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The Consideration of Capital Expenditures in Hotel Valuations

An Examination of Influencing Factors on Capital Spending and
the Impact of Reserves for Replacement on Hotel Values

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Abbreviations

CAPAR	Capex per Available Room
Capex	Capital Expenditures
CCF	Cross-Correlation Function
CIP	Continuous Improvement Process
DRC	Depreciated Replacement Cost
EBITDA	Earnings before Interest, Depreciation, and Amortization
FF&E	Furniture, Fixture & Equipment
FCF	Free Cash Flow
GAAP	Generally Accepted Accounting Principles
GDP	Gross Domestic Product
GOP	Gross Operating Profit
GOPPAR	Gross Operating Profit per Available Room
IRS	Internal Revenue Service
ISHC	International Society of Hospitality Consultants
IVS	International Valuation Standard
IVSC	International Valuation Standards Committee
NOI	Net Operating Income
OCC	Occupancy Percentage
OLS	Ordinary Least Square
PCSE	Panel Corrected Standard Error
PIP	Property Improvement Plan
REVPAR	Revenue per Available Room
TSCS	Time-Series Cross-Section
VIF	Variance Inflation Factors

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1 Introduction

1.1 Relevance of Topic and Aim of Study

The year 2007 witnessed the outbreak of the financial crisis in the United States, which soon spread onto other countries and turned into a global recession. The crisis put into question certain financial innovations, such as the securitization of loans and off-balance sheet lending, which have shaped the real estate lending environment in recent years. While on the one hand these innovations allowed banks to become less exposed to credit and liquidity risk, on the other hand it triggered a dispersion of responsibility and accountability in terms of risk assessment. The relocation of risk and high liquidity of the tradable securities incentivised banks to increase mortgage lending to borrowers with a low credit rating (Cintra & Prates, 2008). As a result, lending institutions have been heavily scrutinized in recent months.

Not only lenders, but also other stakeholders involved in the supply chain of securitization have been criticized and called catalysts to the current crisis, such as rating agencies and property appraisers. This includes hotel appraisers. Hotels are one of the most complex real estate types to value. While the basics for certain assumptions and valuation parameters remain similar for most types of commercial real estate, other factors are exclusive to hotel valuations, such as an in-depth understanding of the hotel operation and the dynamics of the competitive market environment (Rushmore, 2005).

The most important value determinants in a discounted cash flow valuation approach include the projected net operating income ("NOI"), the discount rate, and the terminal capitalization rate (implied in the residual value of the hotel). Due to the uncertainty in the development of hotel and capital markets, all three factors are being heavily discussed in today's environment: In light of an absence of hotel transactions in recent months, going-in and terminal capitalization rates are difficult to assess. Opinions on how to construct the discount rate are just as varied as opinions on where to set it. And projecting net operating income, an output of various variables including occupancy, average rate, operational and fixed expenses as well as capital expenditures leave even more room for argumentation.

Net operating income and the residual value (and therefore also a hotel's present value) are also impacted by projected capital expenditures ("capex"). Capex typically constitutes a significant cash outflow for the owner (depending on the contractual structure with the manager/lessee) at the point of acquisition and throughout the holding period, depending on the timing of the purchase and sale during the life cycle of the asset. The double impact of this significant cash outflow affecting both value driving factors, NOI and the residual value, gives reason for an examination of the quantification and projection of capital expenditures in today's hotel valuation methodology. Various industry professionals have noted the fact that there is a significant gap between projected capital spending in a typical hotel valuation and actual capital expenditures as determined by hotel owners. There are also discrepancies in the methods by which appraisers determine the deduction for capital expenditures.

Because of their impact on different interests, capital expenditures have been a topic of discussion amongst most stakeholders of the hotel industry, including owners, asset managers, hotel operators, lenders, quantity surveyors and appraisers. The historical and projected expenditures impact hotel purchase agreements, franchise agreements, management contracts, lease agreements, lending requirements, renovation budgets, and as previously mentioned, the valuations of hotels for lending and transaction purposes. The impact of capital expenditures within all these contractual relations further underlines the relevance of investigating this cash outflow for the benefit all related stakeholders.

This study is an attempt to contribute to the continued evolution and improvement of hotel appraisal practices.

1.2 Area of Research & Research Questions

In the context of a typical hotel valuation, an appraiser projects a theoretical annual deduction for capital expenditures (in financial planning called 'Reserve for Replacement'). This reserve needs to cover all future investments necessary for the renovation and upkeep of building components, technology, systems, furniture, fixtures and equipment ("FF&E", also called "plant & equipment") of the hotel. The deduction should reflect what an investor buying the asset must budget for future capital investments to maintain the hotel in a competitive position during the holding period. Based on the discussions surrounding

capital expenditures and their consideration in the appraisal process, the study aims to answer the following research questions:

- Which influencing factors trigger capital spending? What motivates or prevents hotel real estate owners to invest?
- How can capital expenditure forecasts be improved and the gap between projected capex and actual spending narrowed in the appraisal process?

1.3 Method of Study & Approach

The study will be structured in the following manner:

(1) Presentation of current practices in regards to the consideration of capital expenditure in hotel valuations. This will be based on current valuation standards and applications, industry models, an example as well as a survey conducted with a number of hotel valuation experts, representing various professional valuation firms globally;

(2) Discussion of influencing factors on capital spending. The discussion will be based on existing literature and interviews with professional hotel owners and operators;

(3) Based on the preceding discussion, a series of hypotheses will be defined, examined and analysed using quantitative methods. The influencing factors were tested for their impact on capital spending using Panel Corrected Standard Error (PCSE) regressions;

(4) Based on the literature review and the outcome of the empirical research, the study identifies the key determinants necessary for the development of an improved methodology. It recommends further research avenues to assist in and accomplish the task of creating a practical capex model for the hotel appraisal process.

1.4 Limitations to Study

There are several limitations related to the study, some restricting the scope of research and some the sample, given the accessibility and availability of data.

The study considers only one of three main approaches to market value for hotel real estate, the income capitalization approach (Rushmore, 1992). Over the years, this valuation

methodology has become the most commonly applied approach for valuing existing hotels because the market players, namely the investors, rely on it for investment decisions (Sikich, 1993, McDonough, Hill, Glazier, Lindsay, & Sykes, 2001). Also, lenders rely on the framework for the valuation of assets as defined in the International Valuation Application 2 (IVA2) called Valuation for Secured Lending Purposes, as published by the International Valuation Standards Committee (IVSC). According to section 6.10.1 of the IVA2, "certain classes of property, including but not limited to hotels and other trading businesses, where the property is approved and purpose-designed for only that use, are usually valued based on profitability but excluding Personal Goodwill" (International Valuation Standards 2007, 8th Edition). Therefore, the income approach, based on anticipated profitability of the hotel is the most relevant valuation approach to examine in the context of this study.

There are a number of variations to the income capitalization approach. For this study, the discounted cash flow analysis with an overall discount rate was selected, which typically is of interest to most investors as it considers the anticipated levels of income, taking into account expected changes in the market place (Nilsson, Harris, & Kett, 2001).

The questioned pool of investors was limited to professional hotel real estate owners, all of which focus on maximizing returns on equity. No trophy investments or hotels held out of personal reasons were considered. The study focuses on the valuation of the owner's freehold or fee simple interest subject to a management or lease contract.

The study includes only commercial hotels. The hotel sample does not include other forms of accommodations, such as hostels, motels, serviced apartments, bed & breakfast inns, holiday apartments, or wider forms of hospitality, such as cruise ships or camp sites.

2 Literature Review

2.1 The Appraisal Practice under Criticism

The years 2006 and 2007 were record years in terms of hotel transaction volume and sale prices of hotels (Smith & Geieregger, 2007). In the US, trading volume reached nearly $79 billion in 2007 (Real Capital Analytics, 2008). These were the years of the 'trophy deal', meaning buyers paid exorbitant amounts of money for quality hotel assets or strategic

locations. The Four Seasons Hotel in Milan, as an example, traded at a record €1.7 million per room in 2006 (Smith & Geieregger, 2007). Deals were based on very low capitalization rates and sale prices were often barely justified by cash flow expectations. These transactions were fuelled by readily available financing at a low cost, i.e. a strongly competitive lending market coupled with an aggressive buyers market.

As a result of the investment environment at the time, valuers were increasingly faced with the challenging task of estimating the Market Value of hotels, which, according to the IVSC, requires a willing buyer and seller (RICS, 2007). A willing buyer again is defined as "[...] one who purchases in accordance with the realities of the current market and with current market expectations, rather than on an imaginary or hypothetical market which cannot be demonstrated or anticipated to exist. The assumed buyer would not pay a higher price than the market requires" (RICS, 2007, p.43). Due to the aggressive buying environment in recent years, buyers were indeed forced to bid record prices in order to win deals and valuers were obliged to reflect such market sentiment when estimating the market value of hotels.

But others, like a columnist of a hotel news website, argued that valuers had assumed "there's only up" in their projections and that "appraisals issued in the last several years are totally wrong" (Ross, 2009). The same author also criticized the consideration of capital investment in hotel valuations. He states: "Within the 10 years (considered in the discounted cash flow analysis of a hotel valuation), there must be a product improvement plan or a major renovation. I've yet to see an appraisal that makes an assumption there may have needed to be an equity or subordinated debt infusion to cover this work because in a number of hotels the furniture, fixtures and equipment reserves aren't sufficient, especially during the next several years of deeply reduced revenue" (Ross, 2009). Ross underlines the fact that non-occupancy related expenses will inevitably accrue over the next few years and cannot be covered by merely setting aside a percentage of revenue. This shortfall is not only the case during economic downturns but throughout business cycles as a 4 to 5% reserve for replacement has proven to be insufficient by a comprehensive capex study (Brooke & Denton, 2007).

Lesser (2009) agrees with the statement that the typical 4 to 5% reserve for replacement is not sufficient to cover the required capital expenditures facing a new hotel owner. But he states that valuers adjust for future capital requirements by adjusting the terminal capitalization rate upward in order to reflect a future property improvement plan ("PIP") upon sale, which would represent a capital deduction in a valuation taking place at the date of sale. This practise, however, ignores any larger investments during the first ten years of projections, where only a standard reserve is assumed. This method therefore boosts value, ignoring capital requirements above the reserve during years one to ten. The first ten years of projections typically represent around 50% of market value, depending on the asset and market (Nilsson, Harris, & Kett, 2001).

This argument shows the disagreement, which exists in the hotel consulting and valuation community over the consideration of capital expenditures in hotel valuations. The two experts, however, only argue over the amount deducted in an appraisal, but not the definition of capex or methods applied to quantify the deductions. This study will examine and question both the amount of capital expenditure allocation and the methods by which appraisers determine the deduction for capital expenditures.

