield. Low yield in one year makes it easier to obtain a high percentage improvement the year after. High relative yield could be caused by weak competition in a certain area.
Costs	Costs of goods Cost of maintenance Cost of insurance Cost of personnel Total cost of capital	We do not have many alternatives to measure sacrifices, resources or effort put into a specific area.	High cost may imply two things 1. The firm put effort(invest) into an area 2. The firm mismanage an area The account does not tell us whether it is 1. or 2. - or maybe a mixture.
Price	Obtained average price per guest night	Easily accessible incorporates discounts	Mask variations according to segments Number of beds per room?
	Price lists	Easily accessible Information on price discrimination should be evident from the price list	Hidden discounts Distribution of volume among price categories

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Table 7.10: (cont.)   Operationalization of variable - possible measures

Variable	Measures	Advantages	Disadvantages
The quality measures:			
Quality	4 production processes Backstage, service, Prosumption and Structure	An empirically tested concept Makes it possible to evaluate various aspects of the quality construct.	Not common in the literature
Other measures:			
Size	Sales	Easily accessible	The sales figure includes the price
	Guest nights	Easily accessible	The number of guests nights is a component of occupation rate
	Number of rooms	Easily accessible price is not included	Measures potential economies of scale, not realised.
	Number of employees	Price is not included	Measures potential economies of scale. Problems of distinguishing part time/full time and owners work.
Capacity utilisation	Occupancy rate per room	Easily accessible A common measure	Ignores the economic benefits of having two people in the same room, instead of one.
	Occupancy rate per bed	Easily accessible A common measure A precise measure	Exaggerates the economic loss of having one person in the room, instead of two.
Segment	5 different segments (cf. table 7.7)	More sensitive to possible differences in price elastisities	Not easily accessible Reduction in degrees of freedom Uncertain relation to the quality perception
	3 segment: Business, Holiday and conferences	Easily accessible A common segmentation	
	2 segment: 1. Business, 2. Holidays and conferences	Easily accessible More degrees of freedom	May not be precise enough
Location	SSBs categorises	Easily accessible A common measure	Not a precise measure
	U.S. categories	Easily accessible Applied by a big player What are our options?	We do not know the rational behind this classification of hotels.

Chapter 8   Analysis

> Whatever economic theory of business mens' opinion may suggest, however, the ultimate test of whether and how a given factor is related to profitability is an empirical one.
>
> Schoeffler, Buzzell, Heany (1974)

> ....there is little convincing evidence that quality and cost leadership are successful business strategies in the first place".....The only evidence for a positive relationship between product quality and ROI is that provided by the PIMS studies.
>
> Buzzell, Gale and Sultan. (1975)

So far we have argued that quality should be judge by consumers after they have experienced the product or service. Our model for quality measurement is specially tailored for service based products, such as for instance hotels, restaurants, banks, insurance and education. In this study, we have operationalized our quality-economic approach in a sample of around 40 Norwegian hotels and 800 U.S. hotels.

The analysis is divided into three parts.

The first part provides an overview of the data. However, the objective is not only to describe the different variables, statistical properties etc., but also to conduct some simple statistical tests, relevant to the following analysis. For instance, we want to explore whether the holidaymakers generally are more positive than the business travellers. Furthermore, we apply factor analysis to establish how the U.S. guest survey reflects the quality dimensions discussed earlier.

Part two comprises partial tests of the hypotheses described in chapter 8. This will serve as a preliminary discussion and an approach towards a more complex and complete model.

Finally, we test and discuss more general models in a LISREL 8.20 framework.

Part 8.1:	Descriptive statistics
Part 8.2:	Partial tests and analyses
Part 8.3:	Assessment of complete models

Part 8.1: Descriptive statistics

8.1.1. Introduction

The first step of any data analysis should involve an assessment of the adequacy of the input data and the statistical assumptions underlying the estimation methods being used (Bagozzi & Yi, 1988; Hair et al. 1995).

Our database contains information from a leading Norwegian hotel chain and an American counterpart. Both chains have carried out quality surveys among their customers for several years. The quality surveys in the Norwegian hotels have been designed according to the model referred earlier, whereas the American quality data have been produced without our influence. Nevertheless, through factor analysis we will show that the American survey carries sufficient information to reflect three out of the four dimensions in the quality model. Finally, we have obtained management accounts and performance data from the same hotels overlapping the time span of the quality surveys.

Multinormality is an important assumption behind multivariate analysis. The reported values of skewness and kurtosis are still the most common method to assess distributional aspects. High values of skewness and kurtosis may cause biased parameter estimates, leading to unreliable standard errors and model fit (Bagozzi & Yi, 1988; Jöreskog and Sörbom, 1996). Hence, the researcher is recommended to delete variables, which are significantly non-normal from further analysis. Muthèn and Kaplan (1985) and Kaplan (1990) suggest that variables with skewness and kurtosis values outside a range from -1 to 1 should be treated with caution.

Skewness or kurtosis does not represent a major problem in the quality data. On the other hand, financial ratios and performance measures extracted from management accounting systems are often not normally distributed (Gupta and Huefner, 1972; Deakin, 1976; Frecka and Hopwood, 1983; Buijink and Jegers, 1986; Barnes, 1987; Ezzamel and Mar-Molinero, 1990; Dugan et. al., 1994; Lau et. al., 1995; Devinc and Seaton, 1995; Martikainen et. al., 1995, Dahlstedt et. al. 1995; Skalpe, 1997). Both the skewness and kurtosis values are in many cases far from the recommended interval. The literature on statistics (Hoaglin and Mosteller, 1983) regards this as a serious problem. According to accounting literature, it is a wide spread and well-documented problem.

Deakin (1976) investigated the distribution of eleven financial ratios and found that only one ratio was not significantly different from the normal distribution. Although various transformations helped in reducing the non-normality behaviour, it did not eliminate it. Somewhat later Foster (1979) and Frecka and Hopwood (1983) focused on the existence of outliers in the distribution of financial ratios. Frecka and Hopwood confirmed Deakin's result regarding the non-normality pattern in ten out of eleven ratios. However, the normally distributed ratio found by Frecka and Hopwood was not the same as the one Deakin discovered earlier.[42] Furthermore, Frecka and Hopwood pointed out that normality could be achieved by removing outliers from the distribution.

Later, Buijink and Jegers (1986) have advocated that lack of homogeneity between industries could be a source of disturbance. Therefore, financial ratios from firms operating under various economic environments are not necessarily normally distributed. Gupta and Huefner (1972) provide examples of such differences and their effects on ratios.

Watson (1990) acknowledged the lack of normality in joint distributions of several ratios. He attempted to solve the problem by removing multivariate outliers. Lee (1985) interprets the non-normality situation as heterogeneity and tries to normalise the distribution by transforming the ratios through a factorial regression.
So (1987) analysed Deakin's 11 ratios and concluded that logarithmic and square root transformations reduced skewness but did not lead to normality.

Ezzamel and Mor-Molinero (1990) and Barnes (1987) provide an excellent review of the literature in this area. From the extensive empirical research into the properties of financial ratios it is concluded that the distributions of ratios are typically non-normal and contain many outliers. Transformations based on simple algebraic functions or regressions are used to overcome these problems. However, both Ezzamel and Mor-Molinero (1990) and Frecka and Hopwood (1983) found that deletion of outliers had a stronger impact, in terms of improving approximation to normality, than did square root and natural root transformations. Various theoretical distributions, such as normal, gamma and stable Paretian have also been suggested.

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[42] Working capital to total assets (Frecka and Hopwood) vs. total debt to total assets (Deakin)

Nevertheless, there is no universal agreement or sound solution to the issue of the distributional properties of financial data. Knowledge of the theoretical distribution which best approximates the underlying distribution is crucial in order to decide which statistical tests are appropriate. Empirical research shows that the level on which the data are analysed influences the goodness of fit to the normal distribution. Furthermore, transforming the data often alleviates the problem of kurtosis and skewness. In our analysis, we are studying homogenous samples from a specific industry. Thus, departure from the normal distribution should be less than in a general study of financial ratios - or even less than in studies focusing on certain industry groups.

Our strategy will be to carefully examine the distribution of the performance measures before we include them in the analysis. We will generally seek to avoid economic measures (ratios) which reveal strong non-normality features. Secondly, we consider the advice from Ezzamel and Mor-Molinero (1990), and Frecka and Hopwood (1983), to delete outliers in order to "improve" the distribution.

The calculations below illustrate the distribution of four performance measures in the U.S. sample of 1996. It shows that non-normality is only a problem for the distribution of cash flow margin. However, if we remove two outliers from this distribution, the kurtosis and skewness values drop to a more acceptable level.

Removal of outliers restores the distribution towards normality

Variable	Mean	Kurtosis	Skewness	N	
CASH96M	0.37	39.79	-5.19	224	Cash flow to sales
CASH96R	6928	0.84	0.30	174	Cash flow per room (hotels open before 96)
REVPAR96	44.1	0.70	-0.03	224	Revenue per room
YIELD96	117	1.18	0.30	607	Revenue per room relative to competition
Two outliers removed:					
CASH96M	0.37	1.67	-1.01	222	Cash flow to sales

8.1.2. The Norwegian quality data

a) Overview of the Norwegian quality data

The Norwegian quality data comprise eleven surveys carried out during 1991 to 1996. Table 8.1 describes the data available to measure the quality construct. All together, around 13.000 customers from three different segments have been asked about their perception of the quality of the hotel in which they are staying. Appendix 8.1 provides an example of a typical questionnaire. The quality score available to the customer range from -5 to +5. A high value indicates a positive opinion of the quality, and visa verse.

Table 8.1: The data on quality perceptions

Time	Segment	#respondent	#hotels
Summer 1990	Holiday	1 197	66
Summer 1991	Holiday	1 801	48
Summer 1992	Holiday	787	13
Summer 1993	Holiday	787	32
Summer 1995	Holiday	1 277	37
Summer 1996	Holiday	1 343	41
Sum holiday segment		7 192	237
Fall 1993	Business	1 056	31
Fall 1994	Business	1 107	36
Fall 1996	Business	1 151	35
Sum business segment		3 314	102
Fall 1993	Conferences	526	26
Fall 1994	Conferences	885	32
Fall 1995	Conferences	1 099	36
Sum conference segment		2 510	94
Sum total		*13 016*	*433*

In order to present summary statistics, extracting additional information from the data, we have decided to perform a cross sectional and a time series analysis. We want to examine whether there are any differences between the quality perception across segments, and if the quality measures are stable over time. Besides, the analysis might provide useful information regarding possible background variables, masking the hypothesised relationship between quality and economic measures.

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b) Customer mix analysis – Norwegian hotels

Table 8.2 supplies an overview of the summary scores in each segment of the various aspects we are measuring. The table indicates that the business segment generally is less satisfied with the quality provided. The business segment also appears more critical than the conference segment, whereas the conference segment is less satisfied compared to the holiday segment. The results suggest that the more pleasure incorporated into the stay, the less critical the customers are in their evaluations of the quality (i.e. a probable mood effect). This tendency is reflected in all the four elements.

Table 8.2: Quality perceptions according to segment[43]

	Holiday		Conferences		Business	
Variable	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Prosumption	2,72	1,79	2,25	1,96	1,79	2,00
Structural	3,12	1,52	2,81	1,52	2,65	1,61
Backstage	3,12	1,55	2,87	1,58	2,56	1,58
Service	3,50	1,51	3,32	1,55	3,11	1,60
No. of respondents		5995		2510		3314

Tourists are generally more satisfied than business travellers

Furthermore, the prosumption element appears to be the most difficult to manage. Most customers seem reasonably satisfied with the service quality provided. Both results are valid across segments.

If we follow Rust et. al. (1994) recommendations and transform the 11 point scale into a three point scale, the main conclusions prevail. Business people are hard to delight, whereas the holidaymakers are generally more positive. Table 8.3 shows the fraction of delighted and dissatisfied customers in each segment.[44]

Table 8.3: Quality perceptions according to segment[45]

	Holiday		Conferences		Business	
Variable	Dissatisfied	Delight	Dissatisfied	Delight	Dissatisfied	Delight
Prosumption	33 %	23 %	43 %	15 %	53 %	11 %
Structural	22 %	31 %	28 %	24 %	31 %	20 %
Backstage	23 %	31 %	29 %	25 %	35 %	17 %
Service	17 %	43 %	20 %	36 %	22 %	31 %
No. of respondents		5 995		2 510		3 314

It is easier to criticise physical objects than service personnel

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[43] The 1990 survey in the holiday segment is excluded because it comprises a different sample of hotels.

[44] Scores from -5 through 2 are defined as dissatisfaction, whereas scores from 4 through 5 are defined as delight.

[45] The 1990 survey in the holiday segment is excluded because it comprises a different sample of hotels.

c) Time series analysis – does the quality improve in the Norwegian hotels?

We expect the quality perceptions to get better as a result of the quality improvement program the Norwegian hotels have participated in.

The latter section indicates that quality varies according to segments. Thus, to investigate whether the quality has improved, we find it necessary to analyse each segment separately. In this section we will focus on the tourist segment only.[46]

We note that the surveys comprise different tourists from one year to another. Thus, some of the differences in the quality scores between the various surveys might be caused by differences in the samples. Secondly, the surveys vary according to sample size, and the number and types of hotels included. Finally, the product itself is heterogeneous in nature and is affected by many factors beyond control of the suppliers. For instance, it is possible that the weather condition during the summer season will disturb customers' evaluations of the prosumption element. A possible halo effect makes it difficult to rule out that the weather also influences the other elements. Unfortunately, we do not have relevant information to control for all masking effects. Exhibit 8.4 illustrates some of the factors we anticipate will influence the quality perceptions over time.

Exhibit 8.4 Quality improvements
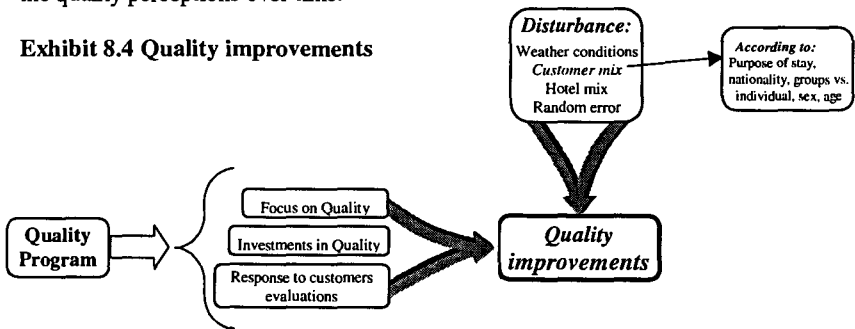
The respondents described in this section regard themselves as tourists. Furthermore, country of origin is also denoted in the questionnaire. In order to explore the possible disturbance from the latter variable, we have separated the sample into two groups: Domestic and foreign. Table 8.5 compares how the Norwegian and foreign tourists evaluate quality. A positive number denotes that the Norwegian holidaymakers are more satisfied, whereas a negative sign implies higher quality scores among foreign tourists. Table 8.5 does not indicate that there are any systematic differences between these two groups' perceptions of quality.

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[46] The reason is practical, not theoretical. We simply have more data on the tourist segment.

Table 8.5: Quality perceptions - differences between domestic and foreign

Norwegian scores minus Foreign scores						
Year	1990	1991	1992	1993	1995	1996
Service	0,55	0,19	0,07	0,09	0,13	-0,23
Backstage	0,29	0,07	0,16	0,16	-0,1	-0,28
Structure	0,35	0,05	0,03	-0,12	-0,09	-0,23
Prosumption	0,22	0,16	0,11	0,04	0,21	-0,08
Total			0,69	0,55	0,39	0,04
Respondent-N	393	1352	611	616	869	1012
Respondent-F	787	445	175	171	408	331

The differences are small, inconsistent and insignificant. Although the Norwegian tourists seem slightly more positive in their summary evaluation, the results are inconsistent in the structure element.

If we examine the various results over time, keeping control of the foreign versus the domestic dimension, we do not find any trend in the level of the quality offered.

Table 8.6: Quality perceptions over time - domestic and foreign

Norwegian score						
Year	1990	1991	1992	1993	1995	1996
Service	2,85	3,89	3,57	3,89	3,23	2,99
Backstage	2,41	3,27	3,13	3,52	2,91	2,77
Structure	2,53	3,38	3,23	3,23	2,92	2,73
Prosumption	1,96	2,82	2,71	3,06	2,61	2,52
Total			3,38	3,5	3,15	2,74
Respondent-N	393	1352	611	616	869	1012
Foreigh score						
Year	1990	1991	1992	1993	1995	1996
Service	2,3	3,7	3,5	3,8	3,1	3,22
Backstage	2,12	3,2	2,97	3,36	3,01	3,05
Structure	2,18	3,33	3,2	3,35	3,01	2,96
Prosumption	1,74	2,66	2,6	3,02	2,4	2,6
Total			2,69	2,95	2,76	2,7
Respondent-F	787	445	175	171	408	331

In order to isolate the potential effects from the *hotel mix* somewhat better, we have selected certain hotels where approximately half of the respondents are foreign tourists. Thus, we seek to compare the evaluations from foreign and domestic guests, keeping the product offer constant. The comparison did not reveal any significant differences among the two groups in how they perceived the quality of the hotel product. We did not discover any particular differences concerning the level of quality perceptions (mean), or any differences regarding the stability of the evaluations (standard deviation). The results in table 8.7 indicate that the proportion of foreign tourists does not affect the total score at the hotel level. Thus, it should not be necessary to consider the proportion of foreign tourists as a control variable in our later study.

Table 8.7: Quality perceptions - domestic and foreign tourists

Quality perceptions do not seem to vary according to nationality

Norwegian score						Foreign score				
Year	1991	1992	1993	1995	1996	1991	1992	1993	1995	1996
Service	3,97	3,56	3,94	3,03	3,09	3,78	3,45	3,52	3,10	3,37
Backstage	3,32	3,04	3,48	2,61	3,03	3,26	3,12	2,98	2,80	3,04
Structure	3,10	3,15	3,07	2,53	3,03	3,29	3,21	3,07	2,70	3,18
Prosumption	2,97	2,35	3,31	2,23	2,85	2,59	2,38	2,85	2,18	2,82
Total		3,45	3,41	2,82	2,97		2,70	2,61	2,48	2,76
Respondent-N/F	118	92	85	85	101	103	72	85	79	83

Norwegian Std						Foreign Std				
Year	1991	1992	1993	1995	1996	1991	1992	1993	1995	1996
Service	1,18	1,18	1,22	1,72	1,79	1,25	1,87	1,51	1,63	1,65
Backstage	1,32	1,31	1,38	1,73	1,64	1,45	1,54	1,74	1,85	1,74
Structure	1,48	1,21	1,34	1,65	1,71	1,76	1,41	1,62	1,83	1,63
Prosumption	1,64	1,71	1,39	1,97	1,71	1,90	2,18	1,87	2,40	1,85
Total		1,31	1,72	1,64	1,82		1,77	2,33	2,16	2,13

Domestic-foreign 2-Tail sign: P-value						Levene's Test on variances:P-value				
Year	1991	1992	1993	1995	1996	1991	1992	1993	1995	1996
Service	0,25	0,68	0,05	0,79	0,27	P= ,259	P= ,001	P= ,065	P= ,279	P= ,121
Backstage	0,72	0,73	0,04	0,49	0,97	P= ,122	P= ,090	P= ,037	P= ,983	P= ,984
Structure	0,41	0,77	0,99	0,52	0,53	P= ,372	P= ,105	P= ,039	P= ,851	P= ,133
Prosumption	0,16	0,92	0,10	0,89	0,89	P= ,136	P= ,129	P= ,002	P= ,183	P= ,622
Total		0,01	0,02	0,26	0,47		P= ,001	P= ,002	P= ,151	P= ,754

A sample of hotels with 50% foreign tourists

Finally, we have selected a sample of hotels, which participated in the surveys conducted in 1991, 1993, 1995 and 1996. More specifically, we randomly selected around 450 tourists from each survey in such a way that the number of respondents from each hotel is the same in all the years. Based on the indication that the proportion of foreign tourists is irrelevant, we have not controlled for this aspect. The purpose of the calculation is to further investigate the progress in quality.

Exhibit 8.8 confirms the lack of trend in the quality data. Thus, there is not much evidence to claim that the quality has risen during the period these surveys cover.

Table 8.8: Quality perceptions over time in a selection of hotels – tourists only

Equal #respondent from each hotel

Quality perceptions do not seem to improve

Mean score					Std score			
Year	1991	1993	1995	1996	1991	1993	1995	1996
Service	3,71	3,88	3,22	3,13	1,49	1,25	1,63	1,78
Backstage	3,17	3,46	2,91	2,95	1,50	1,34	1,65	1,66
Structure	3,25	3,30	2,75	2,72	1,48	1,32	1,67	1,72
Prosumption	2,82	3,14	2,46	2,54	1,78	1,59	1,91	1,91
Total		3,47	2,87	2,68		1,70	1,70	1,91
Respondent-N/F	454	455	455	451	454	455	455	451

If we analyse the development of the quality perceptions, we do not find any strong systematic pattern. Although one might expect the hotels involved in a quality programme to improve over time, the surveys conducted in the tourist segments do not seem to document any significant improvements. Most of the scores are lower in 1996 than in the survey of 1991. The deflation of the structure element can be explained by the fact that the hotels have become five years older. Later, we will show that customers tend to appreciate new facilities (cf. the U.S. data).

8.1.3 The U.S. quality data

a) Overview of the U.S. quality data

The quality surveys from the U.S. are similar to those conducted in Norway. Both studies are based on the principle that the customers should judge the product quality. Although the type and number of questions differ, both surveys rely on information from customers' response to questionnaires.

The data from the U.S. are presented at the hotel level, displaying frequencies in the various score categories. Thus, simple calculus makes us able to compute the mean, standard deviation and number of respondents per question for each hotel. Analysis at the individual respondent level is more restricted. However, the U.S. data contains almost 800 hotels with close to 100.000 rooms. Hence, the U.S. hotel corporation exceeds the size of the entire Norwegian hotel industry.[47]

During 1995 and 1996, the American hotel corporation received response from almost ½ million customers concerning their stay. Table 8.9 provides an overview of the data with respect to the number of rooms, hotels and respondents according to type of hotel.