2.2 Definition of Capital Expenditures

In a hotel, there are three types of expenditures, which become due with varying frequencies: On a daily basis, wear and tear of furniture and fixtures, e.g. scratches on furniture, stains on carpets, are called *maintenance expenses* and treated as an operational cost. Maintenance expenses typically include costs related to the restoration or the maintenance of the original condition of an item and occur on an ongoing basis. Professional and pro-active maintenance may prevent significant costs, which would fall into the other two categories of expenses, which are capitalized expenditures.

The purchase of new lobby furniture or a new kitchen device is classified as a replacement of FF&E. Another example would be the acquisition of flat-screen televisions for hotel guestrooms. The so-called *FF&E Reserve* is the second type of possible expenditures. The reserve is typically defined in a contract between the owner and the operator and its use and allocation is discussed and budgeted on an annual basis in collaboration between the two parties (Eyster, 1997).

The third type of expenditure is often called the *Capital Reserve*. This type of investment is mostly spent on building components, such as the facade, the roof, or technology. Capital investments usually occur less frequently than the other two types of expenditures but typically represent the largest amount of cash.

The distinction between maintenance expense and FF&E replacement can be debatable in many instances and often cause strong disagreements between owners and management companies. There are numerous investments, which could be classified as either a long-term capital expense or a short-term revenue expense. A survey of 71 hotel controllers showed that there is considerable uncertainty in the treatment of expenditures as 63% of the participants responded that they sometimes or often are unsure (Schmidgall, Damitio, & Singh, 1997). The result of such a survey might be different today, but it may be assumed that absolute certainty still does not exist in this area. The same goes for the distinction between an FF&E replacement and investment in a building component. The owner often tries to finance as much as possible through the contractually defined FF&E Reserve in order to prevent additional funding.

Uncertainty in the definition of capex also exists in the context of a hotel valuation. A valuation survey, which was conducted in the context of this study, questioned 22 hotel valuers from the United States, the United Kingdom, and Switzerland about the definition of capex, the quantification and the methodology that they apply in their professional work. Two participants possess over 20 years of work experience, 23% of the participants between 10 and 20 years, 27% between 5 and 10 years, 32% between 3 and 5 years and three participants less than 3 years.

All participants believed that the replacement of aged or broken FF&E should be included in the reserve for replacement, while 91% believe that out-of-style FF&E replacement should also be included in the reserve. Around 80% of the participants believe that the addition of new FF&E when demanded by the target market and the renovation of aged building components, systems and technology should be part of the reserve for replacement.

The greatest difference in opinion involved the subject of functional obsolescence, a result of dated design elements or other features that result in a negative reaction from guests,

especially when compared to newer, more modern facilities. A slight majority believes it should be part of the reserve while the rest does not. Since curing functional obsolescence is capital intensive, this is a fundamental discrepancy and indicates that some valuers must factor in considerably higher amounts of capex into their valuations than others. One third of the valuers include replacement of existing building facilities in the reserve for replacement, which is a further capital intensive inconsistency. All the previously discussed capex components may be classified as mainly value-maintaining measures, although in reality there often is also a value-enhancing component to each capex project, which valuers tend to exclude in hotel valuations. The Uniform System of Accounts for the Lodging Industry (2006) supports this separation by suggesting that "a separate disclosure may be appropriate for the portion of the capital expenditure that results in an increase in the revenue-generating capacity of the lodging property. Separating cash payments that represent an increase in revenue-generating capacity is helpful in enabling users to determine whether the lodging property is investing adequately in the maintenance of its operating capacity." New hotel facilities and repositioning costs are only considered by less than 20% of the respondents.

In conclusion, the only component, which most valuers seem to include in the reserve consistently, is aged, broken, and out-of-style FF&E, which is only a fraction of what owners are required to spend in order to upkeep hotel real estate. The remaining components, namely building, technology, ADA and life safety, amount to approximately 29% of total capex for full-service hotels, according to the CapEx 2007 study. In the case of midscale hotels, these elements amounted to around 66% of total capex (Brooke & Denton, 2007).

The expression "Capital Expenditures" refers to all capitalized expenditures (from an accounting point of view), including the replacement of FF&E and expenditures related to the building. William and Schmidgall (1993, as cited in Schmidgall, Damitio, & Singh, 1997) define capital expenditures as expenditures "whose benefits are realized over a time greater than a year". Any shorter-term investment would be classified as an operating expense and therefore constitute a maintenance expense, deducted in the profit and loss statement (Denton, 1998). According to Swig (2004), "capital expenditures represent the amount of money actually spent by a hotel owner to renovate and refurbish a property

and/or replace furniture, fixtures, and equipment or other components over a specific period of time. These other components involve the cost of correcting obsolescence, making updates to meet changing brand or regulatory requirements, updating technology, and correcting general wear and tear" (as cited in Denton, Raleigh, & Singh, 2004, p. 271). Based on these definitions, the results of the previously discussed survey indicate that valuers do not sufficiently account for required capital in hotel valuations.

For the purpose of this study, capital expenditures (or capex) are defined as all expenses related to the upkeep of the hotel except for the maintenance expenses, as previously defined.

2.3 Quantifying Capital Expenditures

What sort of reserve for replacement is appropriate for a hotel, both from an ownership as well as a valuation perspective, has been a subject of discussion for several years. Most international discussions on capital spending relate to the revenue-related reserve, which is the most widely applied method. Less research was performed on reserves based on life expectancy and effective age in hotel valuations. Mostly, such research is done in an accounting or construction context or for commercial real estate in general.

The first time capital spending in hotels received a great deal of attention was in 1995 when the ISHC first published a CapEx study in the United States. The reason for the study was based on the observation that since the 1930s, the guideline for allocating 3% of gross revenues, as was established by the American Hotel Association, had never been questioned or changed. The study confirmed the suspicion that the (at the time) typically applied reserve for replacement of 3% of gross revenues had not been sufficient in the 11 years preceding the study to keep hotels competitive. The results of the study triggered valuers to start including a 4% replacement reserve.

This is still the case today: As part of the valuation survey, participants were asked how they determine the reserve for replacement in a hotel valuation. 76% of the participants apply between 1 and 5% of total revenues as a reserve (see Appendix I for more detailed information on the survey). This illustrates that the 4 to 5% revenue-related reserve still is the most widely used and rarely challenged measure for projecting capex today.

None of the participants, however, think that the reserve for replacement they typically deduct in a hotel valuation adequately reflects the actual capital investment an owner makes after the date of value. 29% of the participants believe that the amount is adequate in most cases while the rest, or 71% of the participants, think sometimes (57%) or almost never (14%).

In their explanatory comments, the participants mention reasons as to why the forecasts are not adequate but not as to why they are insufficient. Unforeseeable labour and material costs as well as changes in competitive market conditions were mentioned as reasons for valuers' inability to project future spending more adequately. Most comments stated that capital spending is strongly dependent on the owner's investment strategy and cannot be anticipated by the appraiser. Only one comment, however, mentioned the missing connection between capital forecasting and the time elapsed since the last major renovation, in other words, the effective age of a hotel. Such a retrospective consideration is usually only present when new hotels are valued, whereby the reserve is typically lower during the first few years of operation. Valuers therefore do adjust reserves to reflect the excellent condition of a new hotel but fundamentally ignore renovation cycles in the context of existing hotel valuations.

The ISHC followed with a second study in 2000, which highlighted that age is a key factor impacting capital spending and that the 4 to 6% reserves really only cover the basic, more frequent cash needs but not the large building elements. A new study was performed in 2007. Capital spending during the observation period of this study (2000 to 2005) was strongly impacted by the economic conditions at the time, which included the downturn starting in 2001 and the recovery in 2004. The year 2005 included a massive amount of hotel deals, 534 deals in the US alone (Rushmore, 2010), which caused large amounts of capital to flow into assets for renovations, repositioning, and rebranding. According to the ISHC (2007), capital infusions related to changes in ownership, management or brand was not included in the study. Therefore, considering the strong transaction activity, spending ratios would have been higher, if counted. Another influencing factor on capital expenditures was construction costs, which peaked in 2004 and 2005 (Swig, 2009 in Denton, Raleigh & Singh, 2009).

Table 1 shows the changes in capital spending between 1983 and 2005. The longest and most reliable data series was collected for the full-service segment, which contained 35 years of data. Capex, as a percentage of total revenues, continuously decreased in the case of full-service hotels but continuously remained above the typical 4% reserve. The absolute capex per room per year nearly doubled, in line with REVPAR. Capex dramatically increased in the case of select-service hotels between the 1995 and 2000 study before declining slightly in the 2007 study. Capex per room per year is still more than half of the full-service category due to the limited public facilities.

The sample of select-service hotels has 15 years less history than the full-service hotel sample and is therefore not as comprehensive and representative as the full-service sample.

Table 1: CapEx Study – Summary of Results

	1995	2000	2007
Observation Period	1983-1993	1995-1999	2000-2005
Full-Service			
RevPAR	$50.00	$76.00	$100.00
Annual Change		*52%*	*32%*
Capex-Ratio to Total Revenue	6.9%	6.1%	5.1%
Capex per Room per Year	$1'572	$2'219	$2'889
Annual Change		*41%*	*30%*
Indexed (1995=100)	*100*	*141*	*184*
Select-Service			
RevPAR	$36.00	$54.00	$67.00
Annual Change		*50%*	*24%*
Capex-Ratio to Total Revenue	3.7%	5.5%	4.9%
Capex per Room per Year	$474	$1'111	$1'134
Annual Change		*134%*	*2%*
Indexed (1995=100)	*100*	*234*	*239*

All figures are expressed in inflated dollars.

Source: (Brooke & Denton, 2007)

Already the ISHC's 1995 CapEx study claimed that during the 25 years following the study, 7% of gross revenue will be required to keep a hotel in a good competitive condition. In a 2003 article, Rushmore was of the opinion that the 4 to 5% of gross revenue will not be sufficient to keep up with technological change and prevent functional obsolescence. He claimed that a comprehensive reserve to cover all costs could amount to 4 to 5% of revenue for FF&E, 2 to 3% of revenue for technology and 1 to 3% of revenue for building

components. This would amount to a total of 7 to 11% of total revenue. Rushmore warns that these expenditures are "real and ultimately reduce the investor's long-term yield" (Rushmore, 2003). The fact that various industry professionals recognise the underestimation of this expense but no adjustment has taken place in the appraisal practise is an indication that users of appraisal reports, i.e. mostly lenders, are not placing enough importance on a more detailed and tailored forecast.

The strong participation of hotels in the ISHC survey and the numerous citations of the CapEx studies in literature show the strong desire of investors and consultants to further comprehend this subject. The ISHC studies search for reasons why the industry constantly underestimates this at times massive expense (Swig, 2009, as cited in Denton, Raleigh & Singh, 2009). One of the reasons certainly is the lack of time-related capital spending, which takes into account the effective age of a building, as well as a number of other factors, such as the owner's liquidity or investment strategy, the strategic importance of an asset in a portfolio, the profitability of a hotel, the quality of the location, the competitiveness of a hotel market, or changing customer needs. In addition, capital requirements change over time, in line with customer needs and travel patterns.

The widely applied theoretical models of projecting capital spending in hotel valuations shows that there is a significant gap between the projected capital spending in a typical hotel valuation and the actual capital expenditures as determined by hotel owners. The only way to narrow this gap would be to receive a long-term capex plan from the owner and to deduct each anticipated investment in the according year of projection. Denton (1998) supports this by saying that "a properly constructed capital-expenditure planning model [...] gives all parties (including valuers) a clear picture of the property's true financial requirements over both a short- and long-term planning horizon." But since very few owners plan capital investments long-term (more than 5 years), obtaining a 10-year capex plan is unlikely.

This study aims to contribute to the development of a tool or model, which assists valuers in making adequate and realistic forecasts, taking into account the various influencing factors on capital spending.

2.4 Current Methods of Projecting Capital Expenditures

As mentioned previously, disagreement exists over the quantification of capex. This study examines and questions the methods by which appraisers determine the deduction for capital expenditures.

Capital expenditures may occur at various points in time. During the assumed 10-year holding period, a valuer must project the amount and timing of capital expenditures. If a hotel suffers from deferred maintenance or is in non-competitive condition at the date of value, the valuation must reflect an immediate investment by the owner or buyer to put the hotel back to a condition, which justifies the revenues projected in the valuation. This so-called "capital deduction" is subtracted from the present value of the projected cash flows (in year 0). A valuer can also choose to make deductions for the deferred investment during the holding period, by adding it to the remaining capital expenditures, which may be expected. At the end of the holding period, the valuer assumes a resale value, which is determined by capitalizing the 11th year income. Depending on various factors, a new owner most likely will need to invest a significant amount of money again during his or her holding period. In a hotel valuation, all three types of capital expenditures must be evaluated and quantified utilizing some methodology.

Internationally seen, there is one widely utilized and accepted standard practice, calculating the reserve as a percentage of total gross revenues (Method 1, as described below). Based on the author's own experience in the field of hotel valuation and the previously discussed survey, four different forecasting methods currently exist and are applied by professional hotel valuers.

2.4.1 Method 1: Dependent on Total Revenue

This approach exclusively puts capital expenditures in relation to top-line performance of the hotel, by deducting an annual reserve for replacement in each projection year, including the 11th year, which is the basis for the calculation of the terminal value. According to Lesser (2009), valuers also adjust for future capital requirements by adjusting the terminal capitalization rate upward in order to reflect a future property improvement plan ("PIP") upon sale (which would represent a capital deduction in a valuation taking place at the date of sale). He mentions an adjustment of 50 to 100 basis points above the going-in

capitalization rate to account for a future renovation and interest rate risk. It is questionable, however, how and based on which assumptions this adjustment is quantified and based upon what assumptions. An adjusted terminal capitalization rate is a very hazy way to account for a renovation upon sale and it is impossible for anyone to make out how much the valuer accounted for in the terminal sale price.

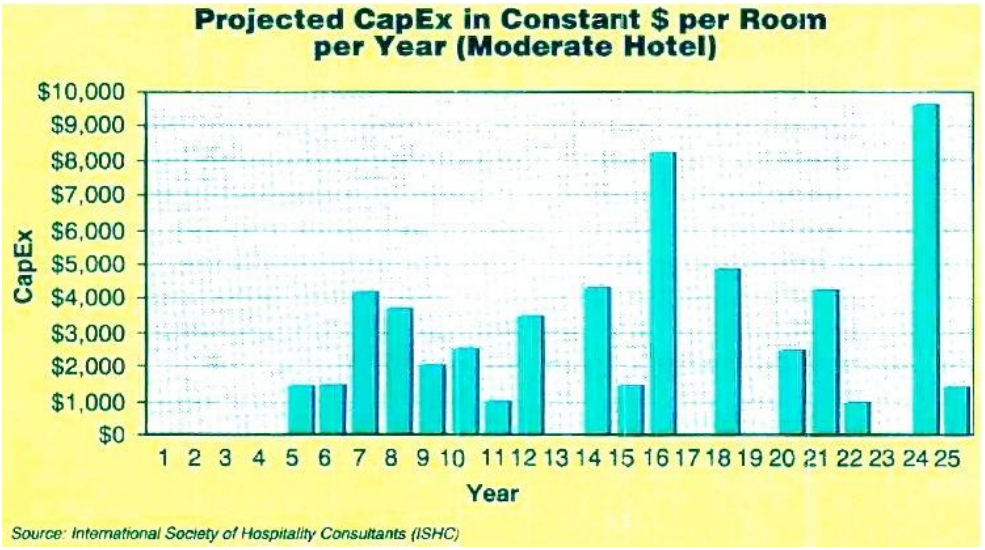
This widely used percentage approach has been criticized by various industry professionals as it does not consider net cash flows available for capital spending, the owner's liquidity or investment strategy, nor the condition and effective age of the building. Proof that capex is not only influenced by revenue was presented in the ISHC CapEx studies, which show that "the relationship between capex and revenue is not constant over time" (Berg & Skinner, 1995). The CapEx 2007 study illustrates that capex during the initial years of a hotel's life is usually insignificant (i.e. less than 4% of gross revenues) but increases and remains above 4% of gross revenue thereafter throughout the 35-year period of observation. Evident from the survey was most of all the irregularity of capital spending. The first major cash outflow typically falls in year six, where soft goods and some case goods are often replaced.

According to the survey, the second major investment occurs during the third decade in a hotel's life (around year 22 – 24) where equipment, machines and systems usually need replacement or repairs (such as chillers, kitchen equipment, HVAC systems, roofs, plumbing, etc.). The sample displayed a wide range in the amount of spending during those years, which is evidence of the various factors influencing each owner on an individual basis. After the renovation years, capex ranges between 4% and 8%, before spiking again in years 33 to 35, due to major infrastructure items (Brooke & Denton, 2007).

Based on the results of the CapEx 1995 survey, ISHC created a capex schedule for a prototype hotel with 200 guestrooms, a restaurant, lounge and 3'000 square feet of meeting space, as presented in Figure 1. It is evident from the graph that capital requirements do not run parallel to hotel revenues. It was recognized that "setting aside a 'standard' percentage of revenue for replacement, may not be an efficient approach to capital reserves" (Phillips, 2003). This was confirmed by Denton (1998) who states that "a constant revenue percentage is an inefficient use of money. This inefficiency arises because the cash flows

are in no way correlated with the capital requirements". An irregular spending pattern, similar to the one presented in Figure 1, was observed in the CapEx2007 study. Such statements underline that the most widely used method of quantifying capital spending in hotel valuations is fundamentally inadequate and highlights the need for an improved methodology.

Figure 1: Capex Schedule – CapEx 1995 Study



Source: ISHC CapEx 1995 Study

This was also confirmed by Swig (2009, as cited in Denton, Raleigh & Singh, 2009), who mentions that a percentage of revenue ignores the time element: "The capital expenditure formula has been driven almost exclusively by the two factors of occupancy and rate […]. However, there are elements of the capital budget, some of which involve very significant dollars, that are driven purely by the calendar and are unaffected by the traditional factors of occupancy, rate, and type of guest usage. […] (He urges that) a new thought pattern and, consequently, a new renovation formula, should be developed for parts of the property that wear with time" (Swig, 2009, as cited in Denton, Raleigh & Singh, 2009).

The necessity to develop a more realistic model to forecast capital spending applies not only to owners (and their asset managers) but also to valuers: As part of a Symposium, focusing on obsolete hotels, conducted by the ISHC in 1990, a hotel valuation must reflect where a hotel stands in its lifecycle (ISHC, 1990). The Symposium notes that buyers should make realistic forecasts of how much capital is needed for major capital improvements

during the holding period and at the resale of the hotel. The participants agreed that "[…] standard reserve for replacement figures may not be adequate for either category of expense. […] There is a need to reflect periodic major capital and ongoing replacement expenditures in valuations, beyond traditional reserves for replacement." The Symposium continued to say that "obsolescence is not handled effectively in market studies or appraisals at this time (and) […] concluded that both market and physical obsolescence and the costs to cure it (and the practicality of affecting a cure) should be considered in these studies. […] However, beginning to reflect these expenses fully in an appraisal, when this has not been standard practice in the past, would be difficult to implement." (ISHC, 1990). This critical observation did not materialize into a global change in the appraisal practice until today, 20 years later. Despite its numerous critics, revenue-based capex forecasting is still the most widely used method by global hotel valuation companies.

2.4.2 Method 2: Dependent on Life Expectancy

A second method mentioned in the survey, which was developed by the Schweizer Gesellschaft für Hotelkredit, deducts an annual percentage of development cost of the asset. This straight-line method first estimates the development cost of the hotel, based on the classification of the hotel (e.g. star rating) and the quality of construction (poor, average, or excellent). Then, it applies different life expectancies for the shell, the technical systems and the FF&E of the hotel and calculates the annual depreciation rate for each component. The resulting annual depreciation or necessary annual reinvestment is then applied as a reserve for replacement in the valuation.

The method allows a stronger wear and tear of the FF&E than for the building elements by applying a shorter life span. Some valuers decide to deduct the average annual amount every year, while others show spending in bulks and allocate the consolidated capex of a number of years into one projection year (e.g. the sum of year 1 to 5, allocated in projection year 5). Typically, the annual amount is assumed in the reversion year (11^{th} projection year).

Table 2 presents a fictitious example of the development cost and life expectancy of each hotel component based on the previously described method, called Reinvest, as developed by the Schweizerische Gesellschaft für Hotelkredit.