Table 8.9: Overview of the U.S. quality data

The U.S. data match the entire Norwegian hotel industry

Type of hotel	1996 #hotels	1996 #rooms	1996 #respondents	1995 #hotels	1995 #respondents
Unknown	223	20 000*	57 628	28	764
Airport	48	5 937	15 750	48	15 282
Highway	218	20 974	65 499	218	49 240
Resort	3	388	1 122	3	1 057
Suburban	319	36 357	110 983	319	101 446
Urban	25	3 078	7 916	25	7 538
Total	*836*	*86 734*	*258 898*	*641*	*175 327*

*estimate

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[47] In 1997 the Norwegian hotel industry comprised 61.187 rooms. The Central Bureau of Statistics reports an average room price of around 600 NOK and an occupation rate per room of 50%. Thus the room revenue in the Norwegian hotel industry (comprising hotels with more than 20 beds) becomes: 62 000 rooms * 600 NOK * 50% occupation rate * 360 days = 6,7 NOK billion. This is approximately $1 billion. We have information regarding performance for around 600 of the 800 hotels in the US. chain. By summarising the revenue figures from 1996 for these 600 hotels, we end up we around $ 1 billion.

b) The measurement scale - mean and variance

The scale in the U.S. data range from A to F. A is denoted «excellent», and F is marked by the word «poor». Thus, the survey has applied the five point grading system, common in most U.S. schools and universities.

An important challenge with respect to a five-point scale is the lack of variance it allows. Many studies have demonstrated that people hesitate to apply the left side of a measurement scale. This is particularly relevant in questionnaires designed to evaluate products or measure satisfaction (Peterson and Wilson, 1992). In other words, people are reluctant to complain, opposed to express their positive views.

In evaluations on a five point scale, a neutral reply would be 3. The descriptive statistics in the frame clearly show that the customers are not neutral, but rather positive. It also confirms that the customers

Mean scores	1995		1996	
	Mean	Std Dev	Mean	Std Dev
Service Quality	4,53	0,12	4,58	0,08
Product Quality	4,48	0,17	4,48	0,16
Production Quality	4,35	0,16	4,36	0,15
The U.S. Data			N=499 Listwise	

It is easier to criticise physical objects than service personnel

find it easier to criticise physical aspects (i.e. product quality) than the interaction with the hotel staff (i.e. service quality). This finding complies with the results from the Norwegian hotels. Finally, the apparently inferior evaluation of production quality might be related to the time of day the measures are recorded. Our production (backstage) quality measure is based on customers' evaluation of the breakfast serving. There are many reasons for hotel guests to be more critical and negative in the morning. Nevertheless, these differences are not a crucial issue in our study.[48]

People are more critical in the morning

The lowest item score in the 1996 data is the evaluation of the heating, ventilation and air condition (HVAC) with an average of 4.24.[49] Higher evaluations are recorded when the customers are asked to rate the service provided from front desk, agent, etc. Generally, the customers seem reasonably satisfied with the quality.

From a research point of view, the lack of variance is a disadvantage. The purpose of our study is to relate variations in quality to variations in performance. If all the hotels in the sample succeed in providing high quality services, it is difficult to derive whether this strategy pays off. We would favour a sample in which the quality and performance levels produced high variances. The U.S. sample consists of rather homogeneous hotels. Most customers are reasonably content. The question is whether the narrow range of the quality scores makes it difficult to capture a possible association to the level of performance. The histogram below shows that the average score on a calculated service quality index varies between 4 and 4,85. It would be an advantage to the study if this range covered more of the interval from 1 to 5. However, these hotels belong to the same company and have similar strategies towards customer satisfaction. Thus, quality measured at the hotel level - based on evaluations from 300–500 guests - makes low average scores per hotel less likely.

We would prefer more variation between hotels, but we do not really expect it.

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[48] We note that all the differences are statistically significant. T-values range from 10 to 20.
[49] Lowest value for a specific hotel in the data set is case #207 with a value of 3.12 for evaluation of HVAC.

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Exhibit 8.10 Histogram of the Service Quality data

Few hotels receive poor evaluations

1995:
Std. dev: 0.12
Mean: 4.53
N: 503

Std Dev = .10
Mean = 4.557
N = 764.00

COMPUTE servqual = mean (ORS,EFS,CYS,FRS,KNS) (COMPUTE)
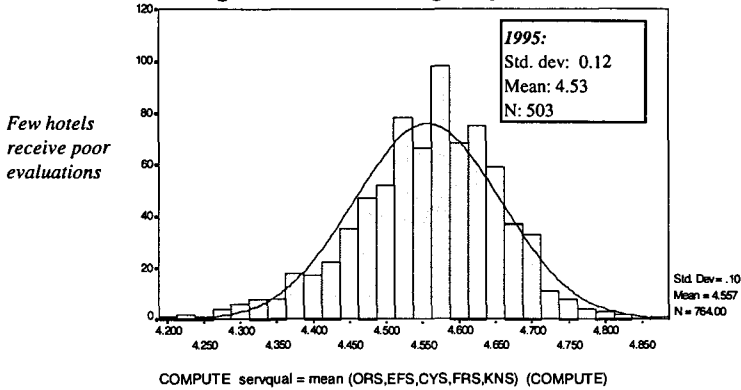
The high level of satisfaction, measured on a five-point scale, implies that the upper end of the scale could represent an effective limitation of the possible variance in the data. Naturally, the higher the mean (or closer to five), the less variance will be possible. Thus, a low variance measure does not necessarily indicate consistency. It might as well be caused by a ceiling effect – i.e. high scores make less room for variance (see Henjesand, 1996). The correlation between the scores and its variance should be a reasonable test to evaluate a possible ceiling effect. A priori, we do not find reasons to expect any correlation between the scores and their standard deviation (H_0). However, table 8.11 reveals a strong and significant correlation between the two measures in the 1996 survey. The coefficients suggest that the measure of standard deviation hardly can be interpreted as a measure of consistency in the quality evaluations. The standard deviations are disturbed by the ceiling effect and thus of limited use to the analysis.

Table 8.11 Correlation between the mean and the standard deviation (1996)

```
                - -  Correlation Coefficients   - -

                    SAS_STD     OAS_STD     ORS_STD     BVS_STD

        SAS         -.9493
                    (  776)
                    P= .000

        OAS         ----        -.9418
                                (  776)
                                P= .000

        ORS                                 -.8302
                                            (  770)
                                            P= .000

        BVS                                             -.8900
                                                        (  776)
                                                        P= .000


        (Coefficient / (Cases) / 2-tailed Significance)

        " . " is printed if a coefficient cannot be computed
```

The ceiling effect makes standard deviation redundant

SAS= Room appearance
OAS= Overall condition appearance of hotel
ORS= Overall reservation
BVS = Breakfast - Overall

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c) **Factor analysis - the amount of information in the data**
The quality surveys reveal high internal correlation between the questions asked. Consequently, customers who are satisfied with one aspect of the hotel, tend to be positive towards the other questions we present, and visa versa. The questions are basically tapping into the same or at least very similar domains.

To investigate this issue further, we picked out 43 questions. On the basis of these questions, we performed various techniques of factor analysis.[50] The analysis showed that the surveys provide less information than one would expect. Most of the scores from the 43 questions are strongly correlated, and various factor extraction techniques only revealed three specific factors. Although we would prefer more information from all these variables, at least the factor solution exposed a distinct and logical solution.

The first factor accounts for more than 67% of the variation in the 43 questions we analysed. The most important questions within this factor (i.e. with the highest factor loading) are aspects related to the room and the overall impression of the hotel. The second factor, which accounts for 9,1% of the variance, includes questions strictly related to the interaction between the customers and the staff. Finally, the last factor (explaining 6,2% of the variance) contains questions related to the breakfast serving. Table 8.11 provides a summary of the factor analysis. We have described the five most significant questions in each factor.

Table 8.11: Summary of factor analysis[51]

Most significant questions	Explained variance (83,1%)	Factor name	Alpha
Room appearance Condition clean Carpets Room Cleanness Bed Linen Cleanness Overall condition appearance of hotel	67,8%	Product quality	0,98
Overall reservation Efficiency of Agent Agent courtesy, respect Friendliness of agent Knowledge of rates	*Additional questions in the Service factor:* *Speed in which call was answered* *Staff knowledgeable/rates, programme* *Fast check-in/check-out* *Staff knowledgeable/area, directions* *Hotel employees enjoy jobs* 9,1%	Service quality	0,98
Breakfast - Overall Breakfast - Quality of breakfast items Breakfast - Attractively presented items Breakfast - Variety of breakfast items Breakfast - Replenishment of items	6,2%	Production quality	0,97

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[50] We selected questions where the number of observations were more or less complete Evaluation of gift shops and sport fitness facilities are examples of questions where few respondent were able to answer. 32 questions related to these aspects were not included in the factor analysis.
[51] The result in this table is based on principal component and varimax rotation. Other techniques were tried but did not alter the results.

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The factor analysis illustrates that the survey does not reveal much variation within each of the dimensions. If the customers are satisfied with the room, they tend to be content with the overall appearance of the hotel, the maintenance of the landscaping and their overall stay - and vice versa.

The results from factor 2 reveal that the customers do not discriminate between the services provided from the agent and the hotel staff. The customers seem to form a general impression of how they are treated. They do not differentiate between service provided from the central booking agent, the front desk or the housekeeping department. However, in order to make the American survey more similar to our data from Norwegian hotels, we disregard the booking procedure and perform a factor analysis without this aspect. Table 8.12 provides a summary of the analysis.

Table 8.12: Summary of factor analysis[52]

Most significant questions	Explained variance (84,2%)	Factor name	Alpha
Room appearance Condition clean Carpets Room Cleanness Bed Linen Cleanness Overall condition appearance of hotel	71,4%	Product quality	0,98
Fast check-in/check-out Front desk professional/friendly Staff knowledgeable/rates, programme Staff knowledgeable/area, directions Front desk staff took initiative to help	8,3%	Service quality	0,98
Breakfast - Overall Breakfast - Quality of breakfast items Breakfast - Attractively presented items Breakfast - Variety of breakfast items Breakfast - Replenishment of items	4,5%	Production quality	0,97

The reduced factor analysis still reveals three distinct dimensions - similar to the one we pointed out in the previous table. However, factor number two only includes the interaction between the hotel employees and the guests. The removal of the questions concerning the agent implies that more variance is captured by the first factor - and less by the last factor. The variance captured by the service factor is reasonably stable.

Thus, a factor analysis of the 43 questions from the U.S. study has left us with three distinct dimensions. From these dimensions, we have selected the five most important questions. In essence, we have reduced the number of questions from 75 to fifteen. If we further perform a factor analysis on these fifteen questions, we receive three dimensions with the same five questions in each factor as in table 8.11. These three factors capture 94,5% of the variance in the fifteen questions.

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[52] The result in this table is based on principal component and varimax rotation. Other techniques were tried but did not alter the results.

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Thus, our data reduction procedure seems to have provided some useful variables to analyse together with a sample of performance indicators.

When we compare the questions in the Norwegian and the U.S. survey, we find that the service elements are almost identical. Furthermore, the product quality element we extracted from the U.S. data is based on similar questions as the structure element measured in the Norwegian hotels. Finally, we will argue that the questions related to the breakfast serving is comparable to the backstage or production element in our quality concept discussed earlier. We repeat that the employees, with the aid of raw material, and/or equipment, produce *the backstage elements.* In contradiction to service quality, these elements can be produced «back stage» without any involvement or presence of the consumer. The questions related to the breakfast serving focuses on variety, presentation and replenishment of the items (cf. table 8.11 and 8.12). Thus, most of the efforts related to this work may be conducted without the presence of the hotel guests. We apply the label: *Production Quality.*

The data allow us to measure matching variables in two different settings, enabling us to retest the hypothesis. Unfortunately, we do not have any obvious match to the prosumption quality dimension apparent in the U.S. survey.

Based on the extraction of important variables and the frequencies of A, B, C, D, F, we are able to follow Rust et. al. procedure and focus on the number of dissatisfied and delighted customers. If we recode the customers who checked either C, D, or F into dissatisfied, and similarly classify customers who gave A as delighted, we can analyse the effect from these two groups in particular. Table 8.13 provides a summary of the proportion in each group after the reclassification.

Table 8.13: Proportion of delighted and dissatisfied customers 1996

	Dissatisfied	*Delighted*
Product quality	8%	61%
Service quality	11%	62%
Production quality	15%	55%

These variables are calculated as the mean fraction of delighted and dissatisfied customers in the five questions reflecting each dimension as table 8.12 suggests.

Table 8.13 further confirms the lack of variance in the data. More than 60% of the customers find the quality excellent. We note that more people are "dissatisfied" with the service, than with the product aspects. On the other hand, there are more people delighted with the service than with the physical product attributes. Nevertheless, the standard deviation in the service evaluations is lower than in the case of product quality. The ceiling effect is a possible reason. It basically makes standard deviation redundant. The fractions in table 8.13 indicate higher dispersion in the service element versus the product element. However, the ceiling effect prevents traditional calculations of standard deviation and variance to capture the dispersion.

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d) Customer mix analysis – U.S. hotels

Finally, we will check whether the holiday market tends to be more content with the quality - compared to the business travellers. This effect showed to be apparent in the survey from Norway. We anticipate that the number of leisure tourists might influence the performance measures because they normally obtain lower rates. Thus, it should be relevant to include this aspect as a control variable in our model. The American data offer access to the fractions of holidaymakers and business travellers per hotel. The partial correlation coefficients printed below, indicate that American hotels also receive better evaluations from people on holiday than business travellers.

Table 8.14: Holiday makers are more positive

Also in the U.S., tourists are generally more satisfied than business travellers

	-- Correlation Coefficients --		
	PHYSQ96	**SERVQ96**	**PRODQ96**
Fraction holiday maker 1996	.1500	.2459	.1147
	(597)	(593)	(597)
	P= .000	P= .000	P= .005
	PHYSQ95	**SERVQ95**	**PRODQ95**
Fraction holiday maker 1995	.1704	.2497	.1245
	(503)	(503)	(503)
	P= .000	P= .000	P= .005
	(Coefficient / (Cases) / 2-tailed Significance)		

PHYSQ9X = Product quality 199X; SERVQ9X = Service quality 199X; PROD9X = Production quality 199X

Table 8.14 shows that the interaction element - i.e. the contact between guests and the staff - reveals the strongest correlation between the fraction of holidaymakers and quality score. Thus, the fraction of holidaymakers is particularly important in assessment of the service element. Holidaymakers also evaluate the physical elements in a more positive manner, whereas the differences in judgements of the breakfast serving are less dominating.

We note that the correlation coefficients in the two years are almost identical. Hence, the results are reliable.

Finally, we note that the results from the U.S. comply well with the results from the Norwegian quality survey. The following conclusion should be well documented:

Tourists are generally easier to please than business travellers.

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e) Time series analysis – does the quality improve in the U.S. hotels?
Finally we like to explore if there are any improvements in the quality. Although we only have two points in time (1995 and 1996), the U.S. sample is larger and less heterogeneous than the Norwegian. We have suggested that customer mix is a relevant causal factor in our analysis. Unfortunately, the U.S. data only provide the percentage of tourist to the total at the hotel level. Thus, we will not be able to analyse the development in quality in each segment separately. Finally, we will concentrate on the service quality element. The product element will be disturbed by the fact that the hotels become one year older. Our analysis exhibits high correlations between product quality and age.[53]

Table 8.15 shows that both the fraction of tourists and the level of quality has increased from 1995 to 1996 in all the types of hotels. In the previous section we stated that tourists generally are more content with the quality than business people. Hence, some of the improvement in quality is caused by a higher fraction of tourists present in the sample.

Table 8.15: Changes in fraction of tourists and quality (listwise)

The level of quality appears to increase, but so do the fraction of tourist respondents

Report

TYPE		LEISUR95	LEISUR96	SERVQ95	SERVQ96
Urban/Airport	Mean	.5853	.6098	4.4913	4.5546
	N	63	63	63	63
	Std. Deviation	9.794E-02	9.749E-02	.1249	8.417E-02
Suburban	Mean	.6143	.6252	4.5254	4.5760
	N	284	284	284	284
	Std. Deviation	.1051	.1057	.1208	8.015E-02
Highway	Mean	.6300	.6430	4.5565	4.5919
	N	152	152	152	152
	Std. Deviation	.1178	.1157	.1239	8.693E-02
Total	Mean	.6154	.6287	4.5305	4.5782
	N	499	499	499	499
	Std. Deviation	.1089	.1082	.1237	8.339E-02

Our challenge is to find how much of the quality improvement, which is caused by the fact that, the quality survey in 1996 comprised more tourists than the survey the year before.

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[53] The newer the hotels are, the better are the ratings of product quality. We have calculated the partial correlation coefficient (controlling for the fraction of tourists) between age on one hand and service and product quality on the other hand. The partial coefficients for service quality and age are 0.12 (1996) and 0.31 (1995). Similar coefficient for age and product quality are 0.66 (1996) and 0.68 (1995).

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To solve this question, we have applied a simple analysis of variance model (ANOVA) with the fraction of tourists as a covariant. Table 8.16 reveals that quality has improved. However, the increase in the number of tourist respondents appears more important than quality improvement caused by learning experience, quality investments etc. from one year to the other.

Our model explains 11,3% of the total variance. The leisure factor accounts for 57% of the explained variance, whereas the remaining 43% may be attributed to factors such as focus on quality, quality investments and response and learning from customers' evaluations.

Table 8.16: Improvement in quality – controlled by fraction of tourists

ANOVA[a,b]

The increase in the number of tourist respondents explains a major part of the quality progress from 1995 to 1996

– but not all

			Unique Method				
			Sum of Squares	df	Mean Square	F	Sig.
SERVQ	Covariates	LEISUR	.750	1	.750	72.200	.000
	Main Effects	AAR	.487	1	.487	46.898	.000
	Model		1.316	2	.658	63.333	.000
	Residual		10.337	995	1.0E-02		
	Total		11.653	997	1.2E-02		

a. SERVQ by AAR with LEISUR
b. All effects entered simultaneously

Appendix 8.2 describes a similar analysis according to the various types of hotels. The results can be summarised as follows:

1. The leisure factor is insignificant in Urban/airport hotels
2. The leisure factor dominates the quality improvement in Highway hotels
3. The leisure and learning effect seem equally important in Suburban Hotels

8.1.4. The economic data from the Norwegian hotels

The economic data from the Norwegian hotels cover a period from 1987 to 1996. Some of the data are annually, some are quarterly, and others are measured three times a year. The number of different economic variables is impressive and everything from price per phone call to operating margins is reported. Thus, there are opportunities for data mining.

The Norwegian chain has changed considerably during the decade. Some hotels have joined other competing chains, and new hotels have been taken onboard. There are very few hotels providing economic information from the entire period. Even when we focus on the period from 1991 to 1996, we find complete information from 20 hotels only. When the information on performance is matched with our guest surveys, the number of valid cases (listwise) drops further. As such, we regard the data as insufficient for time series analysis.

Table 8.17 supplies some pieces of information from the Norwegian chain. The selected performance measures all comply well with the documented progress in the Norwegian hotel industry since 1990 (Skalpe, 1997).