Table 2: Capex Model Dependent on Life Expectancy

	Upscale (4-Star)				Example Hotel		
Developement Cost per Unit	Min.	Average	Max.	No. of Units	Min.	Average	Max.
Cost per Room	140'000	150'000	160'000	130	18'200'000	19'500'000	20'800'000
Cost per Seat (Restaurants)	18'000	20'000	22'000	80	1'440'000	1'600'000	1'760'000
Cost per Seat (Meeting Rooms, Bars, Lounges)	8'000	9'000	10'000	90	720'000	810'000	900'000
Cost per Parking Space	23'000	24'000	25'000	-	-	-	-
Total					**20'360'000**	**21'910'000**	**23'460'000**
Allocation per Category		Allocation					
Category I (Building Shell)		35%			7'126'000	7'668'500	8'211'000
Category II (Technical equipment and Installation)		40%			8'144'000	8'764'000	9'384'000
Category III (FF&E)		25%			5'090'000	5'477'500	5'865'000
		100%			**20'360'000**	**21'910'000**	**23'460'000**
Total Capex per Category		Life Expectancy					
Category I (Building Shell)		66	years		2'255'845	2'427'581	2'599'318
Category II (Technical equipment and Installation)		30	years		5'654'651	6'085'137	6'515'624
Category III (FF&E)		10	years		10'602'470	11'409'633	12'216'795
Total Capex		21	years		**18'512'965**	**19'900'000**	**21'331'737**
Annual Capex per Category		Life Expectancy					
Category I (Building Shell)		66	years		108'298	116'543	124'787
Category II (Technical equipment and Installation)		30	years		271'467	292'133	312'800
Category III (FF&E)		10	years		509'000	547'750	586'500
Capex per Year					**889'000**	**956'000**	**1'024'000**
Building & Systems					379'765	408'676	437'587
Furniture, Fixtures & Equipment (FF&E)					509'000	547'750	586'500

Source: Fictitious example based on the Reinvest model by Schweizerische Gesellschaft für Hotelkredit, Unternehmensbewertung in der Hotellerie, 2001

This method is similar to an owner's or asset manager's approach of defining a long-term capital expenditure plan: Denton (1998) states, for example, that White Lodging, a hotel ownership, development and management company, created a life expectancy model, which applies different life spans for 40 different items in 9 hotel areas, such as guestrooms, bathrooms, corridors, restaurant and lounge and so forth. This contains a more detailed breakdown of the hotel components than the previously described three major categories. Based on the replacement cost, the model also calculates the cost per year (replacement cost divided by the life expectancy in years). But instead of looking at an average annual amount, the model predicts in which year an item needs replacement, which then yields a long-term investment plan by adding all due replacements in each relevant year. This approach respects the actual age of the building (but not the effective one) and yields an uneven, irregular capital spending plan, which, in accordance with the ISHC's studies, is closer to reality.

Both methods, however, do not reflect other influencing factors, such as the financial performance of the hotel, the competitiveness of the market environment, the owner's investment strategy, or the effective age of the building. The ISHC study (Brooke &

Denton, 2007) mentions the missing option to extend or shorten the life expectancy, depending on the effective age of the building in question.

As a result, this approach is subject to the same criticism as a Depreciated Replacement Cost approach ("DRC" or Cost Approach) to valuation. According to Gyamfi-Yeboah and Ayitey (2006), "it is imperative to note that unlike the depreciation adopted for accounting purposes, the valuer, in adopting depreciation in the DRC method, is supposed to arrive at a value that represents the current market value of the property. This requirement obviously rules out the possibility of adopting such simplistic methods as the straight-line method of depreciation". The authors confirm that in the case of the DRC approach to value, there is "no consensus on a model or approach which when used will help reduce the level of variations in the opinion of appraisers" (Gyamfi-Yeboah & Ayitey, 2006).

2.4.3 Method 3: Dependent on Total Revenue and Life Expectancy

A third approach was mentioned by a number of hotel valuers who are mainly based in continental Europe. This method is a mix between Methods 1 and 2 as it includes a deduction for an FF&E reserve as a percentage of revenue and a separate annual amount for building components. By separating the two components, FF&E and building, their different useful life spans are respected. Also, each element is calculated relative to one of its influencing factors; FF&E is determined relative to revenues (occupancy-driven) and building elements are determined relative to life expectancy (time-driven). This approach comes closest to what was suggested in the ISHC's CapEx2007 study: A split of capital spending into time-driven (building, systems) and occupancy-driven (FF&E) elements. But both components of capital spending are exposed to the previously described weaknesses of Methods 1 and 2, respectively: The method ignores net cash flows, liquidity, investment strategy, and the condition and effective age of the building at the date of value.

2.4.4 Method 4: Dependent on Life Expectancy and Effective Age

A last method of quantifying capital expenditures is to commission a qualified quantity surveyor in connection with a hotel appraisal. A surveyor conducts an assessment of the necessary investment over the next two to three decades, basing estimates on the actual and effective age and the physical condition and appearance of the building, which will then be deducted from the cash flows in the valuation. A quantity surveyor analysis includes his or

her expertise in estimating the remaining economic life of the hotel, based on the assessment of the condition of each building component, including FF&E. While this method respects the time-driven elements as well as the effective age of the building, it does not put the forecast in relation to factors, such as net income, the market environment, the owner's liquidity, or investment strategy. A quantity surveyor primarily considers replacement requirements based on the physical and functional usefulness of building components. A hotel, however, is also exposed to rapid changes in design and appearance requirements, set by changing customer preferences and the competitive market environment. According to Brooke and Denton (2007), a hotel has something like a 'design life', which is impacted by factors such as "location, market, management, and public taste and preference" (ISHC, 1990). Those issues lie outside the scope of a quantity surveyor's assessment. The second obstacle is the cost of such a study, which the valuer must either accept or pass on to the client. The additional cost or the difficulty of convincing certain clients to cover this additional expense might be the reason why valuers rarely commission a study on a regular basis when valuing hotel real estate.

2.4.5 An Example of the Impact of Various Methods on Value

For the purpose of this study, a comparison of methods was performed in order to illustrate the impact on value. A 30-year projection period was assumed in order to reflect the long-term capex assumptions in the case of some methods. The same total revenues, GOP and discount rate was assumed in each scenario. As can be seen in Table 3, applying a 5% reserve for replacement (Method 1) yields the highest value. It was assumed that a valuer would select a 5% reserve (rather than another percentage figure, e.g. 4%) because the hotel represents a palace hotel of over a hundred years old.

Adapting the quantity surveyor's renovation schedule (Method 4b) yields the second highest value in this example (Method 4b). The renovation schedule is based on the quantity surveyor's estimate of necessary investments over the next 30 years. In this case, the first projected capital infusion falls within the sixth projection year (2015), as this hotel underwent a major renovation in 2008 and 2009, prior to the valuation. This indicates how important a distinctive understanding and consideration of each property's renovation history is in the context of a valuation. It also confirms that a simplistic method does not

suffice due to the various factors influencing capital spending, such as the effective age of the building components and the condition of the asset.

Method 2b, yielding the third highest value, deducts capex as a lump sum, assuming a long-term renovation schedule similar to Method 4b. The accumulation of an average annual depreciation amount of 956'000 yields an assumed 5.7 million renovation every six years (6 × 956'000; this sum is derived from the tool described in section 2.4.2.). The tool calculates the annual reserve requirement. Method 2a utilizes the same quantification method as the previously described Method 2b but it represents a straight-line approach. In this method, the annual percentage of replacement cost of the asset is deducted (956'000 per year). Method 4a is based on the quantity surveyor's estimate but instead of deducting cash flows in the years where the quantity surveyor expects capital spending necessary (Method 4b), the total investment during 30 years is evenly divided and spread across the projection years (annual capex of 854'285). The lowest value (7.0% lower than Method 1 and Method 4b) yields the hybrid Method 3, which deducts a 4% FF&E reserve as well as an annual amount for the replacement of building and system components.

The discrepancy between values is based on different:

- amount of investments
- timing of investments
- frequency of investments

Table 4 illustrates that although Method 4 considers considerably more capex than Method 1, it returns a very similar value due to the timing of the capital spending. Although the same tool is used for Methods 2a and 2b, the difference in value shows the importance of whether a reserve (Method 2a) or actual cash outflows (Method 2b) are displayed in the projections. The same applies to Method 4a and 4b. The 5% reserve for replacement Method assumes significantly less capex than any of the other methods. The hybrid Method 3 incorporates the highest percentage of revenue (around 7%), which results in the lowest value.

Table 3: Impact of Various Methods on Value

Projection Year	Calendar Year	Revenue	GOP	Less: Reserve	Method 1 NOI after 5% Reserve	Less: Regular Capex	As a % of Total Revenue	Method 2a NOI after Regular Capex	Less: Irregular Capex	As a % of Total Revenue	Method 2b NOI after Capex	Less: 4% FF&E Reserve	Less: Regular Capex	Total Capex	As a % of Total Revenue	Hybrid Method 3 (1 & 2)	Less: Regular Capex	As a % of Total Revenue	Method 4a NOI after Capex	Less: Irregular Capex	As a % of Total Revenue	Method 4b NOI after Capex	Discount Factor
				5.00%								4.00%											5.89%
1	2010	10'263'000	2'959'288	513'150	2'446'138	956'000	9.3%	2'003'288	-	-	2'959'288	410'520	408'676	819'196	8.0%	2'140'092	854'285	8.3%	2'105'003	-	-	2'959'288	0.94438
2	2011	11'145'000	3'612'954	557'250	3'055'704	956'000	8.6%	2'656'954	-	-	3'612'954	445'800	408'676	854'476	7.7%	2'758'478	854'285	7.7%	2'758'669	-	-	3'612'954	0.89185
3	2012	11'977'000	3'990'894	598'850	3'392'044	956'000	8.0%	3'034'894	-	-	3'990'894	479'080	408'676	887'756	7.4%	3'103'138	854'285	7.1%	3'136'609	-	-	3'990'894	0.84224
4	2013	12'490'000	4'165'965	624'500	3'541'465	956'000	7.7%	3'209'965	-	-	4'165'965	499'600	408'676	908'276	7.3%	3'257'689	854'285	6.8%	3'311'680	-	-	4'165'965	0.79539
5	2014	12'614'900	4'207'625	630'745	3'576'880	956'000	7.6%	3'251'625	-	-	4'207'625	504'596	408'676	913'272	7.2%	3'294'353	854'285	6.8%	3'353'340	-	-	4'207'625	0.75115
6	2015	12'741'049	4'249'701	637'052	3'612'648	956'000	7.5%	3'293'701	5'736'000	45.0%	-1'486'299	509'642	408'676	918'318	7.2%	3'331'383	854'285	6.7%	3'395'416	1'781'744	14.0%	2'467'957	0.70937
7	2016	12'868'459	4'292'198	643'423	3'648'775	956'000	7.4%	3'336'198	-	-	4'292'198	514'738	408'676	923'414	7.2%	3'368'784	854'285	6.6%	3'437'913	-	-	4'292'198	0.66991
8	2017	12'997'144	4'335'120	649'857	3'685'263	956'000	7.4%	3'379'120	-	-	4'335'120	519'886	408'676	928'562	7.1%	3'406'558	854'285	6.6%	3'480'835	-	-	4'335'120	0.63265
9	2018	13'127'116	4'378'471	656'356	3'722'115	956'000	7.3%	3'422'471	-	-	4'378'471	525'085	408'676	933'761	7.1%	3'444'711	854'285	6.5%	3'524'186	-	-	4'378'471	0.59746
10	2019	13'258'387	4'422'256	662'919	3'759'336	956'000	7.2%	3'466'256	-	-	4'422'256	530'335	408'676	939'011	7.1%	3'483'244	854'285	6.4%	3'567'971	-	-	4'422'256	0.56422
11	2020	13'390'971	4'466'478	669'549	3'796'930	956'000	7.1%	3'510'478	-	-	4'466'478	535'639	408'676	944'315	7.1%	3'522'164	854'285	6.4%	3'612'193	-	-	4'466'478	0.53284
12	2021	13'524'880	4'511'143	676'244	3'834'899	956'000	7.1%	3'555'143	5'736'000	42.4%	-1'224'857	540'995	408'676	949'671	7.0%	3'561'472	854'285	6.3%	3'656'858	-	-	4'511'143	0.50320
13	2022	13'660'129	4'556'255	683'006	3'873'248	956'000	7.0%	3'600'255	-	-	4'556'255	546'405	408'676	955'081	7.0%	3'601'174	854'285	6.3%	3'701'970	1'683'070	12.3%	2'873'185	0.47521
14	2023	13'796'730	4'601'817	689'837	3'911'981	956'000	6.9%	3'645'817	-	-	4'601'817	551'869	408'676	960'545	7.0%	3'641'272	854'285	6.2%	3'747'532	3'728'226	27.0%	873'591	0.44878
15	2024	13'934'698	4'647'835	696'735	3'951'100	956'000	6.9%	3'691'835	-	-	4'647'835	557'388	408'676	966'064	6.9%	3'681'771	854'285	6.1%	3'793'550	-	-	4'647'835	0.42381
16	2025	14'074'045	4'694'314	703'702	3'990'611	956'000	6.8%	3'738'314	-	-	4'694'314	562'962	408'676	971'638	6.9%	3'722'676	854'285	6.1%	3'840'029	-	-	4'694'314	0.40024
17	2026	14'214'785	4'741'257	710'739	4'030'518	956'000	6.7%	3'785'257	-	-	4'741'257	568'591	408'676	977'267	6.9%	3'763'989	854'285	6.0%	3'886'972	3'463'556	24.4%	1'277'701	0.37798
18	2027	14'356'933	4'788'669	717'847	4'070'823	956'000	6.7%	3'832'669	5'736'000	40.0%	-947'331	574'277	408'676	982'953	6.8%	3'805'716	854'285	6.0%	3'934'384	-	-	4'788'669	0.35695
19	2028	14'500'502	4'836'556	725'025	4'111'531	956'000	6.6%	3'880'556	-	-	4'836'556	580'020	408'676	988'696	6.8%	3'847'860	854'285	5.9%	3'982'271	-	-	4'836'556	0.33710
20	2029	14'645'507	4'884'922	732'275	4'152'646	956'000	6.5%	3'928'922	-	-	4'884'922	585'820	408'676	994'496	6.8%	3'890'425	854'285	5.8%	4'030'637	2'553'925	17.4%	2'330'997	0.31835
21	2030	14'791'962	4'933'771	739'598	4'194'173	956'000	6.5%	3'977'771	-	-	4'933'771	591'678	408'676	1'000'354	6.8%	3'933'416	854'285	5.8%	4'079'486	2'484'998	16.8%	2'448'773	0.30064
22	2031	14'939'882	4'983'109	746'994	4'236'114	956'000	6.4%	4'027'109	-	-	4'983'109	597'595	408'676	1'006'271	6.7%	3'976'837	854'285	5.7%	4'128'824	6'590'232	44.1%	-1'607'123	0.28392
23	2032	15'089'281	5'032'940	754'464	4'278'476	956'000	6.3%	4'076'940	-	-	5'032'940	603'571	408'676	1'012'247	6.7%	4'020'692	854'285	5.7%	4'178'655	-	-	5'032'940	0.26812
24	2033	15'240'174	5'083'269	762'009	4'321'260	956'000	6.3%	4'127'269	5'736'000	37.6%	-652'731	609'607	408'676	1'018'283	6.7%	4'064'986	854'285	5.6%	4'228'984	-	-	5'083'269	0.25321
25	2034	15'392'575	5'134'102	769'629	4'364'473	956'000	6.2%	4'178'102	-	-	5'134'102	615'703	408'676	1'024'379	6.7%	4'109'723	854'285	5.5%	4'279'817	-	-	5'134'102	0.23913
26	2035	15'546'501	5'185'443	777'325	4'408'118	956'000	6.1%	4'229'443	-	-	5'185'443	621'860	408'676	1'030'536	6.6%	4'154'907	854'285	5.5%	4'331'158	1'659'722	10.7%	3'525'721	0.22582
27	2036	15'701'966	5'237'297	785'098	4'452'199	956'000	6.1%	4'281'297	-	-	5'237'297	628'079	408'676	1'036'755	6.6%	4'200'543	854'285	5.4%	4'383'012	1'683'080	10.7%	3'554'217	0.21326
28	2037	15'858'986	5'289'670	792'949	4'496'721	956'000	6.0%	4'333'670	-	-	5'289'670	634'359	408'676	1'043'035	6.6%	4'246'635	854'285	5.4%	4'435'385	-	-	5'289'670	0.20140
29	2038	16'017'576	5'342'567	800'879	4'541'688	956'000	6.0%	4'386'567	-	-	5'342'567	640'703	408'676	1'049'379	6.6%	4'293'188	854'285	5.3%	4'488'282	-	-	5'342'567	0.19020
30	2039	16'177'751	5'395'992	808'888	4'587'105	956'000	5.9%	4'439'992	5'736'000	35.5%	-340'008	647'110	408'676	1'055'786	6.5%	4'340'207	854'285	5.3%	4'541'707	-	-	5'395'992	0.17962
Residual	2039	16'339'529	5'449'952	816'976	4'632'976	956'000	5.9%	4'493'952	956'000	5.9%	4'493'952	653'581	408'676	1'062'257	6.5%	4'387'695	854'285	5.2%	4'595'667	854'285	5.2%	4'595'667	
Value (at a discount rate of 5.89%)					**66'000'000**			**61'500'000**			**63'300'000**					**61'400'000**			**63'200'000**			**65'900'000**	
Difference in Value in Percent (Method 1 = Basis 100)					**-**			**-6.8%**			**-4.1%**					**-7.0%**			**-4.2%**			**-0.2%**	
Difference in Value Absolut (Method 1 = Basis 100)					**-**			**-4'500'000**			**-2'700'000**					**-4'600'000**			**-2'800'000**			**-100'000**	

Average Value (all methods) 63'550'000

Table 4: Comparison of Methods

Method	Dependent on:	Value	Average Capex % of Total Revenue	Sum of Total Capex	Present Value of Total Capex
Method 1	Total Revenue	66'000'000	5.00%	21'700'000	9'400'000
Method 2	Life Expectancy				
Method 2a	Straight-Line	61'500'000	6.90%	29'600'000	13'500'000
Method 2b	Renovation Schedule	63'300'000	6.66%	29'600'000	11'700'000
Method 3	Total Revenue and Life Expectancy	61'400'000	6.95%	30'100'000	13'300'000
Method 4	Life Expectancy and Effective Age				
Method 4a	Straight-Line	63'200'000	6.16%	26'500'000	12'100'000
Method 4b	Renovation Schedule	65'900'000	5.89%	26'500'000	9'400'000

2.5 Factors influencing Capital Expenditures

Capital spending is influenced by a number of factors. The ISHC states "that the right amount to set aside for, or spend on, capital expenditures varies from property to property and is dependent upon a number of variables that must be evaluated in the context of the competitive market: the financial resources of the owner/operator, the quality of construction, the age of the property, and the philosophy and strategic operating approach of the stakeholders in the asset" (Brooke & Denton, 2007).

Unfortunately, the ISHC's CapEx studies did not analyse the reasons for capex spending. But it did mention that "[...] the ability to predict the timing and cost of major capital expenditures at a hotel or resort requires advanced quantitative tools/databases, analytical abilities, and psychic powers that few people possess. Even now that the data exists to evaluate the 'typical' capital needs of a property over its lifecycle [...], the 'human factor' will always complicate this task and requires constant oversight in order to update assessments" (Berg & Skinner, 1995). Therefore, an owner's decision to invest depends on a multitude of factors, which stem from various sources.

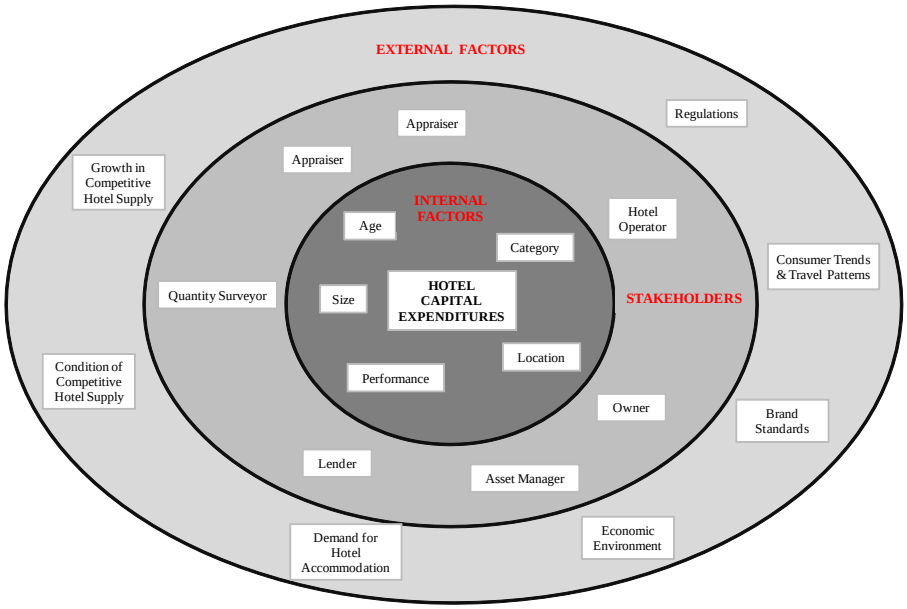
Hassanien, Dale, and Clarke (2010) listed various reasons for renovations, collected from key authors (Baum and Wolchuck, 1992; Baum, 1993; Lynn and Seldon, 1993; Watkins, 1995; Bruns, 1996; Chipkin, 1997, as cited in Hassanien, Dale, and Clarke, 2010). These include customers, operational efficiency, competition, natural disasters, government requirements, head office, the useful life of a hotel, upgrading, technology, and new trends.

Turner and Guilding (n.d.) agree that investment decisions are influenced by a number of factors, including "strategic factors, which are concerned with ensuring that capital

investment projects deliver a ‘competitive advantage’ to the firm, risk factors, which are essentially concerned with ‘political activity’ and performance factors, which typically comprise a ‘human element’, such as intuition and/or judgement” (p.6-7).

As is illustrated in Figure 2, capital spending may be influenced by the external environment, such as hotel market conditions, the economic environment, customer needs and requirements as well as regulations. Stakeholders representing their own interests may also impact capital spending in one form or other. And simultaneously, investments are impacted by internal circumstances surrounding an asset, such as the age of a building, the size and location of a hotel as well as the type of hotel.

Figure 2: Influencing Factors on Capital Expenditures



On the other hand, there are reasons, which constrain hotel renovations. Barriers to renovation from the operator’s perspective were empirically investigated by Hassanien (2006), who found that financial difficulties and the cost of renovation were the strongest barriers, followed by missing support from owners, time limitations and the fear of losing customers. The next section of this study will discuss the nature of each influencing factor and tries to identify what motivates or prevents hotel real estate owners to invest.