Table 8.17 Three economic performance measures from the Norwegian chain

```
Number of valid observations (listwise) = 21.00

Variable      Mean    Std Dev   Minimum   Maximum    N
GRP91        593.52    70.22    459.00    766.00    27   Average price per room
GRP924KV     621.12    81.66    495.00    811.00    26   Average price per room
GRP922TE     601.10    69.61    454.00    787.00    31   Average price per room
GRP924KV     621.12    81.66    495.00    811.00    26   Average price per room
GRP92        627.42    77.38    495.00    811.00    26   Average price per room
GRP93        618.00    76.46    430.00    791.00    31   Average price per room
GRP94        629.81    67.67    490.00    797.00    36   Average price per room
GRP95        637.11    73.51    476.00    822.00    35   Average price per room
GRP96        639.03    82.88    414.00    825.00    34   Average price per room

YIELD91       37.21     9.35     19.39     59.47    24   Yield91 revenue per room/maximum
YIELD92       38.49     9.49     23.58     59.09    28   Yield92 revenue per room/maximum
YIELD93       38.86     8.55     22.78     56.71    31   Yield93 revenue per room/maximum
YIELD94       40.74     7.96     28.40     59.20    36   Yield94 revenue per room/maximum
YIELD95       40.43    10.00     18.6      60.7     35   Yield95 revenue per room/maximum
YIELD96       44.10    10.83     26.47     77.25    33   Yield96 revenue per room/maximum

YIELDA91     325.92    81.47    172.56    579.86    27   Income per room
YIELDA92     337.38    84.27    207.48    576.08    31   Income per room
YIELDA93     344.34    81.56    188.34    552.91    31   Income per room
YIELDA94     359.81    78.22    220.50    555.51    36   Income per room
YIELDA95     368.86    93.08    192.80    620.61    35   Income per room
YIELDA96     393.20    90.06    231.79    613.93    34   Income per room
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8.1.5 The economic data from the U.S. hotels

The economic data from the U.S. hotels contain fewer variables, but more cases (hotels). The number of hotels providing financial information was 225 in 1996 and 190 in 1995. Furthermore, we have obtained alternative performance indicators such as revenue per room, room occupancy, price per room sold etc. These measures are available from 600 hotels in 1996, and 500 hotels in 1995. Table 8.18 displays a summary of the information available from the U.S. company, according to type of hotel.

Table 8.18 Economic information according to type of hotel (1996)

	Suburban		Highway		Airport/Urban	
	Mean	Sum	Mean	Sum	Mean	Sum
Total revenue	2 142 789	254 991 891	1 715 986	106 391 132	2 164 327	54 108 175
Total departemental expenses	538 255	64 052 286	436 831	27 083 522	574 994	14 374 845
Gross Operating Income	1 604 534	190 939 546	1 279 155	79 307 610	1 589 333	39 733 325
Property Operations & Maintance	43 669	5 196 563	34 952	2 167 053	37 807	945 169
POM other expenses	64 319	7 653 917	55 097	3 416 008	57 916	1 447 902
Total Property Operation Maintance	*107 987*	*12 850 477*	*90 049*	*5 583 061*	*95 723*	*2 393 071*
Total Undistributed Expenses	520 307	61 916 474	441 018	27 343 097	503 883	12 597 083
Gross Operating Profit	1 084 228	129 023 132	838 138	51 964 525	1 085 450	27 136 250
Number of hotels with financial information		119		62		25
	Mean	St.Dev	Mean	St.Dev	Mean	St.Dev
Gross Profit Margin (GOPM)	50 %	9 %	46 %	19 %	49 %	11 %
Revenue per room available	43,4	9,5	39,4	10,4	45,1	11,0
Room Occupancy	71,8	11,3	66,6	15,8	71,1	14,0
Revenue per room sold	60,4	8,2	59,3	7,7	63,9	10,2
Relative Yield	116,3	25,1	119,9	34,7	109,5	26,8
Number of rooms	114,0	36,6	96,2	31,0	123,5	38,2
Number of hotels with performance information		318		215		72
Number of hotels with information on GOPM		119		62		25

The table reveals small differences between the various categories of hotels regarding financial performance. However, the highway hotels appear to be smaller, obtain lower occupation rates and revenues per room sold. Nonetheless, the highway hotels outperform their local competition more than the other groups.

Table 8.19 comprises a comparison between hotels supplying complete information from both years. All types of hotels are growing - both in terms of profit and turnover. The highway hotels reveal the best progress, while hotels in urban areas have had a more modest improvement from 1995 to 1996.

Table 8.19 Comparative performance information according to segments

	Airport/Urban		Highway		Suburban	
	1995	1996	1995	1996	1995	1996
Total Revenue	18 900 400	20 088 176	32 728 723	35 783 079	89 345 344	97 065 056
Total departemental expenses	4 865 305	5 126 595	8 544 125	8 694 546	21 426 966	23 719 194
Total undistributed expenses	4 192 426	4 741 998	8 253 420	8 678 160	22 539 836	23 654 004
Gross operating profit	9 842 672	10 219 584	15 931 173	18 410 371	45 378 564	49 691 840
Gross operating profit margin	52,1 %	50,9 %	48,7 %	51,4 %	50,8 %	51,2 %
Occupation rate per room	73,7	74,2	71,8	71,5	70,5	71,4
Average revenue per room	44,3	47,2	41,2	43,6	42,9	45,7
Average price per sold room	59,8	63,3	57,3	60,2	60,4	63,5
Cases	*8*	*8*	*17*	*17*	*44*	*44*
Turnover growth 96/95		6,3 %		9,3 %		8,6 %
Profit Growth 96/95		3,8 %		15,6 %		9,5 %

Table 8.20 supplies a more complete picture of the information available from the U.S. sample. We denote that both skewness and kurtosis represent a significant problem. According to Kaplan's criteria, all variables except the telephone expenses should be treated with caution. Our primary strategy will be to remove some of the statistical outliers to alleviate the problem of non-normality [Ezzamel and Mor-Molinero (1990) and Frecka and Hopwood (1983)].

In analyses including many variables, the listwise deletion procedure will automatically reduce the number of valid observations. Consequently, both the skewness and kurtosis values will change. We hope and believe that listwise observations are more "normal" than pairwise. Thus, the problems of non-normality could be somewhat less than the raw data in table 8.20 suggest. We will try to avoid measures with particularly high values of skewness and kurtosis. Furthermore, we will double check some results by applying distribution free statistics such as Spearman rank correlations.

Table 8.20 Complete accounting information from the U.S. sample

Accounting Information	Sum 1995	Sum 1996	Mean 1995	Mean 1996	Skewness 1995	Skewness 1996	Kurtosis 1995	Kurtosis 1996
Room Revenue	342 817 765	423 812 525	1 804 304	1 892 020	0,61	0,5	2,92	1,81
Telephone Revenue	8 241 777	10 581 898	43 607	47 452	0,95	1,37	3,48	4,83
Other Revenue	6 566 770	9 439 404	34 745	42 329	4,61	3,56	24,85	14,26
Total revenue	*357 626 312*	*443 833 827*	*1 882 244*	*1 981 401*	*0,77*	*0,56*	*3,43*	*1,92*
Room Payroll Expense	51 434 815	65 414 171	270 710	292 028	0,7	5,09	1,66	51,32
Room Other Expense	19 019 933	23 923 836	100 105	106 803	2,02	2,01	7,75	8,19
Comp, Breakfast Expense	9 690 933	12 752 505	51 005	56 931	0,38	1,82	0,9	12
Telephone Expense	4 571 985	6 035 569	24 190	26 945	0,3	0,38	-0,11	0,24
Other Expense	2 771 326	4 490 478	18 853	25 514	5,63	4,79	36,08	26,97
Total departemental expenses	*87 988 991*	*112 616 559*	*463 100*	*502 753*	*1,05*	*2,94*	*2,95*	*22,07*
Admin & General Payroll Expenses	11 710 120	14 696 509	61 632	65 904	2,22	0,42	12,06	0,28
Admin & General Other Expenses	18 832 021	23 018 542	99 116	103 222	7,11	2,17	73,77	10,3
Marketing Payroll Expense	3 123 550	4 193 449	23 137	27 055	1,04	2,15	2,22	7,96
Marketing Other Expenses	7 075 589	7 883 358	37 240	35 194	3,33	2,81	14,93	12,24
Reservation Expenses	13 180 024	16 953 198	69 736	75 684	0,66	0,49	2,28	1,7
Energy Expenses	15 978 995	19 571 423	84 100	87 372	1,8	1,43	9,33	5,54
Prop, Maintenance Payroll Expenses	6 869 373	8 807 689	36 155	39 674	2,08	1,86	8,85	8,44
Prop, Maintenance Other Expenses	9 520 192	13 181 939	50 106	59 112	0,95	2,05	1,6	9,64
Total undistributed expenses	*86 289 864*	*108 306 107*	*454 157*	*483 509*	*1,7*	*0,62*	*7,35*	*1,74*
Gross operating profit	*183 347 457*	*222 911 161*	*964 987*	*995 139*	*0,4*	*0,59*	*2,6*	*1,66*
Management Fees	11 194 099	14 054 654	84 804	87 296	2,4	1,61	10,09	5,35
Franchise Fees	13 618 232	15 867 710	74 012	75 202	1,34	0,9	4,99	3,15
Income before fixed charges	158 535 126	192 988 798	834 395	861 557	0,2	0,68	2,32	1,55
Property Taxes	15 397 096	12 362 354	83 680	56 193	5,41	2,3	33,11	8,17
Property Insurance	2 836 724	3 457 148	15 334	15 714	2,21	2,63	10,78	9,61
Leases	1 385 932	1 451 104	20 086	16 679	7,58	3,19	60,47	13,62
Cash to debts/investments	*138 915 373*	*175 718 191*	*731 134*	*784 456*	*-0,08*	*0,76*	*1,39*	*1,68*

Finally, table 8.21 provides information regarding the specific costs measures reported from the U.S. hotels. We note that both the skewness and kurtosis values mostly are outside the recommended range.

Furthermore, the table is supplemented with performance and quality data. It is shown that the cash flow and gross operating profit margins are even more non-normal than the elements they comprise. However, by measuring profit per room (cash flow or Gross operating profit), the distribution appears to be more normal. We record that non-normality does not represent as a significant problem in the quality measures.

Table 8.21 Specific accounting information from the U.S. sample

Detailed cost items / Quality & Performance	Sum 1995	1996	Mean 1995	1996	Skewness 1995	1996	Kurtosis 1995	1996	Valid cases 1995	1996
Salary Front Desk Salary	17 732 897	21 958 926	94 828	98 471	3,07	3,33	14,95	21,73	187	223
Housekeep Salary	25 794 957	33 077 481	138 683	149 672	0,47	4,13	1,71	38,78	186	221
Admin & General Salary	9 472 502	11 651 397	50 386	52 484	4,56	0,81	34,63	2,17	188	222
Marketing Salary	2 647 612	3 465 926	19 758	23 261	1,13	2,03	2,72	7,26	134	149
Prop, Maintenance Salary	5 783 733	7 340 924	30 765	33 368	1,91	1,57	7,31	5,81	188	220
Benefit Pay	1 570 023	2 637 017	11 057	18 062	2,6	1,44	8,13	1,65	142	146
Bonus	1 062 556	1 071 312	9 403	7 877	2,11	2,14	4,92	5,16	113	136
Benefits Payroll Taxes	6 464 856	7 432 363	35 521	35 905	1,99	1,95	9,93	9,47	182	207
Benefits Workers Comp	2 384 500	2 580 494	12 104	15 929	1,05	2,95	1,38	15,93	197	162
Benefits Group Insurance	1 695 051	2 593 850	10 336	13 302	2,66	4,35	9,45	30,85	164	195
Benefits Other	383 414	1 251 980	3 550	8 077	2,48	6,7	8,21	59,13	108	155
Rooms	22 851	26 983	120	120	-0,64	2,96	1,92	28,71	190	224
Rooms 96		66 946		109		1,47		9,87		615
Available Rooms	7 995 418	9 381 742	42 081	41 883	-1,14	1,2	2,04	14,32	190	224
Sold Rooms	5 950 934	6 812 018	31 321	30 411	-0,64	1,38	1,05	13,61	190	224
Occupancy rate per room			72 %	70 %	-1,59	-1,47	3,53	3,36	498	612
Revenue per room sold			57	60	1,36	1,17	4,65	3,08	498	612
Revenue per room available			41	42	-0,34	-0,41	1,67	1,28	498	612
Fraction of leisure guests			61 %	63 %	0,2	0,24	0,7	0,97	503	598
Yield compare to local competitors			116	117	1,12	0,3	8,1	1,18	498	607
Service Quality			4,53	4,56	-0,29	-0,22	0,35	1,04	503	770
Product Quality			4,48	4,50	0	-0,15	-0,55	-0,53	503	776
Production Quality			4,35	4,36	-0,37	-0,46	0,64	1,27	503	776
GOP per $ sales			50 %	47 %	-2,96	-5,79	17,38	45,5	189	224
GOP per room			7 839	8 040	-0,69	-0,28	2,5	0,46	190	224
GOP per room available			17	18	-1,14	-0,98	3,67	5,48	190	224
GOP per room (hotels opened after 31.12.95)			8 195	8 787	4,07	0,72	-0,74	0,05	172	174
Cash flow per $ sales			38 %	37 %	-1,71	-5,19	5,61	39,79	189	224
Cash flow per room			5 937	6 285	-0,9	0,07	2,48	0,46	190	224
Cash flow per room available			22	23	-0,85	-1,11	4,06	5,31	190	224
Cash flow per room (hotels opened after 31.12.95)			6 203	6 928	-1,09	0,30	3,66	0,84	172	174

8.1.6 Summary of descriptive statistics

The descriptive analysis reveals that the financial data are far from normally distributed. The literature supports our findings. Fortunately, the quality scores and selected performance variables show acceptable fit to a normal distribution.

The quality scores from both the Norwegian and the U.S. hotels are biased to the upper end of the scale. Measuring quality in a homogenous sample of hotels, based on guest surveys, we do expect that the average guest in most hotels is satisfied with the service provided. It is not likely that any of the hotels will allow low scores on their average customer ratings, without addressing the problem. We expect that low ratings will imply immediate action from both local and central management. Thus, a large dispersion in quality scores at the hotel level is unlikely.

The bias to the top end of the measurement scale implies a ceiling effect on the variance. The high negative correlation between the mean and the standard deviation suggests that the standard deviation cannot be understood as a measure of consistency in quality. The ceiling effect makes standard deviation redundant.

We found small differences in quality perceptions among foreign and domestic tourists. However, tourist appears to be more content with the quality provided than business travellers. Also, conference participants were less critical than businessmen. Basically it seems that the respondents are more positive, the more pleasure they have incorporated into their stay. We will denote this as a mood effect.

The service or interaction elements generally receive higher ratings than evaluations of physical aspects, such as room appearance and overall impression of the hotel. We believe that the respondents find it easier to express dissatisfaction regarding dead things, compared to complaining about the staff who do their best to interact and adjust according to the customers needs.[54]

Finally, we did not find any trend in the Norwegian quality surveys, indicating improvement or decline in the level of quality provided. The service quality in the U.S. hotels appears to have improved from 1995 to 1996. However, the main reason is the higher fraction of tourist respondents.

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[54] The results comply with Henjesand (1996)

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Part 8.2: Partial tests and analyses

8.2.1 The cost of quality

We have argued that superior quality requires resources. In order to analyse how quality can be improved, we need to identify these resources. We have proposed that such resources will be reflected in the economic information from the companies - more specifically in the cost items recorded. However, quality related costs only comply a very small proportion of the companies' total cost - or even a small proportion of certain specified cost items. Hence, the cost figures might not be precise enough to capture the resources related to quality management.

Although Crosby (1979) claims that quality is free, we do not think he meant that improvements in quality are obtained without economic resources. Crosby's opinion is rather that the resources invested in quality pay off, almost immediately. Finally, we argued that Crosby's understanding of quality more or less implies a tautological relationship between quality and performance.

We find it reasonable to assume that quality occupies economic resources. However, such expenses or investments will be returned (Rust et. al., 1995). Many scholars have advocated that quality efforts result in cost reductions which more than outweigh the quality expenditures (Bohan and Horney, 1991; Carr, 1992; Crosby, 1979; Deming, 1986). Nonetheless, such phenomena are believed to be more prevalent in manufacturing and standardised services, than in customised big-ticket services and products (Fornell, Huff and Anderson, 1994). According to Fornell et. al. (1994) and Rust et. al. (1995), customisation inhibits economies of scale and consequently makes individual improvements less cost effective.

Improved quality requires expenses in certain areas. The effort will pay off later or perhaps immediately at the bottom line. This process will vary according to the type of product we are analysing. Our intention is to examine a possible link between specific facets of the quality construct and related cost items in the hotel industry. Exhibit 8.22 shows the relationships, which are discussed in more detail in chapter 6.

Exhibit 8.22: The Quality Resource Model

$Time = t$ $Time = t$
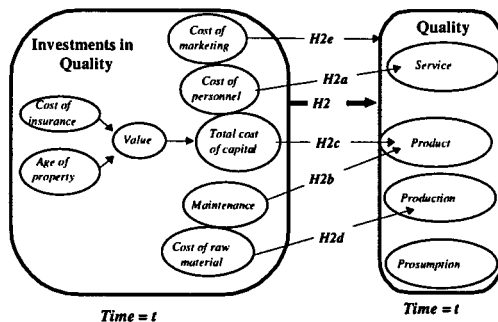
a) Product Quality - The Structural Element

Exhibit 8.11 and 8.12 illustrate that product quality reflects the guests' impression of the physical facilities, such as the overall appearance of the room and the general condition of the building. We propose that more resources allocated into this area will influence customers' perceptions. Cost of maintenance («pay roll related» and «other») should be a relevant item to measure the economic efforts in this field. Furthermore, our data enable us to include factors, such as the age of the hotel, the fraction of tourists and the number of rooms. In fact, we also regard the age of the hotel as a proxy of the value, or capital employed. Besides, we anticipate that new hotels require less maintenance than older ones.[55] We find it likely that age influences the evaluation of the physical attributes. Thus, age both serves as an effect variable and as a relevant causal factor.

The fraction of tourists is included due to our earlier findings suggesting that tourists are less critical. We have incorporated the number of rooms as an adjustment of possible economies of scale inherent in the cost of maintenance. Finally, we do not find reasons to believe that the occupation rate should influence the evaluation of the physical attributes.

Our model applied on the 1996 data is displayed in exhibit 8.23. The empirical analysis does not reveal any particular relationship between cost of maintenance and product quality. A natural implication would be that the resources and efforts related to maintenance do not affect product quality. However, omitted variables such as the skills in maintenance management and the general efficiency of cost control, might represent aspects that wash out the empirical evidence in our sample.

Costs related to maintenance do not influence customers' evaluation of product quality

The crucial issue is not necessarily <u>how much</u> a hotel spends on maintenance, <u>but how</u> the money is spent. Unfortunately, we are not able to control for this latter factor.

We admit that lots of alternatives have been explored. An equivalent analysis on 1995 data provided similar results.

Exhibit 8.23: The Quality Resource Model – The Product element

1996

Opening date β= 0,58 T=10,8

Leisure β= 0,12 T=2,4

Rooms β= - 0,15 T= -2,8

Maintenance costs to revenue
Pay Roll: β=0,01 T=0,2
(Others maintenance: β=-0,02 T=-0,3)
(Housekeeping salary: β=0,1 T=1,84)

Product quality

AdjR² = 41,5%
F=38,9
n=213

Neither maintenance cost per room, nor maintenance per $ sales in 1995 explained any of the variation in product quality in either 1995 or 1996. Thus, we have not succeeded to provide empirical evidence suggesting that the costs of maintenance influence product quality. However, the data suggest that the age of the hotel is an important factor. We have indicated that new hotels normally are more valuable than

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[55] This is confirmed by our data suggesting that age explain around 14% of the variance in total maintenance costs.

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older ones. The estimated cost of depreciation relies on this assumption. Historical monumental hotels might represent a possible exception. However, the oldest hotels in our survey were opened in 1984. Thus, the sample should not contain any monumental treasures. We find it reasonable to anticipate that a hotel built in 1984 is less valuable than a brand new facility. In chapter 3, we discussed the value construct. It is theoretically manageable, but complex to measure. In this section we basically suggest that the value of a hotel will be reflected by its age. The nature of the sample makes it a reasonable assumption.

However, some hotels might be more refined and luxurious than others. Consequently, they represent a higher value than the age of the property indicates. We also overlook the fact that certain hotels are more carefully maintained and thus more able to preserve their value.

However, the strategy of the management is to keep its hotels as homogenous as possible[56] – also regarding these two specific aspects. We assume that they succeed in their strategy. Representatives from the company have approved our logic.

A new hotel is more valuable than a 12 year old facility.

⇩

New hotels are perceived to offer better product quality

⇩

Product quality is not free

Exhibit 8.24 shows that the age of the hotel has a strong influence on the perception of product quality. The customers definitely prefer newer facilities. Although, the effect appears strong and significant, the managerial implications should be questioned. Age is certainly beyond the control of management. A popular comment might be: "So what". However, we believe the analysis provides some evidence towards our hypothesis that quality is not free. It should also prevent the central management from exaggerating the importance of high ratings in brand new facilities.

Exhibit 8.24: The Quality Resource Model - The Product element
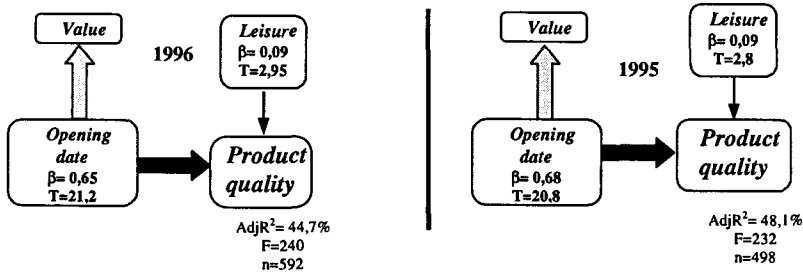
The customers perceive the product quality to be superior in new and modern facilities. These hotels are more valuable and represent higher investments than older buildings. Consequently, investments fuel the product quality dimension.

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[56] A quote from their strategy: *"By strategically focusing on areas that have created competitive advantage -- high quality, consistent accommodations delivered as an outstanding value, 100% guaranteed service, and dynamic unit growth -- we are on track toward our goal of becoming the premier hotel company in the world."*

b) Service Quality - The Interaction Elements

A priori, we do not expect the age factor to dominate the service element or the production facet strongly. It is less likely that a new hotel should manage the interaction between customers and staff any better than older hotels. Is it possible that staff and management in a new hotel are more enthusiastic in order to get a foothold in the market? On the other hand, a well-established facility should benefit from experience. Nevertheless, we cannot rule out a possible halo effect from the product element to the perceptions of service. Still, we believe the net effect from age is more uncertain in the case of service than for the evaluation of various physical aspects of the product. (see footnote 53).

Our analysis has shown that tourists hand out better quality scores than business travellers. We expect this to be more so in the interaction element, than in the case of more objective measures of physical aspects. The general satisfaction related to being on holiday will probably be more evident in a subjective evaluation of the contact with the staff, compared to a more objective judgement of product attributes.

Wages related to service personnel might influence the perceptions of service?

To measure the amount of economic resources spent on service quality, we apply a cost item measuring the payroll expenses of front desk, breakfast, administrative and marketing personnel. Hence, we assume that the level of service provided depends on the number of service related employees, multiplied by their salary. Unfortunately, we are not able to separate these two factors. The frame denotes simple Spearman rank correlations between the variables. Consequently, all possible background factors are ignored. Also, Spearman rank does not rely on any specific assumption regarding the distributional form of the data.