2.5.1 Ownership Profile

Any hotel asset is exposed to a certain type of ownership at any moment in time. The owner, often represented and advised by an asset manager, determines how much, how often, when and where capital is spent. Capital spending varies and is dependent on each phase of the ownership cycle. In some cases, capital investment is necessary immediately after the acquisition in order to achieve profit targets or in connection with a change in brand or management. Transactions often trigger capital spending. This was also stated in the CapEx 2007 study, which mentioned that "following transactions, many properties are re-branded, forcing a change in operator and appearance" (Brooke & Denton, 2007, p. 42). Hence, the amount of capex spent on a hotel over its entire lifecycle depends, among many other factors, on the number of owners.

Owners expect to realize investment objectives within a certain time frame. As such, each owner plans a different holding period, which influences their spending pattern. Owners who tend to turn around hotels assets look for quick value appreciation, which sometimes requires them to upgrade the hotel with large amounts of capital in a short period of time. Short holding periods require owners to maintain and upkeep properties in good condition so that an adequate sales price can be achieved in the short- or medium-term future. Long-term holding periods allow owners more time to allocate capex over an extended period of time. Often, older hotels requiring massive capital in order to remain competitive are run down intentionally in order to exploit the investment as much as possible before selling. Major capital requirements, such as renovations, often trigger a sale decision (Boettger, 2009, as cited in Denton, Raleigh, & Singh, 2004). The importance of an owner's investment strategy was also emphasized in Turner and Guilding's study (n.d.), which found that strategic factors as a capital investment appraisal perspective ranked first in terms of importance, relative to financial (quantitative) factors, which ranked second, followed by managerial intuition (third) and internal politics (fourth).

The influence of holding periods on capital spending can be observed in the CapEx 2007 study. Public companies, such as REITs and C-Corporations which often follow longer-term investment strategies, spent less on average during the difficult economic times of 2001–2005 (5.5% of total revenue) compared to the years between 1988 and 1999 (6.7%).

This might be an indication that owners with a long-term investment horizon tend to adjust capital spending to the economic market conditions.

On the other hand private companies, such as equity and pension funds which often target quick turnarounds and strong value appreciation, still spent more during the difficult years between 2001 and 2005 (4.7%) compared to the 1988-1998 (4.4%) period (Brooke & Denton, 2007, p. 41), aiming to resell at the peak of the business cycle a few years later. The capex to total revenue ratios for both ownership groups appear low. This might have been the case because during "high growth economic conditions, the negative impact of asset value depreciation is largely hidden by high nominal growth rates" (Mansfield, 2000), lessening the need to invest as bid prices are high in any event.

Capital spending may further be influenced by the contractual agreements between an owner and the management firm or lessee. A disadvantageous lease agreement for the lessee, for example, will induce minimal spending on the lessee's side. Or an expiring management agreement with no renewal option often incentivizes owners to spend as little as possible in order to later on spend more on a brand conversion, repositioning or renovation. Typically, it is in the owner's interest to upkeep the building and surrounding area in a good condition in order to maintain property value while the operator is concerned with sufficient spending on FF&E, which is crucial for a hotel's competitive positioning and financial success. If any of the capex responsibility does not lie with the party that is most affected by the care and upkeep of it, conflicts may arise because interests collide. The discussion of owner-operator capex goal congruency has been discussed widely in literature (Turner & Guilding, n.d.). The alignment of interests by defining the most beneficial remuneration structure of the operator or the structuring of lease agreements lies outside the scope of this paper. This study aims to understand capital spending no matter by which party it is funded. However, it is crucial to mention that certain unfavourable contractual arrangements or incentives to choose one capex project over another may have an impact on capital spending in certain situations.

In conclusion, capital expenditures depend on the owner's profile, investment strategy, return requirements, intended investment horizon, and contractual arrangements.

2.5.2 Brand Standards

In an effort to differentiate from the competition, hotel companies such as Starwood and Hilton continuously research and study changing customer preferences and requirements. Differentiating a product or service means creating something that is perceived industrywide as unique. Design, brand identity, image, technology, amenities, and customer service all present opportunities for hotel companies to distinguish themselves from the competition. Most companies strive to be different on every level. The goal remains the same, to gain customers' loyalty and the resulting lower price-sensitivity (Baumann, 2006).

Hotel companies use so-called brand programs as innovation tools. Hilton describes its Continuous Improvement Process (CIP) as: "Hilton believes travel is an opportunity for transformation. Our Continuous Improvement Process allows us to keep our hotels in top condition and encourages our team members to learn new ways to prove themselves as the Masters of the Art of Hospitality" (Building a Hilton Hotel Brochure, 2010, p.11). The CIP at Hilton includes six different brand programs, including a guest satisfaction program, the Hilton Serenity Collection, a bedding and bathroom amenities package, the Hilton Breakfast, a tailored fitness package, a meeting program, and HHonors, Hilton's guest reward program with over 13 million members. During the previous peak years, product innovations have been mainly motivated to gain competitive advantage over another brand rather than based on true customer needs. The 'amenity creep', as it was called in the industry, turned into a multi-million dollar investment for hotel owners. Marriott, for example, launched a new bedding package in 2005, replacing nearly all hotel beds. This implied an investment of around $190 million for its owners (Binkley, 2005). Such initiatives often cause friction between owners and operators because certain capex projects might not directly increase revenue at a given property but rather improve the overall image of the hotel brand. This was confirmed in an interview with an operator who commented that "probably in most of the projects that we are doing now, if you actually put an ROI together, they would probably suggest that you don't do the project, but I know to keep products up to standard we simply need to do them" (Turner & Guilding, n.d., p.13).

Nevertheless, valuers must reflect today's increased spending, especially on FF&E, in a hotel valuation. This was confirmed by Rushmore (2003), who states that "forty years ago an appropriate FF&E reserve for replacement would have been 2% of total revenue. Today,

the industry standard has risen to 4 to 5% of revenue because FF&E now represents a higher component of a hotel's total cost". Ross (2009) fears that once transactions pick up again, there will be insufficient funds in the reserves to cover the required PIPs, which in many cases will be substantial after the last few years of minimal capital spending. He questions where the missing funds are built into the valuation: "Whatever value an investor has for a hotel must be reduced by the inherent requirement for substantial renovation by 2014 or 2015" (Ross, 2009). Brand standards and programs are a fix component of today's hotel branding environment and can no longer be ignored when forecasting capital expenditures.

2.5.3 Hotel Real Estate Lifecycle

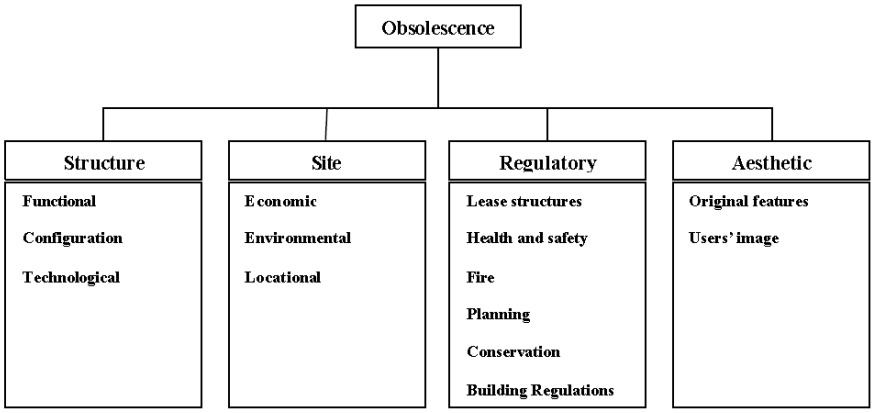
Probably the most obvious reason to invest in a property is the effects of aging. "Property, despite its physical longevity, is a wasting asset (and) [...] compared to other investment opportunities [...] requires often disproportionate expenditures on maintenance [...] to retain its investment value" (Mansfield, 2000). Loss in investment value in a property context is called depreciation, which is a function of physical deterioration caused by weather for example and obsolescence, a much more complex and intensely discussed issue. Physical deterioration may be understood more easily as it represents value decline caused directly by the passage of time.

According to Mansfield (2000), the scope of obsolescence, however, remains undefined because so many factors are in play around this subject, such as a change in the surrounding area, called external obsolescence or subjective, aesthetic issues, often called functional obsolescence (Rushmore, 1992). Figure 3 illustrates Mansfield's grouping (2000) of the various components of obsolescence.

Hotels are exposed to all four groups of obsolescence but disproportionally more to some, which are strongly linked to the success of the hotel business. Hotels often operate in highly competitive market environments. The competitive nature of the business requires hotel products to continuously remain contemporary, fresh and innovative. As such, aesthetic components, such as image, perception and style are much more essential in a hotel's success than most other real estate classes.

Hotels are also strongly dependent on access and visibility. Location is believed to be the most important critical success factor for a hotel. As such, the environmental aspect of site obsolescence is of utmost importance for a hotel. If a highway is built directly connecting two towns, for example, and a local road becomes obsolete, a hotel located on this road is strongly affected by declining traffic frequencies and a drop in occupancy.

Figure 3: Generic Groupings of Obsolescence



Source: Mansfield, 2000

In a small market, the opening of a large, directly competitive, new hotel may put an existing, older hotel out of business. Therefore, economic aspects of obsolescence are a further component, which carries a lot of weight in the success of a hotel business.

Perhaps the most influential type of obsolescence however is of functional nature. Every guestroom needs to be marketed and sold to a different 'tenant', namely a guest, on a daily basis. An old, out-of-style restaurant, for example, which fails to attract diners, eliminates a revenue centre of the hotel, hurting the bottom line. Another frequent example of functional obsolescence is small room sizes, which no longer satisfy the expectations of guests or are significantly smaller than the competitive product offering. Functional obsolescence is evident "when older things function as when they were new but otherwise lose their appeal or usefulness" (Margolis, 1981, p.91, as cited in Corgel, 2007). Today's environment is one of quickly changing customer preferences and rapidly increasing expectations, which makes functional obsolescence an ever-present concern for hotel owners and operators.

In 2007, Corgel studied the effects of age on the sale price of hotel real estate. He estimated an average rate of functional obsolescence for hotels of 1.93% per year. He notes that during the first ten years of operations, functional obsolescence is moderate. During the following 18 years (years 10 to 28), hotels require substantial follow-on investment and the rate of functional obsolescence accelerates. This is in line with the findings of the CapEx studies by the ISHC, which showed the biggest divergence in capital spending when grouping the sample by age. Select-service hotels registered a capex to total revenue ratio of 8.7% for hotels built before 1990 while hotels built after 2000 recorded merely 0.7%. The study stated that "there is a dramatic and continuous increase in spending on hotels older than eleven years of age" (Brooke & Denton, 2007, p.30). After the 28th year of operation, Corgel (2007) observed a 'vintage effect', expressed by a slightly positive slope in the age sale price relationship. Such a vintage effect might be explained by an increased demand for iconic, historic assets. Corgel's study (2007) showed that "hotels on average lose value through functional obsolescence at an increasing rate". The study is evidence of how strongly depreciation affects sales prices of hotels. As a result, valuers must adequately account for the necessary defence against the effects of aging, if growing cash flows are projected into the future. According to the valuation survey, a slight majority of valuers believe that curing obsolescence should be part of the reserve. The difficulty lies in estimating and quantifying each component of this most influential value determinant. None of the methods presented previously fully capture the cost of curing depreciation, i.e. physical deterioration and obsolescence, in the estimation of capex.

Determining a replacement reserve using Method 1, the most widely applied model, simply considers anticipated activity at the hotel, implicit in total revenue, which is connected with the wear and tear of the FF&E but not with physical deterioration of the building or possible obsolescence of hotel characteristics, facilities or the entire hotel. Applying a percentage of revenue in a valuation of a dated hotel with low revenue levels and a falling REVPAR index, struggling to maintain market share, yields a low projection for replacement reserve. Yet, such a property most likely is in desperate need of a comprehensive overhaul. Unless a substantial PIP in connection with a brand change is envisaged or a concrete renovation planned and communicated to the valuer, Method 1 significantly underestimates the costs facing a potential buyer of such a hotel.

Method 4, which represents a long-term capex plan determined by a quantity surveyor, covers mainly physical deterioration. A quantity surveyor assesses at what point in time something needs to be replaced based on an expected life and adjusts for the current condition of an item, taking into account its effective age. But any of the previously discussed types of obsolescence, which affect hotels disproportionally, often lie outside the scope of a quantity surveyor's assessment. The previously described Methods 2 and 3 consider average life expectancy, but ignore a hotel's effective age, which incorporates the impacts of depreciation.

Hotel valuations typically do not adequately account for the need to cure physical deterioration and obsolescence throughout the projection period. The only regularly considered expenditure is a Property Improvement Plan. According to Corgel (2007), "[...] brand affiliation with recognized hotel companies, such as Hilton and Marriott, impose filters on property obsolescence [...]", which prevents hotels from becoming obsolete. The cost of brand-prescribed improvements at the time of valuation is considered by applying a capital deduction to the value.

Already in 1986, Jones Lang Wootton stated that "depreciation became an important issue for property investors when it became clear that the life expectancy of commercial [...] buildings was not as long as had been previously implied in valuation methodology" (as cited in Mansfield, 2000). According to various examples, the useful life of a hotel averages at about 40 years, with a standard deviation of 20 years (Rushmore, 1992). This large variance in life expectancy of a hotel further illustrates the powerful impact of physical deterioration and obsolescence. Yet, today's discounted cash flow valuation methodology still fundamentally ignores the effective age of hotel properties.

2.5.4 Hotel Property

The CapEx 2007 study examined capital spending by hotel characteristic, such as location, property size and hotel category, i.e. full-service, select-service, and extended-stay. Table 5 lists the findings of all three CapEx studies by hotel characteristic (Brooke & Denton, 2007).

Table 5: Capital Spending by Location and Property Size at Full-Service Hotels

Period	1983-1993	1995-1999	2000-2005
Capital Spending by Location			
Airport	5.5%	6.7%	3.4%
Downtown	9.5%	6.6%	7.0%
Resort	8.0%	6.0%	3.8%
Suburban	4.8%	5.4%	3.1%
Capital Spending by Property Size			
<150 rooms	6.4%	<200 rooms 5.7%	<200 rooms 5.1%
150-300 rooms	7.2%	200-300 rooms 7.8%	200-300 rooms 4.3%
>300 rooms	6.8%	>300 rooms 5.5%	>300 rooms 5.2%

Source: Brooke & Denton, 2007

As can be observed in Table 5, capital spending differs depending on the type of location of a hotel. City centre hotels seem to absorb most capital because they tend to be strategically important assets in portfolios due to their central locations and exposure. In order to upkeep representation, increased capex is typically allocated to these flagship properties. When age is considered, however, downtown hotels are 82 years old on average, which is probably a stronger explanatory variable than the nature of the location. "Reinvestment in major updating or renovation work usually arises when [...] hotels are acquired by companies seeking representation in locations [...] where prime sites are limited" (Lawson, 1995, p.324). Rather than looking at the type of location as an influencing factor, it might be more appropriate to look at whether the location of a hotel is considered prime or secondary. Such a distinction might more so influence owners' investment patterns.

Looking at capex as a percentage of revenue, the size of the hotel seems to relate with capital spending. In absolute terms, hotels with more than 300 rooms registered capex of approximately $3'100 per room per year while hotels with less than 300 rooms around $2'500. This indicates that an owner of a 200 room hotel spends $500'000 on average per year on capex and $930'000 on a hotel with 300 rooms. As such, 50% more rooms requires 86% more in capital expenditures. This is most likely due to larger public facilities at bigger hotels, such as more food and beverage outlets, meeting space and recreational facilities. As presented in Table 1, presenting the difference in capex spending depending on hotel category, capex at full-service (including luxury) hotels exceed those at select-service hotels due to more extensive hotel facilities.

The location and size of hotel measured by number of rooms do not seem to impact capex spending directly. Rather age, the extent of hotel facilities and the quality of the product offer, implicit in the hotel category, seem to be the underlying influencing factors.

2.5.5 Hotel Performance

The CapEx 2007 study notes that capital spending is highly dependent on economic conditions, which impacts hotel revenues (Brooke & Denton, 2007). While cash was abundant during the boom period of 1995 through 1999, "hotel owners during the 2002 through 2004 timeframe simply did not have the same cash availability due to the general business decline" (Brooke & Denton, 2007). The time period examined in the 2007 study (2000 – 2005) included the downturn caused by the dot-com bubble and the terrorist attacks on New York City in September 2001, followed by the impact of the invasion of Iraq and the SARS epidemic in 2003 and the following recovery, starting in 2004.

According to Table 1, annual capex per room at full-service hotels increased by 41% between the CapEx 1995 and the CapEx 2000 study, while REVPAR increased by 52%. Between the CapEx 2000 and the CapEx 2007 study, capex increased by 30% while REVPAR increased by 32%. This is an indication that during times of high REVPAR growth, more capital is also spent on capex projects. However, there is most likely a time lag between capital projects and strong REVPAR growth years as reserves first need a boost before extensive capex projects can be funded out of the reserve.

Occupancy levels often impact capital spending patterns in terms of timing. Phillip's survey (2003) mentioned a "big bang" approach, whereby a reserve is built up over time and spent at once in a comprehensive renovation. This often involves closing of certain rooms or hotel facilities, which potentially causes huge losses of revenue. This may be reduced if capex is timed during slow demand periods. Other hotels prevent large renovations, spending smaller amounts each year, without having to close facilities or the entire hotel. Participants of the survey mentioned, however, that continuous smaller renovations are an inconvenience to guests. Hassanien (2007) also found that the fear of losing customers is one of the most important barriers to renovation.

According to the CapEx 2007 study (Brooke & Denton, 2007), repairs and maintenance expenses and capex are related. "Time has proven that a well-maintained hotel asset [...]

will have a longer life than an asset that has not been well-maintained". The study assumes that capital spending should logically decrease with higher repairs and maintenance expenses, and should be higher when little is spent on repair and maintenance. As such, the level of maintenance a hotel receives might also have an impact on capital spending.

Furthermore, the profitability of a hotel may influence capex spending patterns. A hotel, which does not produce healthy cash flows, is not likely to receive significant capex unless the performance may be improved and a return on the investment is expected. Most likely, however, a hotel suffering from low profitability does not provide the necessary funds for an extensive renovation.

2.5.6 Competitive Market Environment

Today's hospitality environment is a highly competitive landscape. The task of selling a perishable product to a highly discerning customer requires proactive and continuous capex planning in order to maintain the building, facilities and soft goods in a competitive condition. According to Hassanien, Dale, & Clarke (2010), a "[...] renovation, if it is well planned and implemented, can achieve product innovation, which leads to enhanced profitability, guest satisfaction and possibly market leadership". Hotels compete on a daily basis to generate room nights and to attract guests who, in the majority of cases, have the choice of various hotels in a market. Websites like Travelocity and tourism blogs allow travellers to report on the quality of the facilities and the service, substantially influencing the buying decision of potential future guests. As such, it is increasingly important for hotels to upkeep their reputation and maintain their product offering in an attractive condition.

Often, a renovation at one hotel in a market triggers a domino effect, whereby its competitors follow in order to avoid market obsolescence. This domino effect was witnessed in the Geneva hotel market, for example, where nearly every upscale hotel renovated its guestrooms and public space within a period of a few years. This was confirmed by a statement of an interviewee in Turner and Guilding's study (n.d.): "If you gave the owners a spectrum (of reasons for investing capex) to choose from, from 'ROI' down to 'simply need to do to maintain competitiveness', for most investment projects, I

reckon they'll all tick the last box (i.e. they will tick ‘simply need to do to maintain competitiveness’).”

Another common reason to renovate a hotel is a new competitive hotel opening. In 2003, Phillips surveyed CEOs and CFOs of seven major international hotel companies, which stated that “the main reason for capex was generally for introduction of new hotels [...]” (p.4). A change in hotel supply is one of the strongest influences on hotel performance. As such, hotels often renovate in order to remain attractive in an increasingly competitive market.

2.5.7 Economic Environment

The influence of the economic environment on capital spending may be indirectly examined by testing the influence of the aforementioned hotel performance measures, such as occupancy, REVPAR or revenue, on capital spending. Extensive research proved the strong relationship between GDP and lodging demand. Wheaton and Rossoff (1998), for example, showed that demand for hotel accommodation grew by 1.3% for every one percent rise in GDP. Vogel (2001) examined the relationship between GNP and hotel demand and his research showed that for every one percent increase in GNP, hotel demand grew by 0.75%.

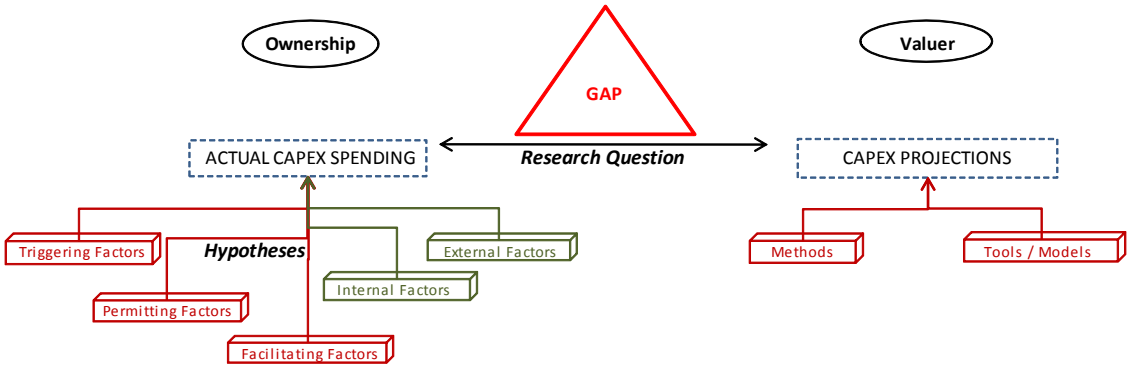
Besides the influence of the economy on hotel revenue, the mere anticipation of an economic development might influence an owner’s spending pattern even more so. Since healthy economic conditions are widely known to positively influence demand, owners might be increasingly encouraged to spend on capex projects in anticipation of strong cash flows. An expected downturn or recession, however, cautions owners to be aware of decreased cash flows and potential liquidity problems. As such, a mere anticipation of an economic development might have a considerable effect on capital spending.