SPEARMAN CORRELATION COEFFICIENTS		
	Service Quality 1995	Service Quality 1996
Payroll front desk, marketing, and administration to sales 1995	.3322 N(132) Sig .000	.2832 N(133) Sig .001
Payroll front desk, marketing, and administration to sales 1996	*.1398* *N(132)* *Sig .110*	.1739 N(148) Sig .035
(Coefficient / (Cases) / 2-tailed Significance)		

The calculation suggests that there exist a positive association between the level of "service salaries" and the evaluations of the service element. It is suggested that service expenses might have an immediate effect, whereas the lagged effect is less dominant. Finally, we do not find any significant correlation between "service payroll" in 1996 and the service quality in 1995 (numbers in italic). Basically the results comply reasonably well with our hypothesis and encourage a more thorough analysis.

We find it relevant to add occupancy rate as a control variable into the more complex model. It should be likely that higher room occupancy requires more staff to offer the same level of service.

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Small hotels might have better prospects of creating a customised and personalised interaction between staff and customers. On the other hand, large hotels may experience economies of scale in the payroll expenses. The number of rooms should be a relevant control.

Exhibit 8.25 shows the results. The models are generally weak and the data only support our hypothesis regarding payroll expenses in 1996. The results in 1996 comply reasonably well with our hypothesis, whereas the results in 1995 do not. The control variables seem to wash out the correlations revealed by the Spearman ranked coefficient. On the other hand, our control measures have strengthened the relationship on the 1996 data.

The results do not discourage our beliefs that service quality requires resources. High kurtosis scores and insufficient measures of the economic resources involved are fair explanations to the lack of fit.

Besides, the analysis reveals the importance of replication. A likely conclusion from the 1996 data would be that costs related to service personnel influence the level of service quality. However, the results from 1995 show that the model is rather inconsistent and unstable.

For instance, the room occupancy is the only significant variable in 1995, but the only insignificant variable in 1996. We note that the negative association between occupancy and service quality complies with the findings in Fladmark Larsen and Troye (1997) and Troye (1996). They find that service quality has a negative effect on the occupancy rate. They hold that the attention per customer decreases by the number of guests. Thus, the higher occupancy rate, the more difficult it is to obtain superior service quality perceptions. Our results from 1995 support this view. The lack of support in 1996 can be explained by the lower occupancy rate in that year (cf. table 8.21). The occupancy rate has to attain a certain level before it starts to deflate the service quality. The limit was reached in 1995, but not in 1996.

Wages related to service personnel do not have a strong influence on the level of service

Exhibit 8.25: The Quality Resource Model - The service element

1996

| Room Occupancy $\beta= 0,17$ T= 1,97 | Leisure $\beta= 0,30$ T=3,9 | Rooms $\beta= - 0,16$ T= -2,1 |

Salary front desk+adm + marketing divided by sales $\beta= 0,21$ T=2,5

Service quality

AdjR^2= 6,7%
F=6,7
n=145

1995

| Room Occupancy $\beta= -0,19$ T= -2,2 | Leisure $\beta= 0,11$ T=1,3 | Rooms $\beta= - 0,1$ T= -1,1 |

Salary front desk+adm + marketing divided by sales $\beta= 0,14$ T=1,5

Service quality

AdjR^2= 9,2%
F=4,3
n=131

145
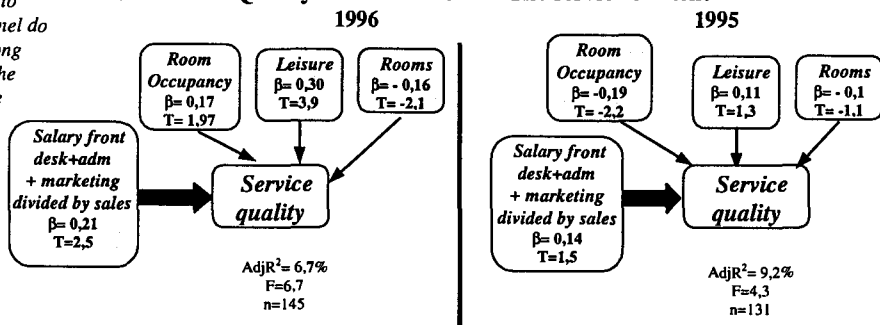
c) Production Quality - A Backstage Element

The breakfast serving is applied as an empirical setting to measure production or backstage quality. The measure comprises both the interactions between breakfast hostess and guests on one side, and product elements such as facilities and food assortment in the breakfast area on the other side. To measure the amount of economic resources devoted to the breakfast serving, we apply a cost item, which reflects the "cost of food, beverage, and supplies related to provide continental breakfast". The wages of the breakfast hostesses are not included. Thus, we assume that resources spent on breakfast related supplies, influence the overall evaluation of the breakfast quality. The customers' evaluation of the breakfast serving is the best operationalization we are able to do of the production quality dimension.

The frame denotes simple Spearman rank correlations between the variables. All possible background factors are ignored. We do not make any assumptions regarding the distributional properties of the

The costs related to breakfast ingredients might influence the perception of the breakfast quality

SPEARMAN CORRELATION COEFFICIENTS		
	Production Quality 1995	Production Quality 1996
Cost of breakfast ingredients 95	.3938 N(188) Sig .000	.3380 N(189) Sig .000
Cost of breakfast ingredients 96	.2195 N(190) Sig .002	.2749 N(220) Sig .000
(Coefficient / (Cases) / 2-tailed Significance)		

data. Nevertheless, the calculations suggest that there exist a positive association between the costs of breakfast ingredients and the evaluations of the breakfast serving. It is suggested that these expenses might have an immediate effect, whereas the lagged effect is somewhat less dominant. Again, the weakest correlation is found between the costs of breakfast ingredients in 1996 and the breakfast ratings in 1995. Basically the results comply reasonably well with our hypothesis and encourage a more thorough analysis – controlling for potential background variables.

We cannot deny that the age of the hotel might have a potential effect on the evaluation of the breakfast area and thus affect the breakfast experience. However, we do not find any obvious reasons why the age of the building should affect the costs of the breakfast ingredients. Hence, we will leave the age factor to the error term.

However, we still find it likely that the fraction of tourists influence the breakfast evaluation. We also include the number of rooms in the equation to control the possible size effects.

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Exhibit 8.26 shows the results from our analysis. The overall model fits are weak. Still, the data support our hypothesis regarding the costs of breakfast ingredients in both the 1995 and the 1996 sample. Consequently, the results do not discourage our beliefs that production quality requires resources. However, the T-values are fairly low and the models do not appear to explain much of the variance in the dependant variable.

Exhibit 8.26: The Quality Resource Model - A Backstage element

1996	1995

Expensive breakfast ingredients give higher scores on production quality

1996:
Leisure β= 0,13 T=1,9
Rooms β= - 0,13 T= -2,0
Cost of complimentary breakfast (to sales) β= 0,25 T=3,7
Production quality
AdjR^2= 12% F=10,6 n=217

1995:
Leisure β= 0,05 T=0,9
Rooms β= - 0,17 T= -2,4
Cost of complimentary breakfast (to sales) β= 0,18 T=2,4
Production quality
AdjR^2= 6,6% F=5,4 n=187
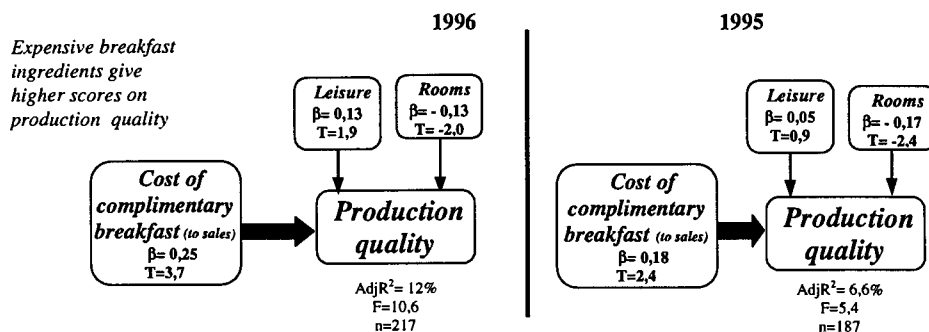
d) Costs of marketing and quality

We did not find any significant relationships between the costs of marketing and the perceptions of the various quality dimensions.

How should we expect the costs of marketing to influence quality?

If resources are spent successfully on marketing, expectations will rise. If the product does not fulfil these expectations, then customers may feel disappointed and down rate the quality after they have experienced the product.

On the other hand, marketing often comprises valuable information ensuring that the hotel attracts the right segment and simultaneously is able to inform these selected guests of the offerings available.

Finally, high marketing expenditures can hide ineffective but still expensive advertising and sales campaigns.

Consequently, lack of results is no surprise. We would need more refined measures to proceed.

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8.2.2 Quality Performance

a) Introduction

The literature presents numerous examples to support a positive relationship between quality on one side, and profitability, prices, growth and performance on the other. Although the empirical evidence is scarce, the general opinion is that quality is profitable. An empirical study questioning the economics of quality would probably be questioned itself. Academics and practitioners seem to believe that the relationship between quality and profitability is obvious and indisputable. There is no doubt that both quality and economic performance are hard to define and measure. However,

Does quality improve performance?

Anecdotes and case studies: YES

most constructs are. The literature does not provide much empirical evidence to support a connection between the two constructs. Thus, it appears odd that businessmen and academics so easily accept quality as a profit generator. We have suggested that the potential tautology between the definition of quality and performance might explain the lack of empirical interest. Anecdotes and case studies keep the quality movement going.

Our discussion of quality and economic performance makes it evident that both these constructs are theoretically ambiguous. This implies that it is difficult to establish unquestionable measurement procedures. Furthermore, the relationship between the

two constructs, if it exists, is expected to be weak. There are obviously many other and more important factors than quality, which determine economic success. Finally, we argue that the distance between quality and economic performance is rather remote. Although a direct effect might exist, we believe it will be hard to develop a refined measurement instrument -

Exhibit 8.27 Quality Performance (Time lagged alternative)

Quality
Service
Product
Time = t

H3
H1
H3
H1

Economic Performance
Price per room
Absolute yield
Relative yield
Sales growth
Operating margin
Profit per room
Profit Growth
Time = t+1

able to capture it. Finally, we do not know how long it will take before the effects appear.
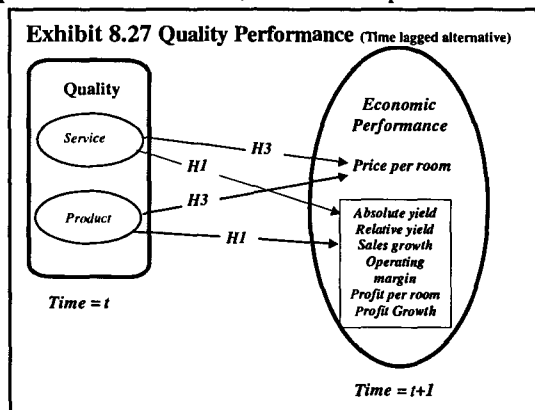
In our analysis, we have decided to perceive economic performance as a formative measure. More specifically, we argue that economic performance comprises variables such as yield, prices, sales growth and return on sales and assets. Furthermore, we believe that the relationships between some of these elements and quality probably are closer, stronger and easier to detect and interpret, compared to a relationship directly from quality to a latent variable measuring economic performance.

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If we are able to observe a relationship between quality and variables such as: yield, prices, profits, sales and growth rates, it still remains to argue that these variables have a positive impact on economic performance. Given that the paths (relationships) between quality and various performance measures are positive and significant, we claim to have provided some evidence regarding the alleged relationship between quality and «economic performance». The framework is described in chapter 6.

b) Quality and price per room sold

We will start the partial performance analysis by testing the hypothesis regarding quality and price. In chapter 5 and 6 we debated the sign and direction of the relationship between prices and quality perceptions. The price may be used as a quality pointer and thus influence the quality perception. On the other hand, higher prices raise the expectations and create more demanding customers. Given identical circumstances, the fact that people pay more could make them more dissatisfied, or critical.

In this analysis, we focus on the average price per room sold. Our hypothesis states that product quality makes it easier to obtain higher average prices per room sold. Exhibit 8.28 introduces a cross sectional model and a time lagged alternative. Earlier, we claimed that product quality is more stable than the other quality dimensions. It requires less frequently updated measures. Consequently, we expect small differences between the cross sectional model and the time lagged alternative in the case of product quality.

The results in exhibit 8.28 confirm our initial hypothesis regarding prices and product quality. It provides evidence suggesting that superior product quality makes it more likely to obtain higher average prices per room sold. However, we note that the T-values are low and the models do not explain much of the total variance.

The size of the hotel has a positive influence on the average price per room sold. Basically, large hotels are more expensive than smaller ones.

Exhibit 8.28: Product quality and price per room sold[57]

Cross sectional 1996

Rooms
β= 0,26
T=5,9

Product quality
β=0,11
T=2,6
→ Average price per room sold

AdjR^2= 5,2%
N=591
F=17,3

Time lag alternative 1995-96

Rooms
β= 0,29
T=6,1

Product quality 1995
β=0,11
T=2,24
→ Average price per room sold in 1996

AdjR^2= 7,1%
N=498
F=18,8
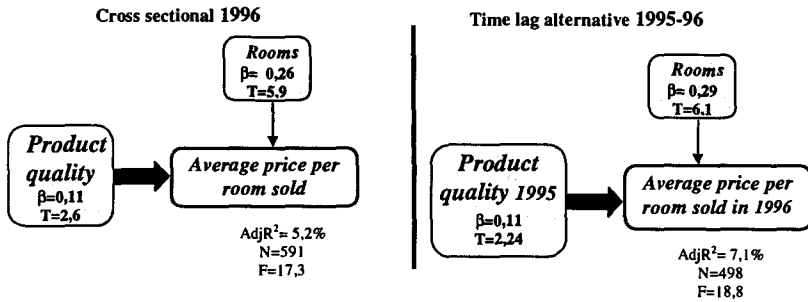
Quality does not have any obvious effect on price per room sold

Maybe prices influence the evaluation of the service?

Furthermore, we have conducted an equivalent analysis of the service dimension. A priori, we expected service to be less important to the average prices than the physical attributes. We also anticipated that service implies a more immediate effect. Moreover, the effect from service quality one year onto the average prices per room sold the year after, is uncertain. Exhibit 8.29 shows that our scepticism is confirmed. The 1996 data indicate that service quality has a negative impact on the average price per room sold. The reason could be that the customers are more demanding and expect more when they pay more. (i.e. the relationship is reversed). This is reflected in their perceptions of the interaction element. Finally, the service quality scores obtained in 1995 do not influence the average prices per room sold in 1996. Hence, the potential effects of «word of mouth» from one year to the other are not evident in our data.

Exhibit 8.29: Service Quality and price per room sold[58]

Cross sectional 1996

Rooms
β= 0,19
T=4,7

Service quality
β= - 0,14
T= -3,6
→ Average price per room sold

AdjR^2= 6,2%
N=591
F=11,2

Time lag alternative 1995-96

Rooms
β= 0,25
T=5,6

Service quality in 1995
β=0,02
T=0,5
→ Average price per room sold in 1996

AdjR^2= 5,7%
N=498
F=16,2

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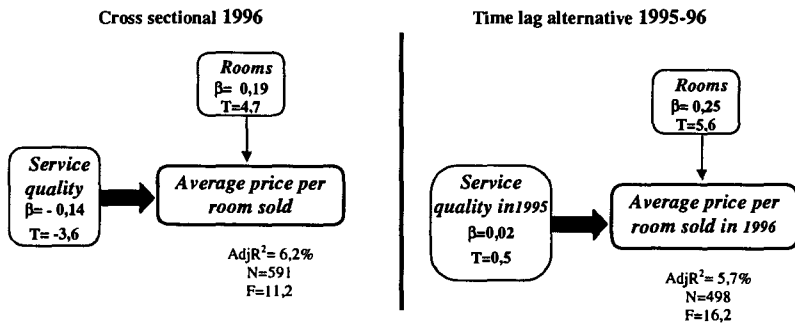
[57] A cross sectional regression on 1995 measures revealed similar results. Both variables had significant impact on average price per room sold.
[58] A cross sectional regression on 1995 measures revealed the following results: Rooms were positively significant, but the service quality had no effect on prices obtained.

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Our partial analysis of prices per room and quality do not reveal very convincing results. We do not succeed to explain more than 5-10% of the variation in the average prices obtained. When we replicate the models on highway and suburban hotels respectively, the results are still inconsistent. Basically, product quality appears important to the average prices in the highway hotels, while there is a positive but non-significant association between product quality and the average prices per room in suburban hotels.

The service element had an immediate negative effect on average prices in both highway and suburban hotels, whereas the lagged model showed no association in the two segments.

Overall, the results indicate that superior product quality might influences the ability to obtain higher average prices per room sold. However, the T-values are low and the results are inconsistent within the various categories of hotels. Hence, we do not have strong evidence to claim that superior product quality influence the prices per room sold.

Discounting increases satisfaction?

Neither do we find that the service quality scores influence the hotels' ability to obtain higher prices. The trend towards a negative relationship rather insinuates that discounting makes the customer more satisfied and less demanding towards the service personnel. Thus, the direction of influence could be opposite of our initial proposal.

c) Quality and revenue per room available

Location influences prices and yield

Revenue per room available is the next variable we consider. It is often referred to as yield. This is a popular performance measure in the hotel industry. The results from the analysis are exposed in appendix 8.3. The regressions do not suggest that quality is an important determinant of revenue per room available (i.e. yield). The quality dimensions explain a very small proportion of the variance in revenue per room available. The size of the hotel and the occupancy rate are the most important determinants. The room occupancy is a component of revenue per room. Thus, the relation is decided by definition. Nonetheless, leaving out the occupancy rate from the analysis does not provide any improvements.

You need higher prices and yields at Manhattan than in Arkansas

Basically, we are not able to explain much of the variation in either prices or revenues per room available. The disappointing results raise questions to whether these variables are valid performance measures. The hotels are spread around the U.S. Thus competition, business skills, business culture and cost level will vary. So far, our models ignore these aspects. A hotel needs higher prices and yield to survive in a city centre than in a rural area (c.f. table 8.18).

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d) Quality and relative yield

In this section we acknowledge the shortcomings of absolute performance indicators and substitute these with relative measures. The substitution of absolute measures by relative measures makes the disturbance from omitted variables less problematic. The first relative measure we introduce is: <u>revenue per room available compared to the closest competitors</u>. Thus, we avoid the noise from variation in prices, competition and cost levels across the U.S. Exhibit 8.30 and 8.31 show that the relative performance indicators improve the fit of our proposed models. The models generally explain between 30 and 40% of the variance in relative yield.

Exhibit 8.30: Service Quality and relative yield

Service quality makes the hotels more competitive

Cross sectional 1996 and *(1995)*

| Leisure |
| β=0,13 (0,13) |
| T=3,9 (3,4) |

| Rooms |
| β= - 0,29 (-0,23) |
| T= - 8,7 (-6,3) |

| Room Occupancy |
| β=0,54 (0,57) |
| T=16,6 (16,1) |

| Service quality |
| β= 0,13 (0,09) |
| T= 4,0 (2,5) |

| Relative Yield |

AdjR²= 39,7% (40,5%)
N=588 (482)
F=97,9 (82,9)

Time lag alternative 1995-96

1996

| Leisure |
| β= 0,11 |
| T=2,9 |

| Rooms |
| β= - 0,29 |
| T= - 7,5 |

| Room Occupancy |
| β=0,39 |
| T=10,7 |

| Service quality (1995) |
| β=0,17 |
| T=4,4 |

| Relative Yield (1996) |

AdjR²= 32,5%
N=496
F=60,6

Exhibit 8.30 suggests that service quality has a positive impact on hotels' ability to obtain higher revenue per room available than the local competition. Although the lagged model explains less of the total variance than the two cross sectional analyses, service quality has a stronger impact. Hence, improvements in relative performance from superior service quality will appear rather instantly, but more strongly in the following year.

On the other hand, if we apply service quality in 1996 to decide the relative yield in 1995 (i.e. we reverse the direction of influence), service quality still appears to make a significant impact. However, the β-coefficient and correspondent T-value are lower than in the other three models.[59]

Exhibit 8.31 shows that product quality apparently has a similar influence on relative yield as service quality. In fact, the models suggest that product quality is slightly more important to relative yield than service quality. However, the differences are small. Again, the lagged model proposes a stronger impact from the quality variable, but poorer general fit for the overall model.

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[59] An equivalent regression on 1995 measure with the service quality of 1996 revealed similar results as the cross sectional model from 1995: All variables were significant. The Beta = 0,09 and T= 2,47 for the service quality dimension. Adjusted R-squared of the model were 40,5%. Thus, the panel technique does not provide much guidance related to the direction of influence.

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Exhibit 8.31: Product Quality and relative yield

Cross sectional 1996 and *(1995)*   Time lag alternative 1995-96
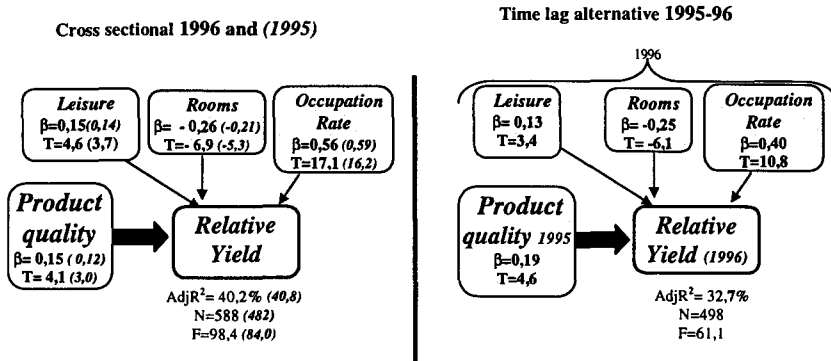
If we apply product quality in 1996 to decide the relative yield in 1995, the product quality variable still appears to make a significant impact. However, both its β coefficient and correspondent T-value[60] are lower than in the model, which follows our proposed direction of influence.

Quality represents a competitive edge with a duration of more than one year

Our yield variable measures the revenue per room available compared to the nearest local competitors. Thus, assuming that these

Exhibit 8.32 Quality and Relative Yield

SPEARMAN CORRELATION COEFFICIENTS

ALL HOTELS:

	SERVICE 95	SERVICE 96	PRODUCT 95	PRODUCT 96
Relative yield 1995	.1526	*.1568*	.1031	*.0611*
	N(484)	N(497)	N(484)	N(498)
	Sig .001	Sig .000	Sig .023	Sig .173
Relative yield 1996	**.2997**	.2468	**.3220**	.1540
	N(497)	N(589)	N(497)	N(589)
	Sig .000	Sig .000	Sig .000	Sig .000
		(Coefficient / (Cases) / 2-tailed Significance)		

local competitors are almost identical to the hotels we are analysing, we may disregard the control variables all together. Exhibit 8.32 reveals that a robust Spearman rank correlation analysis provide additional evidence to the findings in the previous models. We note that the highest coefficients of correlation are found when the direction of influence follows our proposal (numbers in bold) – i.e. that the quality scores in 1995 influence economic results in 1996. The opposite relationships reveal weaker correlations (numbers in italic). We note that Spearman rank does not depend on distributional properties. It is a distribution free technique.

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[60] An equivalent regression on 1995 measures with the product quality of 1996 revealed better model fit than the model following our proposed direction of influence: All variables were significant and beta = 0,13 T= 3,49 for the product quality dimension. AdjR²= 41,2%. Thus, the panel technique does provide some guidance related to the direction of influence – but not much.

e) Quality and sales growth

The models comprising relative yield indicate whether superior quality perceptions make it more likely for the hotel to outperform its local competitors – measured according to revenue per room available. In our next analysis, we will focus on the hotels' progress compared to their own performance. Or more precisely: Does superior quality make progress more likely? To answer this, we analyse growth in revenue per room available from 1995 to 1996 (i.e. equivalent to sales growth).

The results are less consistent than in the study comprising relative yield. First, our models do not succeed in explaining a large proportion of the variation in sales growth. Other unmeasured factors related to changes in business environment appear to explain most of the dispersion in sales progress. Finally, our analysis suggests that product quality is a more important driver of sales growth, than service quality. Nonetheless, the differences are rather small.

Exhibit 8.33: Quality and sales growth

Quality improves the growth potential

All hotels

Leisure96 β= -0,17 T= -4,0 → **Service quality 1995** β=0,12 T= 2,8 → **Sales Growth** ← Hotel Type β= -0,08 T= -2,0 ← Open date β= 0,35 T=8,0
AdjR²= 17,0% N=495 F=26,4

Leisure96 β= -0,19 T= -2,9 → **Service quality 95** β=0,12 T= 1,9 → **Sales Growth** *Suburban hotels open before 31.12.94 only*
AdjR²= 3,2% N=249 F=5,2

All hotels

Leisure96 β= -0,16 T= -3,9 → **Product quality 1995** β=0,18 T= 3,2 → **Sales Growth** ← Hotel Type β= -0,1 T= -2,1 ← Open date β= 0,26 T=4.6
AdjR²= 17,5% N=495 F=27,2

Leisure96 β= -0,2 T= -3,2 → **Product quality 95** β=0,23 T= 3,6 → **Sales Growth** *Suburban hotels open before 31.12.94 only*
AdjR²= 6,7% N=249 F=10,2

The models do not explain much of the differences in sales growth. The T-values are low. Uncertainty is emphasised when we disregard the age factor and focus on suburban hotels opened before 1995. These models only explain 3 to 7% of the variance in sales growth.

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f) Quality and operating profit

So far, all our performance measures have ignored the variations in costs. An implicit assumption (or justification) is that the unit costs are reasonably stable among the hotels in our sample. In this section, we will introduce a new measure: Profit per room available. In addition, we will apply the operating profit margin, or profit to sales. Both measures reflect variations in costs.

Quality improves the profit potential

First, we will include a simple analysis comprising growth in these two measures. Changes in profit divided by rooms available and $ sales,

Exhibit 8.34 Quality and Profit progress

SPEARMAN CORRELATION COEFFICIENTS

ALL HOTELS:

	SERVICE 95	SERVICE 96	PRODUCT 95	PRODUCT 96
Growth in profit per room available	**.2200** N(109) Sig .022	*.1985* N(110) Sig .038	**.3168** N(109) Sig .001	*.2985* N(110) Sig .002
Growth in profit per $ sales	**.1978** N(110) Sig .038	*.2025* N(111) Sig .033	**.1874** N(110) Sig .050	*.1784* N(111) Sig .061

(Coefficient / (Cases) / 2-tailed Significance)

reduce the need of control variables. Exhibit 8.34 reveals the results from a simple correlation analysis. Again, we apply Spearman rank to avoid the problems related to departure from normality.[61] Exhibit 8.34 indicates support to our hypothesis. Superior quality increases the possibilities of obtaining growth in profit. However, we find scarce evidence regarding our proposed direction of influence. It seems uncertain whether the quality scores in 1995 have stronger impact on the growth in profit in 1996, than the quality measures from 1996.

Our final models in the partial analysis attempts to explain the variations in absolute profits per $ sales and rooms available. In this case, the equations are exposed to many unmeasured factors beyond control. It is uncertain whether quality has a direct effect on absolute measures of profit. So far, the analysis suggests that quality is positively related to improvements in economic measures, such as profit and sales. Also, our data indicate that superior quality makes it more likely for the hotels to outperform their local competitors.

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[61] We note that a similar analysis with Pearson correlation indicated no partial associations between any of the variables. The kurtosis (skewness) values of Growth in profit per room available and of Growth in profit per $ sales were 21,0 (4,1) and 39,6 (6,0) respectively. Thus, departure from normality represents a potential problem.

Exhibit 8.35 presents the lack of evidence related to a direct relationship between product quality and absolute profit measures. The variation in profit is basically a product of the average prices per room sold and occupation rate. We have substituted these two variables by revenue per room available. It is clear that product quality does not explain much of the rest variance in profit per room available in any of the three models.

Exhibit 8.35: Product Quality and profit per room available

Cross sectional 1996 and *(1995)*   **Time lag alternative 1995-96**

Cross sectional 1996 and (1995):

Leisure: β= - 0,06(-0,15) T=-1,9 (-4,0)
Rooms: β= -0,02 (-0,01) T= -0,4 (-0,3)
Revenue per room available: β=0,88 (0,87) T=26,0 (23,0)
Product quality: β= -0,01 (-0,06) T= -0,4 (-1,5) → Profit per room available
AdjR²= 77,3% (75,0) N=217 (185) F=185,5 (140)

Time lag alternative 1995-96 (1996):

Leisure: β= -0,09 T=-2,7
Rooms: β= -0,03 T= -1,0
Revenue per room available: β=0,89 T=27,0
Product quality (1995): β=-0,01 T=-0,3 → Profit per room available (1996)
AdjR²= 79,8% N=189 F=188,6

Quality has no direct influence on profit

Exhibit 8.36 illustrates the results from a equivalent model on service quality and operating margin. Again, we are not able to submit any empirical evidence of a direct link between quality and profit. The lack of evidence is consistent in both the cross sectional analysis and the time lagged regression.

Exhibit 8.36: Service Quality and profit per $ sales[62]

Cross sectional 1996 and *(1995)*   **Time lag regression 1995-96**

Cross sectional 1996 and (1995):

Leisure: β= - 0,1(-0,2) T=-1,7 (-2,7)
Rooms: β= -0,04 (-0,06) T= -0,7 (-0,8)
Revenue per room available: β=0,52 (0,35) T=8,5 (5,1)
Service quality: β=0,04 (-0,17) T=0,6 (-2,4) → Profit per $ sales
AdjR²= 25,7% (17,5%) N=217 (186) F=19,8 (10,9)

Time lag regression 1995-96 (1996):

Leisure: β= -0,16 T=-2,5
Rooms: β= -0,12 T=-1,8
Revenue per room available: β=0,47 T=7,3
Service quality 95: β=0,01 T=0,2 → Profit per $ sales (1996)
AdjR²= 23,6% N=189 F=15,6

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[62] Ranked profit margin did not alter the results

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8.2.3. Summary of the partial analysis

The partial analysis is divided into two parts. The first part focuses on resources required to produce superior quality perceptions. The second part is devoted to test if quality influences economic performance.

Our analysis on the costs of producing quality provided inconsistent results. The level of various cost items did not explain much of the variance in product or service quality. This could be a measurement problem as the cost items also include mismanagement and waste. However, the cost of raw material related to the breakfast serving appears as a promising exception. Both the numbers from 1995 and 1996 indicate that the costs of the breakfast ingredients are reflected in the evaluation of the breakfast serving. We regard this results as evidence towards the resources linked to the production quality dimension.

Exhibit 8.37: Summary of significant results

Quality provides better room for improvements and competitiveness

The strongest results in the quality resource analysis are related to product quality and value. Our proxy of value of a hotel facility is simply the age of the building. Within a time span of 12 years, this is a reasonable assumption. The analysis shows that almost 50% of the variations in product quality are explained by age. Thus, we conclude that new hotels are more likely to receive superior evaluation of physical attributes. The results support our hypothesis contradicting quality as a free lunch.

Our findings suggest that quality require resources. Although, we do not view quality as a major cost driver, it should not be perceived as an immediate cost saver.

If we accept that quality tends to absorb economic resources, our next step is to analyse whether these sacrifices outweigh the potential benefits. Basically, we do not find evidence to support a direct relationship between quality and profit. Instead, our numbers suggest that superior quality tends to influence profit indirectly. Excellent quality rating from the customers makes the hotel more capable of outperforming local competitors. Furthermore, both sales and profits tend to grow faster in hotels, which obtain high quality scores. Exhibit 8.36 summarises the results. Quality basically provides better room for improvement and strengthens competitiveness. These effects will eventually make the hotel more profitable (cet. par).

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Part 8.3: Assessment of a complete model - LISREL

8.31 The measurement model

LISREL is a statistical software program[63] developed to analyse Linear Structural Relationships. It is a two step modelling approach, which handles two conceptually distinct models. The fit of the measurement model and the structural model should be evaluated independently. Jöreskog and Sörbom (1993) express it as follows.

> The testing of the structural model, i.e., the testing of the initially specified theory, may be meaningless unless it is first established that the measurement model holds. If the chosen indicators for a construct do not measure that construct, the specified theory must be modified before it can be tested.

> Jöreskog and Sörbom (1993)

However, single indicators measure our constructs. Although the various quality dimensions were produced from a bundle of questions, we extracted three distinct factors in an explorative factor analysis. The factor solution confirmed the ideas in the theoretical model proposed by Troye (1990).[64] Furthermore, we revealed the lack of variance in the quality data. The product quality dimension explained more than 2/3 of the total variance. The correlations between the 75 questions asked are extraordinarily high. This implies that all the questions may tap into the same domain. Nevertheless, whether the questions reflect three different quality dimensions or only one, is not of major concern to our analysis. We are chiefly interested in the relationships between quality on one side and economic measures on the other. Whether or not quality is a multi- or uni-dimensional construct is of secondary importance to our study.

We treat quality as a formative measure The quality measures are originated from customers' perceptions whereas the financial data and the market information involve objective measures. Thus, we anticipate that quality somehow is reflected through the response from customers' evaluation forms. We will use the dimensions extracted from the factor analysis as single indicators of the various quality dimensions. Thus, we perceive quality as a formative measure, created by the average scores of five questions summarised in exhibit 8.12. Economic performance is assumed to be formed by the level of single objective indicators, such as sales, profit, relative revenue and growth. Basically, we do not find it benefiting to design latent variables of any of the constructs involved. It would imply a more complex model without any obvious advantages. Models comprising observable single indicators are easier to interpret and replicate. Consequently, we do not have to specify and test and a measurement model.

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[63] It is developed by Karl Jöreskog and Dag Sörbom. We have applied the latest version: LISREL 8.20, which was released in 1998.
[64] See chapter 2.

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8.32 Structural analysis

a) Introduction

Structural equation modelling (SEM) combines the measurement model and the structural relations into the same analysis. Although we do not emphasise the measurement model, structural equation modelling (SEM) will be applied as a supplementary approach to the partial analysis described in part 2. Compared to multiple regression, SEM provides important advantages. However, by using only uni-dimensional measures, we avoid the advantages related to allowing error terms on the exogenous variables. We simply ignore the measurement model. Thus, measurement errors are not incorporated in the exogenous variables of our LISREL models.

SEM represents a complete analysis However, the SEM framework enables us to model interdependence and simultaneously causation. In contrast to multiple regression, SEM is an analysis of both the model and the hypothesis. The relationship between two variables is not only related to the number and types of independent variables included, but also to which dependent variables we choose to include in the model. The partial analysis in part two only allows one endogenous variable at a time. SEM permits analyses of several exogenous and endogenous variables together.

Finally, SEM comprises an overall test of the model fit as well as for each of the free parameters. Jöreskog (1993) has emphasised that it may be misleading to interpret significant parameters from a model with poor fit. However, Multhèn (1996) has disputed this statement and suggested that partial interpretation is acceptable in simple models where the theoretical foundation is well established.

SEM modelling is often described as a five-step procedure: 1) Model specification, 2) Identification, 3) Estimation, 4) Testing and 5) Respecification.

Model specification is basically to construct a structural model from the theory. Our theory on the economics of quality is not well developed. We argued that quality demands resources (investments or costs) and that these efforts will pay off. The literature supplies anecdotes, case studies and some empirical studies. However, we do not find any complete or obvious theoretical framework to assess. Lack of guidelines combined with numerous alternative measures makes model specification challenging.

SEM requires that we identify the parameters and assure that the model is not saturated.

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Testing of the model may be done by various techniques.[65] Maximum Likelihood (ML) and General Least Square (GLS) are common. The processes are iterative – i.e. they seek the best fitting values of the parameters by trial and error. When there is no room for improvement, the process will stop. A growing body of research suggests that Maximum Likelihood perform more consistent than General Least Square (Hoyle and Panter, 1995). Thus, ML will be applied in our study.

The rational in LISREL is to assess whether the proposed model fits the data. LISREL reproduces the covariance matrix of the population (Σ) through its parameters (P). The model will produce covariances (σ_{ij}) which are functions of the parameter (P). The issue is whether the covariances generated by the proposed model are close to the covariances generated by the data. A model should be able to reproduce the variances and covariances in the sample. The structural equation model is a test of the theory's ability to reproduce the observed covariance matrix. If the theory does not succeed, respecification of the model may be applied. This actually implies that we alter the theory to fit the data. The more we adjust, the more explorative our study becomes.

Respecification must be justified

b) Fit indices

We will report four fit indices:
1) χ^2
2) RMSEA
3) CFI
4) NNFI

The LISREL program produces a large number of fit indices. These indices are developed to assess the goodness of fit of the model – or to what extent the observed data comply with the proposed model. In our analysis we will emphasise four indices: Chi Square, CFI, NFI (the predecessor of NNFI) and RMSEA. Chi Square, CFI and NFI are consistent with the proposed measurement template of Journal of Marketing Research. RMSEA is strongly recommended by Browne and Cudeck (1993) (Sandvik, 1998).

Multiple regression:
H_1 = Theory

SEM
H_0 = Theory

Chi-Square is a measure of perfect fit. It denotes to which degree the proposed structural model accounts for the observed covariances among the variables. The test assesses the likelihood of the observed sample based covariances, S, to be different from the estimated covariances, $\Sigma(\theta')$. Thus, the test is slightly different to the common procedures in classical test theory. Basically, H_0 ($\Sigma = \Sigma(\theta)$ =true) proposes that the theory is true, whereas H_1 implies rejection of the model. In classical test procedures, this is opposite, i.e. H_1 represents the proposed theory.

The strength of the Chi-Square test is a function of the sample size. Thus, a large sample will entail smaller confidence interval of the Chi-Square test. In this particular test.procedure (SEM), H_0 (the theory) is more likely to be rejected the greater the sample size. The sample size of our analysis varies from 200 to 500 cases. Lack of perfect fit will then be easy to obtain. It is necessary to evaluate other fit indices to assess various aspects of our proposed models. The quote from Browne and Cudeck (1993) justifies the need of alternative indices.

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[65] Such as Maximum Likelihood (ML), General Least Square (GLS), Unweighted Least Square, (WLS), General Weighed Least Square (WLS) etc.

In the applications of the analysis of covariation structures in social sciences it is implausible that any model that we use is anything more than an approximation to reality. Since a null hypothesis that a model fits exactly in some population is known a priori to be false, it seems pointless to even try to test whether it is true. If the sample size is sufficiently large in a practical investigation, it can be expected that even models that approximate the covariance matrix closely will be rejected.

Browne and Cudeck (1993)

χ^2 - perfect fit

RMSEA - close fit

Thus, instead of a <u>perfect</u> fit statistic, Browne and Cudeck introduce a <u>close to</u> fit index denoted <u>Root</u> Mean Square Error of Approximation. The notation for RMSEA test is H_0: $\sqrt{(F_0/d)} \leq 0.05$. F_0 is the chi-square distributed fit function of the model and d represents the degrees of freedom. The formula shows that RMSEA rewards simple structures. This makes sense since models with more degrees of freedom imply a stronger and riskier test of the theory. The chi square statistic will automatically drop if new paths are freed, whereas the RMSEA involves punishment of over identification. RMSEA may be used as a guide between a parsimonious and interpretable model and a well fitting structure (Sandvik, 1998). RMSEA has a known sampling distribution and is applied as a test of the likelihood of the theory (i.e. the structural model) to be an acceptable approximation to the data collected from the real world.

In addition to these two absolute fit indices, two relative indices will be reported in our analysis. These are Non Normed Fit Index (NNFI) and Comparative Fit Index (CFI). Both indices are based on information from three sources: the sample covariance matrix, the reproduced covariance matrix and the null hypothesis with uncorrelated variables. The null model is used as an anchor of describing fit (Tanaka, 1993). Tanaka (1993) describes the logic behind these two indices as follows:

.. that no more complicated model can be hypothesised for the data if the data support the mutual uncorrelatedness model.

Although, the logic behind the two indices is congruent, they supplement each other in the way they consider the model assessment. CFI is population based and sample size dependent, whereas NNFI rewards simplicity. Gerbing and Anderson (1993) advocate these two as valuable and supplementary candidates to assess overall model fit.

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c) Test strategy

Our objective is not to assess a complete set of structural equations. Instead, we will emphasise the hypothesised relationships between quality and economic measures. The regression analysis showed inconsistent results. We cannot expect a structural model to "solve the problem". SEM is actually a more restricted method, compared to partial correlation and multiple regression.

The structural model approach makes it possible to analyse more of the available information simultaneously. We are also less restricted concerning the number of exogenous and endogenous variables. Finally, the LISREL program enables us to respecify the model until a satisfactory solution is obtained. The latter point, however, should be conducted with caution. Extensive respecification of the initial model makes the significance levels outlined by statistical calculus misleading. However, the quote from Browne and Cudeck (1993) implies that respecification is more acceptable in social science, or in areas where the theoretical foundation is weak.

Respecification must be conducted with caution

Opposed to most "LISREL work" within social science, we are modelling single indicator measures of both objective and subjective nature. We do not benefit from the inbound logic present in response from key informants.

A common procedure is to ask the manager what (s)he believes the customers think about the various aspects of the product. Then, the same person will be ask to rate the economic performance (Sandvik, 1998, PIMS studies). There are two crucial problems related to key informants.

Do we ask key informants about things they don't know?

First, we suspect most managers to impose certain logic in their answers. For instance, they might hesitate to claim that their quality is superior to their competitors', while their economic performance is not. This self-inflicted need to respond in a logical manner will help the data to "behave".

Secondly, we doubt that managers have sufficient knowledge about the questions we ask them. Do they really know what their customers think? Are they qualified to assess the financial performance of their employer? They may have knowledge related to one or the other, but we doubt that key informants know everything. Nevertheless, extensive research holds that managerial decisions are driven by perceptions (Einhorn and Hogarth, 1981; Slovic et. al., 1977). We are not claiming that these perceptions are irrelevant, but rather that objective measures are preferable.

In our study we do not ask the managers to assess customers' opinions – we ask the customers themselves. Neither do we ask the manager about the company's performance. Instead, we use objective financial information. These are important strengths of our analysis, but it probably makes it more difficult to obtain significant results.

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Lack of control in the data collection process is a disadvantage with our approach. In a traditional survey, we would be able to design the questionnaire according to our research problem. We have collected detailed secondary data relevant to our problem of research. This process has provided us with a large number of alternative measures. Finally, the theoretical foundation is rather weak and inconsistent. Quality is said to reduce costs (Crosby, 1979, Luchs, 1983), improve market share (Buzzell & Wiersema 1981), and increase return on investments and sales (Phillips, Chang & Buzzell, 1983). Besides, quality may represent a profitable investment opportunity (Rust et. al., 1995).

Our challenge is to construct a reasonable model within the LISREL framework. We have many alternative measures and information from two points in time. Previous research does not provide many guidelines to how a model should be designed. Neither do we have much knowledge to whether quality has an immediate effect on performance, or a lagged influence. The number of variables and lack of theoretical guidelines makes it possible to propose several models and respecify these according to the signals from the fit indices. Although some general guidelines and restrictions are implied by our theoretical discussion, we can hardly claim that our analysis is "exploration free". However, the number of cases is high and we have information from two consecutive years. Thus, we are able to retest our re-specified models in sub-samples and in different years. Our strategy is to start with simple models and expand these to include more of the information available. Exhibit 8.38 provides an overview of the variables in focus together with an indication of the relationships we want to test.

Exhibit 8.38 Dependent, independent and control variables

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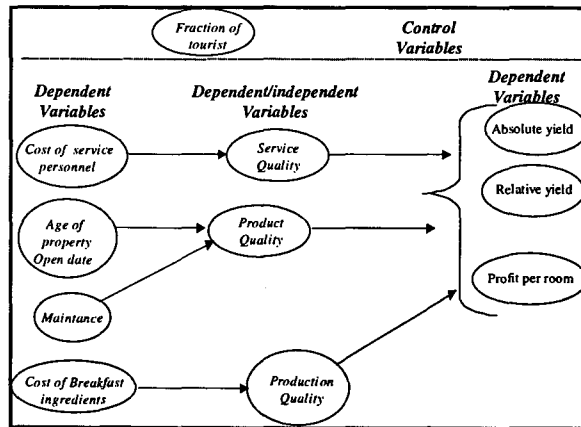
d) Results

The nature of our research problem and type of available data make it difficult to propose and test a complete model once and for all. First, it is not clear if quality has a lagged or an immediate effect on the economic constructs. Secondly, we cannot know whether there is a direct effect or an indirect effect from quality onto economic measures. In particular, we feel that the theoretical discussion together with the partial analysis has made the relationships between specific cost items and quality uncertain. The cost information is also more restricted (less valid cases). Few observations make it easier to produce acceptable fit through respecification of the models. However, the low number of cases will make it more difficult to obtain significant paths.

Our strategy has been to start with simple models in areas where we anticipate that our theory is strong. From the theoretical discussion and the partial analysis, it should be reasonable to expect quality to improve competitiveness and revenue per room available. Moreover, the factor analysis showed that our product quality dimension accounted for more than 70% of the total variance. We also argued that age (Open date) is a reasonable proxy of value and thus will influence the product quality ratings. Consequently, it should be sensible to test a relationship from age (value) to product quality and then to relative and absolute yield. We note that the available information related to these variables, comprise around 500 cases of valid listwise observations. This makes significant T-values likely. On the other hand, the fit indices punish large samples.

Exhibit 8.39 reports the results from this simple model. Both the lagged and the cross sectional analysis perform well. All the fit indices and RMSEA scores are acceptable. We note that even the strict Chi-Square test supports our lagged theory. Although the size of the sample almost ensures significant T-values, we emphasise that their signs comply with our hypothesis.

We record that a similar model on the 1995 data provided somewhat poorer results. However, one reason is that some hotels started up in the middle of 1995 and naturally obtained a lower revenue per room available in that year. We may solve this by allowing age to influence revenue per room. This modification will leave us with two degrees of freedom, Chi-Square = 3.10 and RMSEA = 0.034 (see appendix 8.4). Hence, all parameters are logical, significant and the modified model fits the theory.
(13a)

If we instead remove all hotels opened after 31.12.94 and apply the initial model, the paths are still significant and we obtained an RMSEA of 0.094. If we still find it relevant that new hotels might have some drawbacks regard to obtaining satisfactory revenue, opening a path between age and revenue per room revealed a significant negative relationship and deflated the RMSEA to 0.076.

Exhibit 8.39: The economics of Product quality - LISREL

Product quality requires investments but improves competitiveness and makes higher revenue per room available more likely

$\beta_c=0,63$ $t_c=18,41$
$\beta_l=0,69$ $t_l=21,06$
Age of property (Open date)
Product Quality
$\beta_c=0,30$ $t_c=6,99$
$\beta_l=0,32$ $t_l=7,52$
Relative yield
$\beta_c=0,23$ $t_c=5,36$
$\beta_l=0,22$ $t_l=4,96$
Absolute yield

t_c = t-value cross sectional model 1996
β_c= Standardised β-coefficient cross sectional model 1996
N_c =511 df=3

t_l = t-value lagged model
β_l= Standardised β-coefficient lagged model
N_l =497 df=3
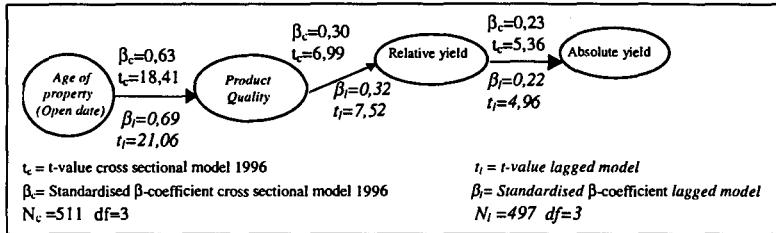
Cross sectional Model: Chi-Square 11,82, RMSEA = 0,075, CFI = 0,97, NNFI=0,95 (13)
Lagged Model: *Chi-Square 7,57*, RMSEA = 0,055, CFI = 0,99, NNFI=0,98* (10)

The model proposes that new hotels receive better product scores from their customers, which again make them more competitive and able to obtain higher revenues per room available. Thus, product quality is expensive and requires investments. The pay off will be evident in revenues per room available. We note that our model does not tell whether investments in quality are profitable. Although product quality seems to increase revenues, the cost could increase more and deteriorate the profit potential.

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Our next step is to focus on service quality. We have documented that the fraction of tourists is an important determinant of service satisfaction - simply because tourists are less critical than other segments (a mood effect). Furthermore, we do not expect the age of the hotel to influence service quality. Exhibit 8.40 shows a simple model in which the age of the property and product quality (c.f. 8.39) are replaced by service quality and fraction of tourists. Although the overall fit is relatively poor, all our proposed relationships are significant and comply with the hypothesis. We note that the lagged model performs better (or less worse) than the cross sectional alternative. We will also argue that the fit is reasonable, considering the large number of cases and the fact that we do not use key informants.

Exhibit 8.40 The economics of Service quality - LISREL

Service quality improves competitiveness and makes higher revenue per room available more likely

Cross sectional Model: Chi-Square 32,56, RMSEA = 0,135, CFI = 0,77, NNFI=0,53 (12)
Lagged Model: *Chi-Square 25,89, RMSEA = 0,121, CFI = 0,81, NNFI=0,63 (15)*

We record that a similar cross sectional model on 1995 data provided comparable results. More specifically, we removed 50 hotels opened after 1994 (reducing N to 417 hotels) and opened a path between fraction of tourists and absolute yield. Tourists pay less and we anticipate a negative effect in this path. Given these adjustments, the cross sectional analysis on the 1995 data produced an RMSEA of 0.13. However, all the t-values were significant and supportive to our proposed logic. The result is displayed in appendix 8.4(12b)

Both exhibit 8.39 and 8.40 indicate a better fit of the lagged models. These results comply with our theoretical discussion. However, the differences between the two alternatives are minor in both cases. We also remind that the higher number of observations makes it more difficult to obtain acceptable fit in the cross sectional structure. Consequently, we do not know if the superior fit of the lagged models simply is caused by the reduction in valid observations.

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Exhibit 8.41 combines the two models. However, in order to improve the overall fit, we allow service to influence product quality. Moreover, the service element is seen as a driver of product quality (Troye et. al, 1995). We have to admit that the overall fit is poor. The service element does not reveal any significant effect on relative yield. We would have obtained a better fit if age were allowed to influence service and the relationship from service directly to relative yield were removed ($RMSEA_l=0,092$ and $RMSEA_c=0,098$). However, we do not see any obvious justification of such a respecification.

Exhibit 8.41 Service driven economics of quality - LISREL

Quality improves competitiveness and makes higher revenue per room available more likely. Time of influence is uncertain.
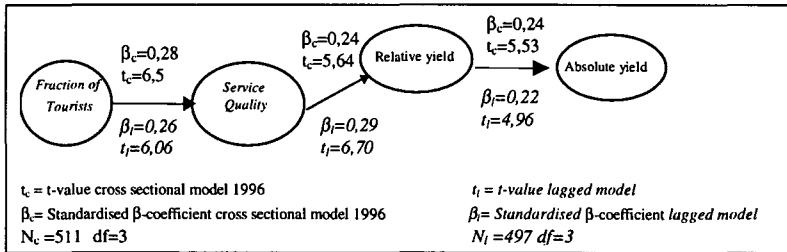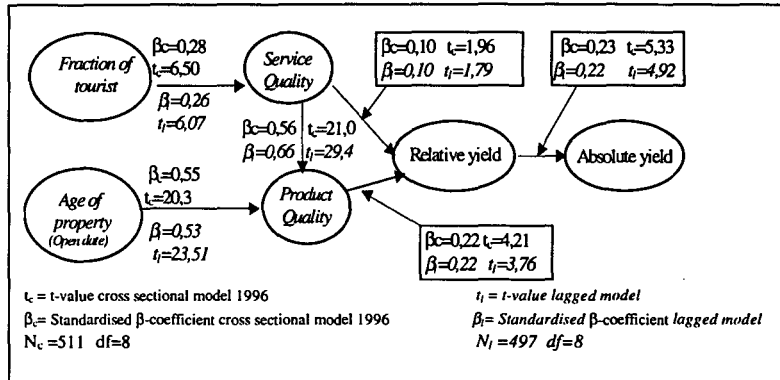

Cross sectional Model: Chi-Square 64,35, RMSEA = 0,118, CFI = 0,92, NNFI=0,87 (51)
Lagged Model: *Chi-Square 93,44, RMSEA = 0,143, CFI = 0,91, NNFI=0,84 (52)*

Despite the somewhat higher number of valid observations, the analysis suggests that the cross sectional model reveal better fit than the lagged alternative. However, none of the models are impressive. We do not believe any conclusions regarding the time of influence are appropriate on the basis of our analyses. The differences between the two alternatives are small and inconsistent. The question regarding the time of influence is unclear. In the following models we will concentrate on the cross sectional data – offering more valid observations.

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In exhibit 8.42, the cost items are included. This reduces the number of valid cases. We argued that the cost measures have doubtful validity as measures of resources spent on quality. Evidently, the cost items also comprise waste and mismanagement.

Exhibit 8.42 reveals that the new variables do create problems. Neither the overall fit, nor the parameters, presents convincing support.

Exhibit 8.42: The economics of Quality – LISREL [16]

Chi-Square 133,44   RMSEA = 0,152 CFI = 0,74 NNFI=0,65   N =138 df=27

β = Standardised β-coefficient. t = t-values. *Insignificant parameters are denoted in italic.*
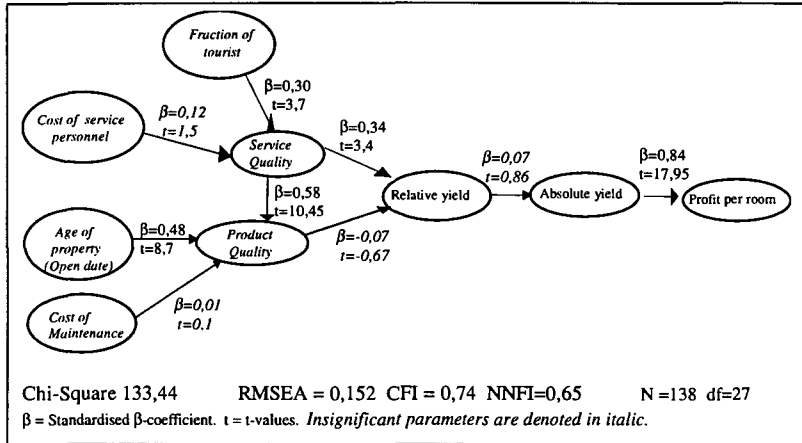
However, if we respecify the model, acceptable fit is within reach. Still, we do not find that the cost items are related to quality. Mismanagement and waste are likely explanations. Naturally, we find that the cost items are significantly negatively related to revenue and profit per room. We also discover that the cost of maintenance is less in new hotels, and that the fraction of tourists tends to have a negative effect on profit per room. If we incorporate these rather obvious paths into our model, we obtain acceptable fit.

We observe that the number of cases is fairly low. Hence, it is easier to accomplish support of the theory. On the other hand, a small sample makes it more difficult to produce significant paths. Exhibit 8.43 reveals that crucial paths are insignificant. For instance, product quality fails to affect relative yield and relative yield does not seem to influence revenue per room available. Nevertheless, some of these relationships have shown to be statistically significant in the previous models involving more hotels.

We have not succeeded to establish any convincing relationship between the cost items and product or service quality. Again, mismanagement and waste are natural explanations of the lack of association. The cost measures are basically not precise enough to reflect the resources spent on quality.

Exhibit 8.43: The modified economics of Quality – LISREL (16S)

Quality requires resources but will still imply some positive effects on competitiveness and performance.

Fraction of tourist

β=-0,06
t=-1,70

β=0,30 t=3,7

Cost of service personnel

β=0,12
t=1,5

Service Quality

β=0,34
t=3,4

β=-0,32
t=-3,94

β=-0,29
t=-7,47

β=0,58 t=10,45

Relative yield

β=0,06
t=0,75

Absolute yield

β=0,75
t=19,45

Profit per room

Age of property (Open date)

β=0,48
t=8,46

Product Quality

β=-0,07
t=-0,67

β= -0,22
t=-2,67

β=0,01
t=0,1

β=-0,21
t=-5,64

Cost of Maintenance

Chi-Square=34,59 RMSEA = 0,060 CFI = 0,97 NNFI=0,95   N =138 df=22

β = Standardised β-coefficient. t = t-values. *Insignificant parameters are denoted in italic.*

In our final model, we will disregard the composite cost items and concentrate on a refined cost measure reflecting the expenses of breakfast ingredients. To assess the amount of economic resources devoted to the breakfast serving, the data comprise an item reflecting the cost of food, beverage, and supplies related to providing continental breakfast. The wages of the breakfast hostesses are not included. Thus, we assume that resources spent on breakfast ingredient influence the overall evaluation of the breakfast quality. Finally, we incorporate age and product quality into the model. Apart from the variety of the breakfast items, the breakfast quality evaluation might be affected by product elements in the breakfast area. We believe the perception of the breakfast experience will be better in a trendy area designed in 1996, than in a "tacky" environment built 12 years ago.

Exhibit 8.44 shows a model, which is respecified until acceptable fit is obtained. Thus, the model is more an explorative analysis, than a theory test. However, all the paths are reasonably logical and significant.   One might argue that the arrow from breakfast quality to product quality should be reversed. Furthermore, a path from product quality to relative yield would make this model more congruent with our previous analyses. However, these two adjustments will increase the RMSEA score to 0,093. No disaster, but still we loose the pleasure of acceptable fit.

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We will argue that the direction of influence is generally uncertain as well as the relationships themselves. Although our final model is questionable compared to the theory, what models are not? We admit that the data have provided more information than is normally accepted. Nonetheless, the model fit is reasonable, the T-values are all significant and the signs support our earlier discussion. Thus, an ex post justification of this model is possible.

Exhibit 8.44 shows that the cost of breakfast ingredients drives production quality. The fraction of tourists has a positive impact on the breakfast perceptions and the cost of breakfast ingredients. The first effect may be explained by a general mood effect. Besides, it would be likely that tourists have more time to exploit the breakfast serving – thus increase the costs of replenishment. Age of the property is important to both product quality and production quality. The former relationship has been discussed earlier, whereas the latter may be caused by the newness of the physical aspects surrounding the breakfast area. Finally, it is not impossible that the breakfast experience makes the guest more positive towards the general evaluation of product quality.

Exhibit 8.44: The economics of Production Quality – LISREL (18)

Quality requires resources but will still improve competitiveness, yield and profit per room.

Chi-Square 34,66 RMSEA = 0,068 CFI = 0,97 NNFI=0,96   N =217 df=17

β = Standardised β-coefficient. t = t-values. *All the parameters are statistically significant.*
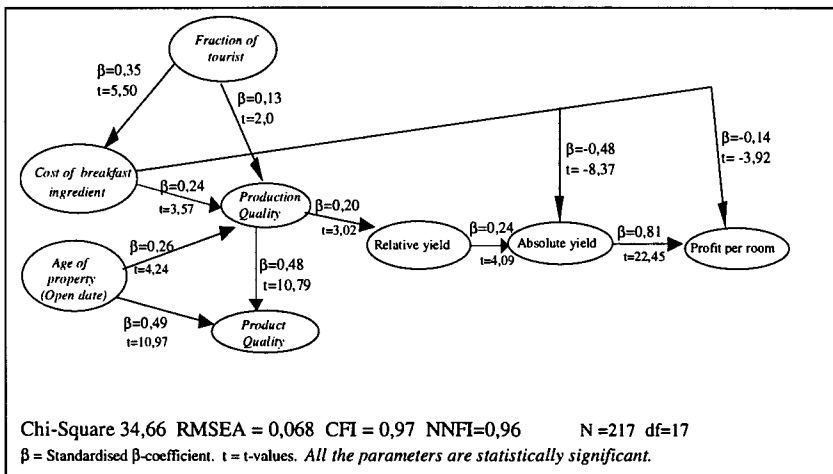
Table 8.45 Summary of hypotheses tests – Quality effects

Hypotheses	Proposed	Found		Significant Level	Conclusion
Proposition 1:					
Successful Quality	**+**				
⇒ Economic performance					
Service Quality		MR:	0,09-0,17	p<0,01	
⇒ Relative Yield		SR:	0,25-0,30	p<0,001	Supported
		LISREL	0,10-0,34	p<0,05	
Product Quality		MR:	0,12-0,19	p<0,005	Supported
⇒ Relative Yield		SR:	0,10-0,32	p<0,05	Supported
		LISREL	-0,07-0,32	p<0,25	Mixed Support
Quality ⇒ Absolute Yield					Not supported
Service Quality ⇒ Sales Growth		MR:	0,12	p<0,05	Supported
Product Quality ⇒ Sales Growth		MR:	0,18-0,23	p<0,01	Supported
Service Quality ⇒ Profit Growth		SR:	0,20-0,22	p<0,05	Supported
Product Quality ⇒ Profit Growth		SR:	0,19-0,32	p<0,05	Supported
Service Quality / Product Quality ⇒ Profit per Room					
Service Quality / Product Quality ⇒ Profit per $ sales					Not supported
Proposition 3:					
Successful Quality	**+**				
⇒ Average price per room					
Product Quality ⇒ Price per room		MR:	0,10-0,13	p<0,05	Supported
Service Quality ⇒ Price per room					Not supported

Note: Explanation of the abbreviations in table 8.45:
SR: Spearman Rank Correlation Coefficient. MR: Standardised Multiple Regression Coefficient
LISREL: Completely Standardised BETA coefficient in LISREL.
The intervals denote the range of the results from the various models.
The inequalities of the p-values are valid for all the models involving the specified variables.
(i.e. they denote the significant level of the worst model).

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Table 8.45 (cont.) Summary of hypotheses tests – Quality determinants

Hypotheses	Proposed		Found	Significant Level	Conclusion
Proposition 2:					
Resources	**+**				
⇒ Successful Quality					
Property Value (*Open date*)		MR:	0,65-0,68	p<0,0001	Supported
⇒ Product Quality		LISREL	0,48-0,69	p<0,0001	Supported
Maintenance costs					Not supported
⇒ Product Quality					
Service personnel costs		MR:	0,14--0,21	p<0,07	Weak Support
⇒ Service Quality		SR:	0,17-0,33	p<0,05	Supported
		LISREL	0,12	p<0,07	Weak Support
Costs of breakfast ingredients		MR:	0,18--0,25	p<0,008	Supported
⇒ Production Quality (Breakfast related)		SR:	0,27-0,39	p<0,0001	Supported
		LISREL	0,24	p<0,0002	Supported
Other Quality					
determinants:					
Fraction of Tourists		MR:	0,09-0,12	p<0,008	Significant factor
⇒ Product Quality					
Fraction of Tourists		MR:	0,11-0,30	p<0,09	Weak
⇒ Service Quality		LISREL	0,26-0,30	p<0,0001	Significant
Fraction of Tourists		MR:	0,05-0,13	p<0,18	Weak
⇒ Production Quality		LISREL	0,13	p<0,0001	Significant
Number of rooms		MR:	-0,15	p<0,0026	Significant
⇒ Product Quality					
Number of rooms		MR:	-0,10 to -0,30	p<0,13	Weak
⇒ Service Quality					
Number of rooms		MR:	-0,13 to -0,17	p<0,02	Significant
⇒ Production Quality					

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Chapter 9: Discussion and implications

This chapter is divided into three sections. First, we summarise and discuss the results from the analyses. Then an assessment of the theoretical and methodological strength and weaknesses follows. Finally, we explore the possible implications for businesses and further research.

9.1 The main results: Summarised and discussed

Case studies and anecdotes are difficult to replicate.

The objective of our study has been to seek insight into the economics of quality. We wanted to challenge the existing literature of anecdotes and case studies. These basically state that quality is a powerful competitive weapon, applicable to all kinds of industries and services. When we scrutinise the literature, it is hard to debate its conclusions. The reason is not the impressive empirical evidence, but rather the way quality is defined.

Quality is generally perceived as implementing systems that ensure perfectionism in all parts of the business. A company that successfully attains this goal is likely to outperform firms experiencing mismanagement and disasters. To do things correctly the first time is obviously cheaper and more profitable than to produce errors. We basically state that the general understanding of quality and economic performance more or less represents a tautological relationship. Thus, the lack of empirical research is probably more a relief than a surprise.

Quality is judged by the consumer

In order to avoid the tautological trap, we have specified a more limited concept of quality. Our approach has been to let the customers decide the quality of the product after consumption. Consequently, we are only employing a specific element of the more comprehensive quality construct referred to in the journals. Our quality concept is probably tapping into the domain of customer satisfaction. Nevertheless, it is certainly not tautological in relation to economic performance. We are basically analysing whether <u>successful</u> quality, measured on the basis of customers' perceptions, is associated to economic measures.

Our next challenge has been to establish reasonable measures of economic resources and performance. We did not find it necessary to create latent variables based on multiple measures. Instead, we have applied simple interpretable variables, which are assumed to influence the general concepts of sacrifices and gains.

The analysis is introduced by thorough descriptive statistics of the available data. It reveals that the fraction of tourists is an important control variable to consider. Furthermore, it is evident that kurtosis and skewness represent a serious challenge.

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We will claim that our study is based on primary data. However, these measures are not tailored to solve our particular problem. They are originally collected for other purposes. The fragmented information available has made it reasonable to conduct many independent bits and pieces of analyses – applying different techniques and combinations of variables. Based on an overall view of the findings, we claim to have contributed to the research on the economics of quality.

The data analysis comprises a section emphasising partial models applying multiple regressions and simple calculations of Spearman rank correlations. The latter technique is used to ensure that non-normality, revealed in the descriptive analysis, does not imply serious problems regarding our main conclusions. There are a number of reasons to include partial analyses into our study. First, we know that most scholars are familiar with the techniques presented. Thus, it is easy to understand, control and replicate partial analyses. Secondly, partial analyses are more flexible. They allow us to focus certain relationships and pay less attention to the overall model fit. Finally, partial techniques are less dependent on large samples. It is possible to conduct studies of smaller sub samples than is the case when we apply the LISREL framework. However, we note that many partial analyses, applied to the same problem, makes the significant levels disputable.

The LISREL framework is introduced to overcome some of the shortcomings related to the partial analyses. First, it represents a more restricted and complete test strategy. Secondly, it allows us to analyse endogenous variables simultaneously. Thus, the temptation of searching for significant relationships should be less. Still, respecification of a LISREL model provides room for exploration.

We have applied many techniques and measures to confirm our initial results

Basically, non-of our methods or techniques are perfect. There are always possibilities of omitted variables, masking the relationships we want to study. Nevertheless, this critique is relevant to all research. Our study comprises numerous of techniques and variables. This represents a danger of unintended data mining. However, independently of the techniques and variables involved, the conclusions of our study basically point to the same direction – namely that quality requires resources and simultaneously improves competitiveness and performance. We have used different techniques and variables to confirm our results, not to explore whether lack of results may be uncovered by a different set of variables.

In chapter 6, we described three separate propositions:

P1: Quality $\rightarrow$ Economic Performance
P2: Costs $\rightarrow$ Quality
P3: Quality $\leftrightarrow$ Price

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In the empirical study, we incorporated the quality-price relation into the analysis of quality and performance. The rational is that higher average prices obtained per room are seen as a performance indicator. Our study does not focus on the traditional consumer behaviour literature on price and quality. As such, we are left with two overall proposals and finally a more complete test of the theory.

1. The economic benefits related to successful quality   *(P1 and P3)*
2. The economic sacrifices related to successful quality   *(P2)*
3. The Economics of quality   *(P1, P2 and P3)*

Exhibit 9.1 reveals a summary of the most important partial results related to the benefits of successful quality. The table denotes the methods used and the measures involved.

Table 9.1 Summary of results: Successful quality and economic benefits

H1 and H3:	*Measures*	*Results*	*Method*
Successful Quality	Product quality-Price per room	+ in all models	Multiple regression.
	Service quality-Price per room	inconsistent results	Two cross sectional models
	Product quality-Relative yield	+ in all models	(1995 and 1996)
	Product quality-Relative yield	+ in all models	and one lagged model
	Service quality-Relative yield	+ in all models	(1995-96)
	Product quality-Relative yield	Direction of	Spearman Rank correlations.
	Service quality-Relative yield	influence supported	Panel analysis.
Most results comply with our hypotheses	Product quality-Sales growth	+ in lagged model	Multiple regression.
	Service quality-Sales growth	+ in lagged model	Quality 95 → Growth 96/95 ↓
	Product quality-Sales growth	+ in lagged model	Identical analysis in a sub sample
	Service quality-Sales growth	+ in lagged model	of older suburban hotels
	Product quality-Profit growth per room	All coefficients revealed positive significant signs. No guide to direction of influence	Spearman Rank correlations.
	Service quality-Profit growth per room		
	Product quality-Profit growth per $ sales		Panel analysis.
	Service quality-Profit growth per $ sales		No control variables
Economic Benefits	Product quality-Profit per room	Inconsistent results in all models	Multiple regression. Two cross sectional models (1995 and 1996) and one lagged model (1995-96)
	Service quality-Profit per $ sales		

The analysis suggests that quality provide better possibilities of obtaining higher prices. Hotels with successful quality ratings also seem to outperform their local competitors more frequently, and they have better prospects of future growth. The panel analyses mostly support our hypothesised directions of influence. Furthermore, the Spearman Rank coefficients indicate that the level of skewness and kurtosis does not necessarily intimidate our conclusions.

We did not find any direct relationship between quality and profit. This does not prove that a direct relationship does not exist. It is more likely that omitted variables, such as the cost level, culture and business environment, are masking the potential association.

Relative measures alleviate the problem of omitted variables Omitted variables are less problematic when we apply relative measures. In fact, the models perform well when we use relative performance measures. Nevertheless, we do not disregard the existence of direct links between quality and absolute economic measures. Instead, we argue that our models do not succeed to include sufficient control variables to capture a direct relationship.

Exhibit 9.2 reveals a summary of the most important partial results related to the sacrifices involved in obtaining successful quality. The table denotes the methods used and the measures involved.

Table 9.2 Summary of results: Economic sacrifices and successful quality

H2:	Measures	Results	Method
Economic Resources	Maintenance cost-Product quality	no association	Multiple regression.
	Housekeeping -Product quality	no association	Two cross sectional models
	Open date (≈value)-Product quality	+ in all models	(1995 and 1996)
	Service related payrolls to sales → Service Quality	+ in 1995 and 1996 Direction of influence supported	Spearman Rank correlations. Panel analysis. No control variables.
	Service related payrolls to sales → Service Quality	+ in 1995 insignificant in 1996	Multiple regression. Two cross sectional models (1995 and 1996)
	Costs of breakfast ingredients to sales → Breakfast Quality	+ in 1995 and 1996 Direction of influence supported	Spearman Rank correlations. Panel analysis. No control variables
Successful Quality	Costs of breakfast ingredients to sales → Breakfast Quality	+ in 1995 and 1996	Multiple regression. Two cross sectional models (1995 and 1996)

The strongest result from a quality resource perspective, is the association between product quality and age of the facility. The result suggests that successful product quality depend on investments and upgrading of the physical assets. Thus, product quality is definitely not free.

The results regarding specific cost items are generally weak. Cost items also comprise mismanagement and waste. Hence, lack of association is probably caused by measurement problems.

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Besides, we did find a significant relationship when a specific and refined cost item was related to a particular dimension of our quality construct. More specifically, we managed to document a positive relationship between the rating of the breakfast and $ spent on breakfast ingredients. Mismanagement and waste is expected to be less disturbing in the purchase process of breakfast ingredients, compared to the more comprehensive items related to maintenance and housekeeping.

Exhibit 9.3 provides an overview of the five models we have analysed in a LISREL framework. These models both contain the resources required and the gains obtained from successful quality. We start with few variables and then expand the analysis into a more complex model. The analysis of the breakfast dimension represents a special case.

Table 9.3 Summary of hypotheses: The economics of quality in LISREL

	Measures	*Results*	*Comments*
Model I: ***The economics*** ***of Product quality***	Age (≈value) → product quality→ relative yield → absolute yield	all paths significant Acceptable model fit	Significant paths are expected in an analysis of around 500 cases. However, their signs comply with theory Acceptable model fit with 500 cases is a strong result The lagged model even provides insignificant χ^2
Model II: ***The economics*** ***of Service quality***	Fraction of tourists service quality→ relative yield → absolute yield	all paths significant Poor model fit	All paths are strong and comply with theory. Model fit is not to bad considering 500 valid cases and a simple structure (RMSEA 0.12 - 0.13)
Model III: ***Service driven*** ***economics of quality***	Fraction of tourists, Age (≈value) service quality, product quality, relative yield, absolute yield.	all paths significant Poor model fit	All paths comply with theory. Model fit is not to bad considering 500 valid cases. (RMSEA 0.12 -0.14)
Model IV: ***The economics*** ***of quality***	Open date (≈value), Costs of service- and maintenance personnel ,fraction of tourists, service quality, product quality, relative yield, absolute yield, profit per room → <u>9 variables</u>	**Initial structure: 4 of 9** paths are non-significant. Poor model fit. **Modified structure: 5 of 14** paths are non-significant. Acceptable model fit	The initial structure leaves some crucial paths insignificant. However, only 138 valid cases might be insufficient to conduct this type of analysis. The low number of observations makes it possible to modify the structure and obtain reasonable fit. The modified model still provides some insignificant paths related to our main hypothesis.
Model V: ***The economics*** ***of Production quality***	Open date (≈value), Costs of breakfast ingredients ,fraction of tourists, quality, product quality, relative yield, absolute yield, profit per room → <u>8 variables</u>	All paths significant Acceptable model fit	All paths comply with theory and logical reasoning. The number of valid cases is large enough to obtain breakfast both significant paths and reasonable model fit (N=217)

The results from the two simplest LISREL models (I and II) are quite promising regarding both the partial T-values and the overall model fit. The models comprise information from around 500 hotels at two points in time. Thus, we are able to test two cross sectional models and one time lagged alternative. The two cross sectional models from 1995 and 1996 revealed similar results. We have chosen to exhibit the results from 1996 because they involve more valid cases.

In both two models (I and II), the time lagged alternatives seem to perform somewhat better than the cross sectional structures. However, the differences are not immense and we do not find it reasonable to draw any distinct conclusions regarding the time of influence.

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The two simplest LISREL models (I and II) offer high T-values supporting our hypotheses. However, the fit indices are rather unstable. RMSEA varies from 0.14 and down to 0.055. We would prefer both lower and more stable values. However, the high number of cases, the validity of objective data and the simple structure proposed, (no respecification has been made) makes it difficult to obtain a perfect fit. We will argue that the results are acceptable.

Model III proposes a simple structure in which service is anticipated as a driver of product quality. Open date (≈value) is still seen as the most important factor related to product quality. Finally, we propose that both service and product quality influence relative yield which again fuels revenue per room available. The model exposes six paths which all support our hypotheses. However, we note that the overall fit is poor. Besides, the cross sectional model complies better with theory than our lagged proposition. This represents another reason to avoid any conclusions regarding the time of influence.

If we remove the direct relationship from service to relative yield, we acquire a minor reduction in RMSEA (from 0.118 to 0.114). In addition, the T-value of the coefficient between product quality and relative yield increases from 4.2 to 6.6. Thus, it might make sense to perceive service as a pure driver of product quality and disregard the link between service and performance. This modification produced significant paths, but the overall fit was still poor.

Model IV is more complex. In this model, the cost measures are incorporated. We remind that the association between costs and quality is debatable. Costs reflect mismanagement, accidents and waste. This is a measurement problem, unfortunately not resolved by the LISREL program. Although, a modified version of model IV reveals acceptable fit, we note that the paths from costs to quality still are insignificant. We also find that product quality has no influence on performance and that relative yield fails to affect absolute yield. The low number of valid cases involved in this model is one reason for the low T-values combined with acceptable fit. When we modify the structure by opening several obvious paths between costs and profit, acceptable fit is obtained. However, these obvious relations cause the successful fit. Our specific questions of issue only disturb the overall model. We might argue that the result would be improved if more valid cases were included. The outcome of the previous models supports this argument. Still, we have not been able to present much convincing evidence related to the association between costs and quality – neither in the LISREL framework nor in the partial analysis. Unrefined and comprehensive cost items are the most immediate explanation.

In the fifth model we have tried to alleviate the measurement problems by incorporating a more refined cost measure into the analysis. Basically, we believe mismanagement and waste are less dominant in the cost of breakfast ingredients, than in other more comprehensive items. The results from this structural model (V) appear to support our beliefs. All the paths are significant and the overall model fit is acceptable. Also, the number of valid observations is at a satisfactory level.

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Unfortunately, we do not find any significant relationship between product quality and performance. Thus, the model appears slightly data driven. However, the empirical evidence between costs and quality is our main concern. This specific relationship does not depend on whether product quality is allowed to influence performance or not.

The main critique of the empirical results is the lack of a complete and robust structure that succeeds to document the proposed hypotheses regarding the economics of quality. Instead, we have found bits and pieces of supporting evidence. However, our T-values are generally higher than the ones reported in Phillips et. al. (1983). They applied key informants and received mixed results. We also experienced mixed results, but we did not rely on key informants.

Our study comprises a specific segment of the hotel industry. We have objective data from two points in time. Although, the skewness and kurtosis values are outside the recommended range, simple Spearman Ranks statistics do not indicate that we face major problems.

Lack of variance in the scores might be held as a possible criticism to our study. The main reason is the homogenous sample on which the study is based. However, this simultaneously implies an advantage related to the threat from background variables - potentially disturbing and masking the relationships of interest.

Internal validity is strongly emphasised in our study. Hence, disturbance from omitted variables is minimised. Nonetheless, we did not manage to find a direct link from quality to absolute performance. A more heterogeneous sample would obviously imply even more problems regarding disturbance from a third factor.

Case studies and anecdotes are more convenient We do not find it reasonable to blame the data for the lack of simple and robust results. We rather hold that the economics of quality is a flimsy issue. It is extremely difficult to obtain sufficient and relevant information to study the problem empirically. Case studies, experiments and theoretical arguments might represent a more realistic approach. The literature certainly suggests that these are more popular procedures.

9.2: The data and research design

This section discusses the quantity and validity of the data available to our research project. Furthermore, we look into the challenges related to research design.

a) The data

The amount and the relevance of the information available represents a significant value to our research project. In particular, we will emphasise five advantages:

1. We have information from homogenous operations within a particular industry from two countries
2. We have many alternative measures and also access to relative performance data
3. The number of valid cases is high
4. We have information from two consecutive points in time
5. We have objective measures (no key informants)

Two hotel companies produce our data, one in the U.S. and one in Norway. Both databases offer homogeneity related to the line of business and segment. However, we find the Norwegian data to be insufficient. The number of valid cases providing information related to both quality and economic issues is small. Nevertheless, the Norwegian data offer knowledge regarding the relevance of specific control variables. Two sets of data make it possible to explore certain issues in one set of data and retest them in different samples.

The high number of measures both represents an advantage and a challenge to our study. It is challenging to decide which measures to include, and which to exclude. Data mining is a potential danger when too many alternatives are available. On the other hand, surplus information makes it more likely to obtain relevant measures.

The American data comprise measures of performance related to their closest local competitor. This variable is particular helpful to our study. It enables us to pay less attention to the potential influence from masking variables outside our control.

The data acquired from the U.S. hotel company comprise valid information on quality and performance of up to 500 cases from two consecutive years. PIMS represents a database of similar magnitude. The study from Phillips et. al. (1983) applied between 132 and 299 business units per industry. These industries were more heterogeneous than our sample of hotels. The availability of information from two consecutive years makes it possible to retest and confirm the results in different years. Moreover, we are able to conduct a panel design to assess the direction of influence.

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Key informants do not necessarily tell you anything about reality

Nonetheless, the major strength of our data is probably the absence of key informants. We avoid the risk that executives agree to our hypothesis, but still <u>do not</u> know the answers to the specific questions. Instead of admitting their lack of knowledge, managers are likely to provide logical answers in accordance with their beliefs and education. We suspect them to extrapolate their knowledge. This phenomenon will help the analyst to reach significant results. However, the analyst will not know if the measures are valid. Our quality measures are based on direct questions to the customers after they have experienced the product. Then, these ratings are related to objective performance and cost measures provided by management accounting systems.

Our study is not a <u>sophisticated opinion poll</u> on the economics of quality

Opposed to PIMS, we do not rely on management's perceptions of quality, cost and performance. Most executives have learned that satisfied customers and superior quality are profitable strategies. We suspect they will answer our questions bearing this in mind. By answering our questions in a rational manner, they secure some association between the constructs. It is difficult to design questionnaires which completely avoid this potential source of artificial support. Objective data alleviate the problem. Objective measures are more valid because they reflect reality. Reality is even messier than executives' thoughts. Thus, higher error terms and discouraging results represent a potential disadvantage.

b) The research design

The main challenge of our study is to operationalize the constructs and design a model capable of assessing the proposed relationships. Although we have fairly detailed financial information, the accounts are not designed to measure costs or revenues related to quality. In fact, one might question the purpose of all minor cost items reported. Both the Norwegian and the U.S. accounting system seem to emphasise some rather insignificant and peculiar economic issues. The reason is probably that items such as telephone bills and revenues from the minibar are visible and easy to measure. Costs related to quality are more complicated to review. The economics of quality is presumably of minor importance to a firm's overall performance. Variation in comprehensive items such as labour costs, room revenues, costs of goods and financial expenses are more significant. Our challenge is to capture and measure the costs and revenues related to quality.

We are using objective and non-customised information to study some fragile associations. Thus, we do not expect strong results. However, the number of observations is fairly high and the sample is homogenous with respect to several aspects. A large sample almost ensures that the traditional T-values are significant Nevertheless, they also need the right signs in order to comply with our hypothesis. The number of observations does not affect the signs - only the level of significance. Besides, we have applied the LISREL framework, which basically makes acceptance of the theory (H_0) more difficult as the number of observations increases.

Disturbance from masking variables is less in a homogenous sample. Lack of external validity is the price we pay. Bass et. al. (1978) have shown how parameter estimates of causal paths may be seriously distorted when observations across heterogeneous industries are pooled together. They argue that industry specific forces will act as background variables. Failure to take these into account represents an omitted variable problem. We have chosen to focus on a specific industry and thus prioritise internal validity.

Similar hotels
Less disturbance
↓
Little variance
Weak results

The problem of a homogenous sample from a particular industry is the lack of variance it may produce. In a homogenous chain of hotels, the participants will seek to keep their quality and performance in line with the others members. Thus, we are only able to study the economics of quality within a restricted interval. If all the hotels provide almost identical levels of quality, it will be impossible to infer if quality has any impact on performance.

We have shown that the literature provides few restrictions and guidelines related to our research design. The design is generally based on the logic that quality requires resources (input) and that quality has positive effects on economic performance (output).

Figure 9.4: The basic research design
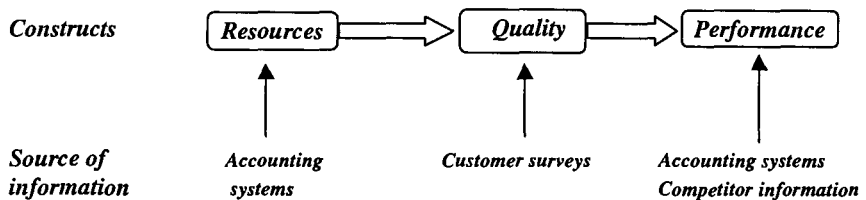
We are free to choose from a number of variables representing quality-related resources, sacrifices, costs, investments and efforts. Unfortunately, we did not find any variables that were particularly appropriate as measures of quality costs. The wage level is determined by formal skills, years of experience, moral, motivation and commitment. High wages do not necessarily indicate superior output quality. Neither does expensive maintenance guarantee efficient maintenance.

Our results confirmed the disturbance by rejecting most cost items from influencing quality. The cost of breakfast ingredients represented an exception. This item is more refined and does not involve salaries or other items more sensitive to disturbance. Finally, we used the age of the hotels as a proxy of investments in physical facilities. This proxy revealed strong and supporting influence in all our models.

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We decided to apply a restricted definition of quality in order to avoid tautology. The quality measures are simply based on the customers' perceptions. It is solely the customers who judge the quality provided. Technical standards, quality manuals and management recipes are not considered. We are emphasising the success of the output, not the input.

It is obvious that our definition of quality taps into the domain of customer satisfaction. Nevertheless, our research will still be valuable. It will be interesting to those who regard customer satisfaction of crucial importance. We argue that the analysis comprises an indicant of successful quality. This measure may well tap into the domain of customer satisfaction. We maintain that customer satisfaction is a core element of quality management (Talley, 1991).

Finally, we arrive at the output variables – namely economic performance. The management accounting systems provide a number of different and relevant alternatives. Most variables are strongly interrelated. Nonetheless, we did not manage to verify any direct relationship from our indicators of successful quality onto absolute measures of economic performance. We explained the lack of association by the fact that the absolute performance measures are affected by masking variables, such as the local cost level, culture and competitive environment. Fortunately, we manage to acquire a relative performance measure – comparing the performance of each hotel to its nearest local competitors. This relative measure revealed much better association to our indicants of successful quality. Finally, we also found that successful quality had a positive influence on <u>growth</u> in sales and profit. Unfortunately, the path from the relative measures to the absolute performance measure were debated in one of the five LISREL models. A possible explanation is the small number of valid cases available in this particular model.

Complex questions
Many measures
Few guidelines
↓
Freedom in design
Exploratory flavour

Our discussion in chapter 6 suggests that the financial results from successful quality may take a while. However, the data did not provide sufficient evidence to decide anything related to the time of influence. Finally, we hypothesised that service quality should be cheaper and more effectual than product quality. Facing the real world through empirical data, we did not manage to resolve this particular issue. With hindsight, these two specific hypotheses were probably too ambitious. The economics of quality is a complex problem, let alone if one dimension of the construct has a different effect than the other.

We have been investigating a flimsy and unexplored area. Thus, we have found it acceptable to adjust and modify the design according to the information available. This has been necessary in order to reveal some interesting results. Empirical studies of the economics of quality are not common – especially not using objective data. The exploratory flavour of our study should be accepted. We emphasise that the data enable us to explore an association in one sample and retest the results in another.

9.3 Managerial implications

The fraction of tourists influences quality perceptions

The descriptive statistics showed that tourists generally are less critical than business travellers. Assuming everything else to be constant, they tend to be more content with the quality offered. Hence, the quality perceptions will depend on the fraction of tourists present in the sample. The central management has to consider this aspect in order to make a fair judgement of the variation in quality between its member hotels.

The study uncovers bits and pieces of empirical evidence, which support our hypothesis regarding the economics of quality. Nonetheless, we did not succeed to capture very robust relationships or establish stable models. We do not believe quality to be of major importance to the economics of a firm. There are several other strategic variables that are far more consequential. Superior quality and satisfied customers is a strategy among many others, which contributes to economic success.

Quality is not free!

Our analysis suggests that a quality strategy require financial resources. We do not support either Luchs (1986) or Crosby (1971) who present quality as a free lunch that managers overlook. Nevertheless, our study does not recommend the financial controller to allow more slack in cost related to maintenance, service personnel or housekeeping. We did not find any association between these items and the level of quality provided. The cost items are basically too comprehensive and thus invalid as measures of quality efforts. Mismanagement and waste are more likely explanations of overspending.

However, in a specific item recording the cost of breakfast ingredients, we were able to discover a positive relationship to the quality ratings of the breakfast. We argue that this particular item is sufficiently refined, and qualifies as a measure of quality efforts. Thus, cost savings on breakfast ingredients might affect the quality rating of the hotel.

We find that management accounting systems often are overloaded with variables. The relevance of specific items should be carefully assessed. What is the rational of recording revenues and income related to telephones, mini bars, laundry services, and agents' fees? The value of any accounting system should be judged by its potential to influence the decision making process. Mintzberg (1975) has conducted an empirical study of various accounting systems. He wrote:

> ".... these giant management information systems are not working
> - managers are not simply using them".
>
> Mintzberg (1975)

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Information systems should contain simple and relevant data

Experts tend to develop comprehensive systems in order to reduce the risk of leaving out essential variables. They produce a <u>buffer zone</u> of irrelevant information. (Bjørnenak, 1994). Figure 9.5 illustrates how we view the relevance of the information available to our to study. The buffer zone contains information which we anticipate is of minor value. The buffer zone does not include much information of relevance to our problem. We advocate a better co-ordination of the information collected. The customer survey program should be integrated to the management accounting system. The design of both systems should be formed on the basis of their potential to influence the decision making process.

Figure 9.5 Information available and required
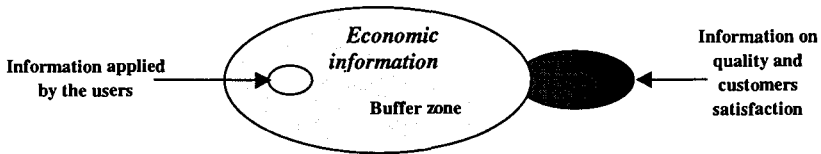
The Norwegian hotel chain seems to include everything possible into their accounting system. The preference of detailed items is more restricted in the U.S. accounts. Furthermore, we have shown that the U.S. customer survey program provides little information compared to the number of questions asked.

The accounting systems tend to favour items, which are easy to obtain, rather than items that are relevant to strategic decisions. We hold that the strong focus on quality and customers satisfaction justifies that these issues should be considered in the accounts. Of all the various cost items recorded, only one was relevant to the costs of quality. However, we acknowledge that it is more difficult to measure the cost of maintaining and improving the services and products offered, rather than summarising the phone bills in a spreadsheet.

Information systems should be co-ordinated

Companies should tailor their information systems according to their strategies and goals. The relevance of every item should be carefully considered. Simplicity will make the systems more user-friendly. The complexity of the current systems does not only appear unnecessary, it also prevents the information from being applied in the decision making process.

The performance measures reported are few in number, but generally relevant to our study. The empirical results suggest that quality have a positive effect on performance – mainly as drivers of revenue per room relative to the local competitors. Furthermore, we find higher growth rates in businesses, which receive eminent quality ratings. Finally, we argue that these relative performance measures will influence the absolute measures.

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Quality has positive effects on economic performance

Thus, we state that quality, keeping everything else constant, will strengthen competitiveness and increase economic performance. From a managerial point of view, it is probably irrelevant how this effect develops, as long the profit improves. We also argued that the lack of evidence related to a direct relationship might be caused by omitted variables such as the local price level, culture and business environment. Thus, our analysis does not rule out a possible direct link between successful quality and profit. However, we did not manage to isolate and measure it.

The study provides bits and pieces of evidence related to the economics of quality. We find that quality requires resources and that our indicants of successful quality have profit implications. When we incorporate the information into a complete model, the conclusions remain.

Quality, based on customers' ratings, requires resources. Nonetheless, the companies who devote the necessary resources tend to report better economic performance. Although our results could have been stronger and more stable, we definitely do not find evidence leading towards an opposite conclusion. Hence, our study recommends the hotels to continue their work related to quality and customers' satisfaction.

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Epilogue

Our samples comprise large and well run international hotels. These firms manage to keep their customers reasonably content. We do not see quality as their most important challenge. The reason is <u>not</u> that quality is irrelevant. However, we find that the hotels succeed to keep their quality within a satisfactory interval. In other words: The large international hotels have joined the quality movement. Customer satisfaction and quality have already acquired management attention for decades.

Quality and customer satisfaction are popular and uncontroversial strategies

The official strategy in one of the worlds largest hotel companies underlines the focus:

> " By strategically focusing on the areas that have created competitive advantage - high quality, consistent accommodations delivered as an outstanding value, 100% guaranteed service, and dynamic unit growth - we are...............".

This is a study of the economics of quality. It might seem unorthodox to mention other strategic issues, such as costs of supplies, outsourcing, personnel policy, financial structure, new product development, waste and mismanagement. Opposed to quality, these concerns are often controversial, complex and painful to manage.

Quality and customers' satisfaction is believed to benefit all stakeholders simultaneously. Consequently, they have become compulsory strategic issues in almost every firm. These strategies are also anticipated to serve the image of the firm in the market place. We do not believe the economics of quality represent the main reason for its popularity.

Given the level of quality provided by the hotels in our samples, we hold that improvements in other areas will have stronger immediate profit implications. In our samples of hotels, we regard the following three points as relevant:

1. Quality achieves management attention
2. The customers are generally satisfied
3. The economics of further improvements are hard to assess

Quality, based on customers' evaluations, has an upper limit. Further improvements are hard to obtain. Hotels rely on interaction between different people of various cultures. We believe that it is difficult to make everyone perfectly happy.

On the other hand, quality should still be important to smaller hotels where the quality movement is ignored. Our study suggests that resources devoted to quality efforts are profitable - even when the quality is kept at a satisfactory level. On the other hand, we believe the potential economic advantages are more important in hotels where quality has received minor attention. This hypothesis is not answered by our study.

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	HOTELL 31		INH NIVÅ	
SAMHANDLING (SKALA= -5 - 5)	3.43**	1.48	3.84	1.37
Personalets imøtekommenhet ved innsjekking	3.60**	1.74	4.14	1.41
Personalets høflighet	3.82**	1.44	4.24	1.27
Personalets serviceinnstilling	3.68**	1.57	4.01	1.47
Personalets evne til å informere om akt. på sted	1.52**	2.48	2.24	2.45
Personalets evne til problemløsning	2.95	2.03	3.24	2.10
Personalets evne til å yte rask service	3.71	1.53	3.77	1.66
BACKSTAGE (SKALA= -5 - 5)	3.17**	1.58	3.41	1.46
Informasjon om stedets aktivitetstilbud på hotellet	2.77**	2.05	3.16	2.00
Maten på hotellet	3.98	1.24	3.97	1.45
Åpningstid i bar/restaurant	3.34	1.77	3.57	1.87
Menyens variasjon	3.08	1.73	3.27	1.81
Rutine for betaling	3.27**	1.83	3.70	1.62
Informasjon om sikkerhetsrutiner	2.47	2.31	2.65	2.45
STRUKTUR (SKALA= -5 - 5)	2.88**	1.61	3.23	1.51
Hotellets beliggenhet	3.43**	1.80	3.80	1.67
Hotellrommenes utseende/innendørsarkitektur.	2.89**	2.27	3.53	1.89
Størrelse på baderommet	2.99	2.20	3.10	2.33
Sengens komfort	3.05**	2.26	3.50	1.96
Rengjøring av hotellrommet	3.41**	2.14	3.91	1.74
Ventilasjon på rommet	2.14	2.51	2.45	2.69
Hotellets utseende/ arkitektur	2.33**	1.99	3.05	2.01
Hotellets utendørsanlegg	3.13**	1.86	2.45	2.55
Mulighet for rolig og fredelig opphold	2.07**	2.59	3.04	2.44
KUNDEAVHENGIG (SKALA= -5 - 5)	2.13**	2.15	2.78	1.86
Aktivitetstilbud på hotellet	0.16**	2.89	2.19	2.91
Kultur- og underholdningstilbud på stedet	1.09**	2.54	1.64	2.40
Turmuligheter på stedet	2.59**	2.07	3.30	1.90
Natteliv og underholdning på hotellet	2.82	1.97	2.70	2.14
Shoppingtilbud på stedet	2.54**	2.32	3.36	1.99
Leketilbud for barn ved hotellet	2.51**	2.45	1.90	2.78
TOTAL EVALUERING (SKALA= -5 - 5)	2.63**	1.81	3.21	1.84
**= Signifikant P<0.05 *= Signifikant P<0.10 N=75-166	GJSN.	ST.AV	GJSN.	ST.AV

1. Nasjonalitet   N

2. Hvilken dato ankom du dette hotellet?   Ankomstdato   1-7-96

3. Hvor mange netter har du overnattet på dette hotellet på denne reisen?   4   overnattinger

4. Hvordan ble denne feriereisen organisert? Sett sirkel rundt tallet som angir ditt svar.

1. Selskaps-/gruppereise arrangert av reisebyrå, reisearrangør, forening, turoperatør, etc.
2. Individuelt opplagt tur for deg og ditt reisefølge helt eller delvis bestilt gjennom reisebyrå/reisearrangør.
3. Individuelt opplagt tur arrangert av deg selv og ditt reisefølge uten forhåndsbestilling gjennom reisearrangør

5. Kjønn: Sett sirkel rundt tallet som angir ditt svar.
1. Kvinne   2. (Mann)

6. Benytter du og ditt reisefølge "InHotel card" eller "Nordisk Hotellpass"/ "Scandinavian Bonuspass" i forbindelse med hotellovernattinger på denne feriereisen? Sett sirkel rundt tallet/tallene som angir ditt svar.
1. InHotel Card
2. Nordisk Hotellpass/Scandinavian Bonuspass
3. (Ingen av delene)

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7. For mange er valg av hotell i forbindelse med en feriereise en viktig beslutning. Ofte må man foreta en avveining mellom en rekke forhold. Nedenfor ber vi deg ta stilling til i hvilken grad du er enig i de avveiningene som er foretatt. Sett sirkel rundt tallet som angir ditt svar.

	Helt uenig	Litt uenig	Litt enig	Helt enig
1. God mat er viktigere enn høy værelsesstandard	1	2	3	4 5 (6)
2. Godt aktivitets- og underholdningstilbud er viktigere enn god mat	(1)	2	3	4 5 6
3. Godt aktivitets- og underholdningstilbud er viktigere enn høy værelsesstandard	1	2 (3)	4	5 6
4. Høy værelsesstandard er viktigere enn god mat	(1)	2	3	4 5 6
5. Hyggelig betjening er viktigere enn høy værelsesstandard	1	2	3	(4) 5 6
6. Lange åpningstider i bar og restaurant er viktigere enn høy værelsesstandard	(1)	2	3	4 5 6
7. Mulighet for rolig og fredelig opphold er viktigere enn lange åpningstider i bar og restaurant	1	2	3	4 (5) 6
8. Hyggelig betjening er viktigere enn god mat	1	2	3	(4) 5 6
9. Hyggelig betjening er viktigere enn godt aktivitets- og underholdningstilbud	1	2	3	4 (5) 6
10. Høy værelsesstandard er viktigere enn hyggelig betjening	1	2	(3)	4 5 6
11. Profesjonell betjening er viktigere enn høy værelsesstandard	1	2	3	(4) 5 6
12. God mat er viktigere enn profesjonell betjening	1	2	3	4 (5) 6
13. Hyggelig betjening er viktigere enn god mulighet for rolig og fredelig opphold	1	2	(3)	4 5 6
14. Godt aktivitets- og underholdningstilbud er viktigere enn god mulighet for rolig og fredelig opphold	1	2	(3)	4 5 6

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8. Hva forbinder du med INTER NOR HOTELS?

Dyre priser   Hotell kjede

9. Nedenfor ber vi deg gi en vurdering av det hotellet hvor du fikk utdelt dette spørreskjemaet. Hvor tilfreds eller utilfreds er du når det gjelder de egenskapene som nevnes?

Ta utgangspunkt i DET BESTE HOTELLET du har benyttet i forbindelse med feriereiser i Norge når du foretar din vurdering. Sett en sirkel rundt tallet som uttrykker din vurdering. Dersom du ikke synes du kan vurdere det som er nevnt, setter du en sirkel rundt spørsmålstegnet til høyre.

Et eksempel:

I forhold til det beste hotellet jeg har benyttet er jeg:

	svært utilfreds									svært tilfreds	ikke relevant
når det gjelder:											
0. Informasjon om utflukter	-5 -4 -3 -2 -1 (0) 1 2 3 4 5										?

Denne gjesten er hverken mer eller mindre tilfreds med dette hotellets informasjon om utflukter enn han er med det beste hotellet han har benyttet i forbindelse med feriereiser.

I forhold til det beste hotellet jeg har benyttet er jeg:

	svært utilfreds		svært tilfreds	ikke relevant
når det gjelder:				
1. Personalets imøtekommenhet ved innsjekking og utsjekking på hotellet	-5 -4 -3 -2 -1 0 1 2 3 (4) 5			?
2. Personalets serviceinnstilling	-5 -4 -3 -2 -1 0 1 2 3 (4) 5			?

I forhold til det beste hotellet jeg har benyttet er jeg:

	svært utilfreds	svært tilfreds	ikke relevant
når det gjelder:			
3. Romservice	-5 -4 -3 -2 -1 0 1 2 3 (4) 5		?
4. Personalets evne til å løse problemer	-5 -4 -3 -2 -1 0 1 2 3 (4) 5		?
5. Personalets evne til å informere om aktivitetstilbud på stedet	-5 -4 -3 -2 -1 0 1 2 3 4 (5)		?
6. Personalets evne til å yte rask service	-5 -4 -3 -2 -1 0 1 2 3 4 (5)		?
7. Informasjon om aktivitetstilbud på stedet (brosjyrer, oppslagstavler, o.l.)	-5 -4 -3 -2 -1 0 1 2 (3) 4 5		?
8. Maten på hotellet	-5 -4 -3 -2 -1 0 1 2 3 (4) 5		?
9. Åpningstidene i bar og restaurant	-5 -4 -3 -2 -1 0 1 2 (3) 4 5		?
10. Menyens variasjon	-5 -4 -3 -2 -1 0 1 2 3 (4) 5		?
11. Rutiner/prosedyrer for betaling (f.eks for opphold, minibar, restaurantbesøk)	-5 -4 -3 -2 -1 0 1 2 3 (4) 5		?
12. Informasjon om sikkerhetsrutiner (f.eks brannrutiner)	-5 -4 -3 -2 -1 (0) 1 2 3 4 5		?
13. Renhold	-5 -4 -3 -2 -1 0 1 (2) 3 4 5		?
14. Hotellværelsets utseende/innredning/arkitektur	-5 -4 -3 -2 -1 0 1 2 (3) 4 5		?
15. Baderommet	-5 -4 -3 -2 -1 0 1 2 (3) 4 5		?
16. Sengens komfort	-5 -4 -3 -2 -1 0 1 2 3 (4) 5		?
17. Hotellets beliggenhet	-5 -4 -3 -2 -1 (0) 1 2 3 4 5		?
18. Ventilasjon	-5 -4 -3 -2 -1 (0) 1 2 3 4 5		?
19. Hotellets utseende/arkitektur	-5 -4 -3 -2 -1 0 1 (2) 3 4 5		?
20. Hotellets utendørsanlegg	-5 -4 -3 -2 -1 0 (1) 2 3 4 5		?

I forhold til det beste hotellet jeg har benyttet er jeg:

	svært utilfreds	svært tilfreds	ikke relevant
når det gjelder:			
21. Parkeringsmulighetene	(-5) -4 -3 -2 -1 0 1 2 3 (4) 5		?
22. Mulighet for rolig og fredelig opphold	-5 -4 -3 -2 -1 0 1 2 3 4 (5)		?
23. Aktivitetstilbudet på hotellet (f.eks sauna, solarium, ...)	-5 -4 -3 -2 -1 0 1 2 (3) 4 5		?
24. Kultur og underholdning på stedet (f.eks konserter, revy, teater,...)	-5 -4 -3 -2 -1 0 (1) 2 3 4 5		?
25. Turmulighetene på stedet	-5 -4 -3 -2 -1 0 1 2 (3) 4 5		?
26. Natteliv og underholdningstilbudet om kvelden	-5 -4 -3 -2 -1 0 (1) 2 3 4 5		?
27. Shoppingtilbudet på stedet	(-5) -4 -3 -2 -1 0 1 2 3 4 5		?

10. Hva vil du eventuelt trekke frem som spesielt positivt eller negativt ved dette hotellet?

Spesielt positivt: _____

Spesielt negativt: _____

11. Sammenlignet med andre hotell i Norge i samme prisklasse var dette hotellet: Sett sirkel rundt tallet som angir ditt svar.

Svært dårlig		Svært bra
-5 -4 -3 -2 -1 0 1 (2) 3 4 5		

---

12. I forhold til den prisen du har betalt, hvordan vil du vurdere dette hotellet? Sett sirkel rundt tallet som angir ditt svar.

Svært dårlig		Svært bra
-5 -4 -3 -2 -1 0 1 2 3		

13. Basert på din helhetsvurdering, hvor tilfreds eller utilfreds er du med dette hotellet? Sett sirkel rundt tallet som angir ditt svar.

Svært utilfreds		Svært tilfreds
-5 -4 -3 -2 -1 0 1 2 3 5		

14. Hvis du skulle besøke dette området ved en senere anledning, hvor sannsynlig er det at du vil velge nettopp dette hotellet? Sett sirkel rundt tallet som angir ditt svar.

Svært usannsynlig		Svært sannsynlig
1 2 3 4 5 6 7 8 9 10		

15. Hvis en god venn av deg skulle besøke dette området, hvor sannsynlig er det at du ville anbefale nettopp dette hotellet? Sett sirkel rundt tallet som angir ditt svar.

Svært usannsynlig		Svært sannsynlig
1 2 3 4 5 6 7 8 9 (10)		

16. Ville du valgt dette hotellet som overnattingssted i forbindelse med denne feriereisen dersom hotellet ikke hadde vært et Inter Nor Hotell? Sett sirkel rundt tallet som angir ditt svar.

Svært usannsynlig		Svært sannsynlig
1 2 3 4 5 6 7 8 9 (10)		

Takk for at du tok deg tid til å fylle ut skjemaet!

Listwise ANOVA Urban/Airport hotels

ANOVA[a,b]

			Unique Method					
			Sum of Squares	df	Mean Square	F	Sig.	B
SERVQ	Covariates	LEISUR	2.0E-02	1	2.0E-02	1.811	.181	.131
	Main Effects	AAR	.112	1	.112	9.934	.002	
	Model		.147	2	7.3E-02	6.507	.002	
	Residual		1.386	123	1.1E-02			
	Total		1.533	125	1.2E-02			

a. SERVQ by AAR with LEISUR

b. All effects entered simultaneously

Listwise ANOVA Highway hotels

ANOVA[a,b]

			Unique Method					
			Sum of Squares	df	Mean Square	F	Sig.	B
SERVQ	Covariates	LEISUR	.341	1	.341	32.907	.000	.288
	Main Effects	AAR	7.6E-02	1	7.6E-02	7.349	.007	
	Model		.436	2	.218	21.058	.000	
	Residual		3.117	301	1.0E-02			
	Total		3.553	303	1.2E-02			

a. SERVQ by AAR with LEISUR

b. All effects entered simultaneously

Listwise ANOVA Suburban hotels

ANOVA[a,b]

			Unique Method					
			Sum of Squares	df	Mean Square	F	Sig.	B
SERVQ	Covariates	LEISUR	.327	1	.327	32.824	.000	.228
	Main Effects	AAR	.329	1	.329	33.039	.000	
	Model		.691	2	.346	34.730	.000	
	Residual		5.623	565	1.0E-02			
	Total		6.314	567	1.1E-02			

a. SERVQ by AAR with LEISUR

b. All effects entered simultaneously

Casewise ANOVA Urban/Airport hotels

ANOVA[a,b]

			Unique Method					
			Sum of Squares	df	Mean Square	F	Sig.	B
SERVQ	Covariates	LEISUR	1.6E-02	1	1.6E-02	1.405	.238	.111
	Main Effects	AAR	.120	1	.120	10.509	.002	
	Model		.145	2	7.3E-02	6.349	.002	
	Residual		1.462	128	1.1E-02			
	Total		1.607	130	1.2E-02			

a. SERVQ by AAR with LEISUR

b. All effects entered simultaneously

Casewise ANOVA Highway hotels

ANOVA[a,b]

			Unique Method					
			Sum of Squares	df	Mean Square	F	Sig.	B
SERVQ	Covariates	LEISUR	.346	1	.346	31.969	.000	.274
	Main Effects	AAR	6.8E-02	1	6.8E-02	6.260	.013	
	Model		.435	2	.218	20.126	.000	
	Residual		3.806	352	1.1E-02			
	Total		4.241	354	1.2E-02			

a. SERVQ by AAR with LEISUR

b. All effects entered simultaneously

Casewise ANOVA Suburban hotels

ANOVA[a,b]

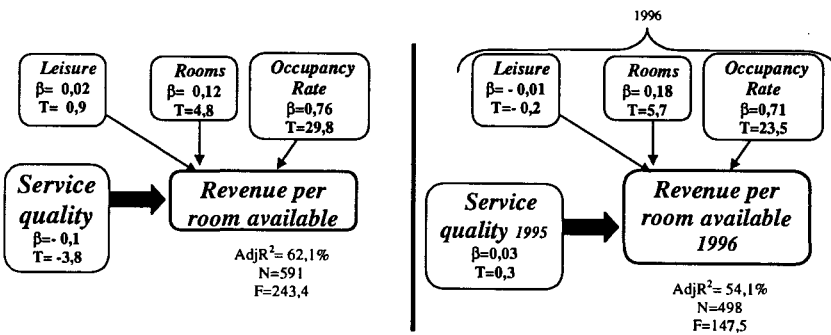|			Unique Method					
			Sum of Squares	df	Mean Square	F	Sig.	B
SERVQ	Covariates	LEISUR	.378	1	.378	35.580	.000	.237
	Main Effects	AAR	.326	1	.326	30.648	.000	
	Model		.746	2	.373	35.091	.000	
	Residual		6.402	602	1.1E-02			
	Total		7.148	604	1.2E-02			

a. SERVQ by AAR with LEISUR

b. All effects entered simultaneously

Exhibit 8A: **Product quality and revenue per room available**

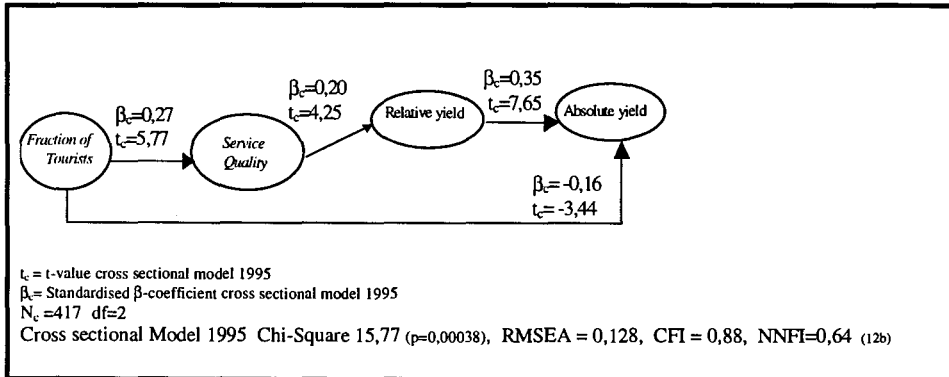1996   Time lag alternative

1996

Leisure	Rooms	Occupancy
β= - 0,006	β= 0,16	Rate
T= - 0,2	T=5.8	β=0,77
		T=29,6

Product quality
β=0,07
T=2,6

Revenue per room available

AdjR²= 61,6%
N=591
F=238,2

Leisure	Rooms	Occupancy
β= - 0,01	β= 0,2	Rate
T=- 0,4	T=6,2	β=0,71
		T=23,5

Product quality1995
β=0,07
T=1,98

Revenue per room available 1996

AdjR²= 54,4%
N=498
F=150,0
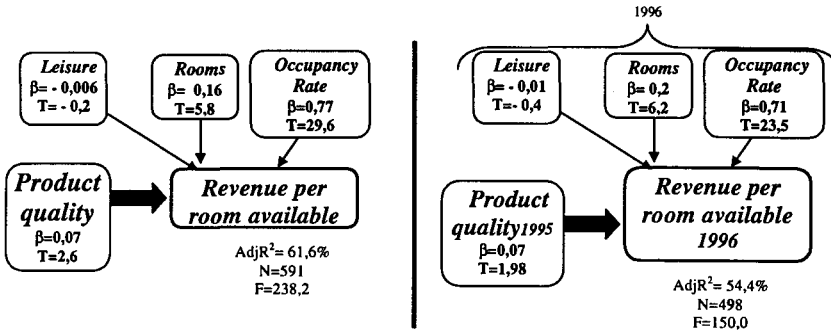
Exhibit 8.B: **Service quality and revenue per room available**

1996   Time lag alternative

1996

Leisure	Rooms	Occupancy
β= 0,02	β= 0,12	Rate
T= 0,9	T=4,8	β=0,76
		T=29,8

Service quality
β=- 0,1
T= -3,8

Revenue per room available

AdjR²= 62,1%
N=591
F=243,4

Leisure	Rooms	Occupancy
β= - 0,01	β= 0,18	Rate
T=- 0,2	T=5,7	β=0,71
		T=23,5

Service quality 1995
β=0,03
T=0,3

Revenue per room available 1996

AdjR²= 54,1%
N=498
F=147,5

The economics of Product quality 1995 – LISREL

$\beta_c=0,09$
$t_c=2,00$

$\beta_c=0,43$
$t_c=10,77$

$\beta_c=0,68$
$t_c=20,53$

$\beta_c=-0,20$
$t_c=-4,89$

Age of property
Product Quality
Relative yield
Absolute yield

t_c = t-value cross sectional model 1995
β_c= Standardised β-coefficient cross sectional model 1995
N_c =483 df=2
Cross sectional Model 1995   Chi-Square 3,10 (p=0,21), RMSEA = 0,034, CFI = 1,00, NNFI=0,99 (13a)

The economics of Service quality 1995- LISREL

$\beta_c=0,20$
$t_c=4,25$

$\beta_c=0,35$
$t_c=7,65$

$\beta_c=0,27$
$t_c=5,77$

$\beta_c=-0,16$
$t_c=-3,44$

Fraction of Tourists
Service Quality
Relative yield
Absolute yield

t_c = t-value cross sectional model 1995
β_c= Standardised β-coefficient cross sectional model 1995
N_c =417 df=2
Cross sectional Model 1995 Chi-Square 15,77 (p=0,00038), RMSEA = 0,128, CFI = 0,88, NNFI=0,64 (12b)

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