3 Hypotheses

The study aims to investigate the reasons for the gap, which exists between projected and actual capital spending. In order to gain an understanding of why it is difficult for valuers to adequately quantify future investments in a hotel and what considerations are potentially

missing in the current appraisal practice, the influencing factors on capex need to be fully understood. Figure 4 illustrates the key research question and the derived hypotheses.

Figure 4: Research Question & Hypotheses



The study tests the following series of hypotheses:

Hypothesis 1: Ownership Profile

As discussed previously, capital spending is expected to be influenced by the ownership profile and the contractual relationships that exist between the owners and the operators. More specifically, the effects of the factors driving capital spending decisions are likely to differ depending on the ownership profile. For instance, the potential conflicts of interest arising from the contractual agreements between owners and lessees or management companies may prevent or force an owner to invest while external or internal factors would necessitate the opposite decision to be made. An example of such a decision could be when an owner is required to invest in upgrades to comply with brand standards while the existing asset is still functional and competitive in its marketplace. Hence, it is expected that:

Hypothesis 1 (H1): The factors influencing capital spending decisions differ according to the ownership profile.

Hypothesis 2: Characteristics of the Hotel Property

Characteristics specific to the asset have also been viewed as important determinants of capital spending decisions. Previous studies have reported – yet

not statistically tested - differences in capex for hotels located in prime or secondary locations, and for hotels of different size. It is therefore expected that:

Hypothesis 2.1 (H2.1): The factors influencing capital spending decisions differ according to the location of the asset.

and that:

Hypothesis 2.2 (H2.2): The factors influencing capital spending decisions differ according to the size of the asset.

The age of the asset has also regularly been viewed as a key determinant to capital spending. Structural and design elements, as well as equipment, have finite useful lifecycles and need frequent reinvestments to cope with physical or aesthetic obsolescence. Consequently, capex is expected to evolve cyclically, with regular peaks corresponding to the end of some asset's lifecycle, and the beginning of the lifecycle of its replacement. For this reason, it is expected that:

Hypothesis 2.3 (H2.3): Capital spending is influenced by the age of the asset and follows a regular cycle.

Hypothesis 3: Hotel Performance

Prior studies have also showed that capital spending projects tend to be delayed when the financial performance of the hotel is low such as in recessionary periods. The availability of cash appears to be critical to the timing of capex, hence it is expected that:

Hypothesis 3 (H3): The financial performance of the hotel is positively related to capital spending. An increase in financial performance results in an increase in capital spending.

Hypothesis 4: Competitive Market Environment

The need to maintain the level of competitiveness of a hotel has been reported to be one of the primary reasons for capital spending. Such loss of competitiveness might be attributed to the obsolescence of some features of the asset, due to changes in consumer behaviour or to the natural aging process of the asset, or to the emergence of a new competitor in the market place. In such context, owners

are likely to respond by increasing their capital spending to protect their competitive position and maintain their market share. It is thus expected that:

Hypothesis 4 (H4): The level of competitiveness of the hotel is negatively related to capital spending. A decrease in competitiveness results in an increase in capital spending.

Hypothesis 5: Economic Environment

The demand for hotel room nights, one of the key drivers of the financial performance of the asset, has been showed to be strongly related to the domestic economic environment. Hotel owners are thus likely to pay attention to the evolution of their economy when making capital spending decisions as it is a significant driver of their cash flows. It is thus expected that:

Hypothesis 5 (H5): The growth of the domestic economy is positively related to capital spending. An increase in economic growth results in an increase in capital spending.

By examining and answering these five hypotheses, the study may give certain recommendations for an improved methodology in the forecast of capital spending in hotel valuations.

4 Data and Methods

4.1 Models and Variables

Most studies on capital spending present descriptive statistics using capex in percentage of the hotel's revenue. Since the present study attempts to uncover internal and external factors driving capex, the use of capex in percentage of revenue is not adequate. Such operationalization could indeed create endogeneity problems as the testing of hypothesis 3 requires the selection of an independent variable measuring hotel performance. This variable would very likely be extremely correlated to revenue thereby creating a loop of causality between the dependent and independent variables. Capex in absolute terms was thus preferred. In order to control for size differences between the hotels and over time, capex is divided by the number of available rooms. Thus, capex per available rooms (*CAPAR*) is computed as follow:

$$CAPAR_{it} = \frac{CAPEX_{it}}{RA_{it}}$$

Where all variables are for hotel *i* in time *t*, and where *RA* is the number of rooms available.

Hypothesis 1 seeks to establish the differences in factors affecting *CAPAR* for different types of ownership. As the hypothesis is concerned by the differences that stem from the existence of a contract between the owner and the operator, the hotels in the sample were categorized according to whether they were owned and operated by the same company (i.e. wholly owned or joint-venture; the group is assigned the value of 0) or under a contractual agreement between the asset owner and the operator (i.e. lease agreement or management contract; the group is assigned the value of 1; note that none of the hotels in the sample were under a franchise agreement).

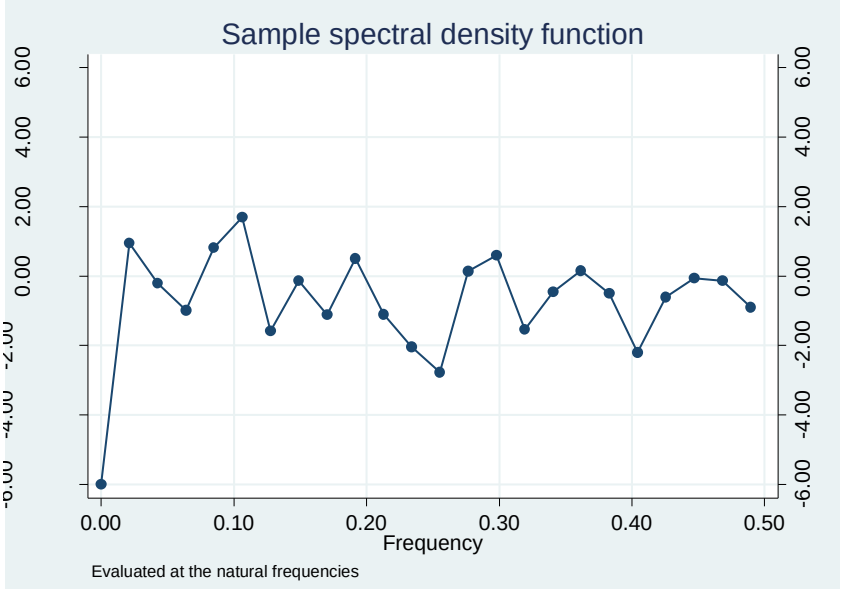
Hypotheses 2.1 and 2.2 are concerned with the differences in factors influencing *CAPAR* that arise from differences in the location of the asset and from its size. For the location, hotels were categorized as being in prime or secondary location as discussed in the previous section. For size, hotels were grouped based on the categorization scheme as in Brooke & Denton (2007). Precisely, hotel with fewer than 150 rooms were categorized as small hotels, hotels with 150 or more rooms, but less than 300 were medium hotels, and hotels with 300 or more rooms were deemed as large hotels.

Hypothesis 2.3 suggests that *CAPAR* evolves in a cyclical manner, with regular peaks that depend on the age of the asset. A visual inspection of the patterns in *CAPAR* was conducted to establish the frequency of cycle peaks, over the life of the hotels in the sample (see Figure 10) and over the sample window (see Figure 7; from 2000 to 2009). The most apparent periodicity from the visual inspection was peaks every 6 years from the date the hotel was opened or acquired. Interestingly, the pattern of 6 years corresponded for most hotels to the years 2000 and 2006 in the sample window. To strengthen the evaluation of this periodicity, a spectral analysis was conducted.

Figure 5 shows the spectral density function for the 47 years capex history of the sampled hotels. The highest point in the function corresponds to a frequency of 0.12-0.13, or a cycle of 6 years repeated over 47 years of history (6 ÷ 47 = 0.128), thereby supporting the conclusions of the visual inspection. Consequently, a dummy variable (*DUMCYC*) was

created to account for such periodicity, taking the value of 1 the first year of operation or re-opening and for every 6th year afterward, and the value of 0 otherwise.

Figure 5: Sample Spectral Density Function



Hypothesis 3 considers hotel performance as a significant factor influencing *CAPAR*. A number of variables were considered to measure hotel performance, including Revenue Per Available Room (*REVPAR*), Occupancy percentage (*OCC*) and Gross Operating Profit Per Available Room (*GOPPAR*). All variables were tested for potential lag effect on *CAPAR* using cross-correlation functions (CCF). *OCC* and *GOPPAR* were lagging *CAPAR* by 1 year while *REVPAR* was coincident (see Annex II). Despite the potential use of these three variables in the models, their extreme intercorrelations caused multicolinearity concerns. As *REVPAR* is the most widely used performance metric in the industry, it was kept for further testing while the *GOPPAR* and *OCC* were dropped.

Hypothesis 4 argues that decreases in the level of competitiveness of a hotel trigger new capital spending. As discussed above, such changes in competitiveness may be due to a "natural" decline in competitiveness related to the obsolescence of the asset, or to the emergence of a new competitor. In order to consider these two situations, two variables were used. First, the "natural" or ongoing level of competitiveness is traditionally measured in the industry by a REVPAR Index. Formally, the REVPAR Index (*REVPARINDEX*) is computed as follow:

$$REVPARINDEX_{it} = \frac{REVPAR_{it}}{REVPAR_{jt}}$$

Where the *REVPAR* of hotel *i* in time *t* is divided by the *REVPAR* of the competitive market *j* in time *t*.

The second variable was created using a dummy coding scheme (*NEWSUPPLY)* which would take the value of 1 when a new hotel entered a competitive market and the value of 0 otherwise.

Finally, hypothesis 5 suggests that the domestic economic environment in which the hotel operates influences *CAPAR*. Numerous studies of the hotel industry have showed that Gross Domestic Product (*GDP*) was highly related to hotel demand, and thereby a key economic indicator tracked by hotel professionals. Hence, the percentage change in *GDP* of the country in which the hotel operated was used to measure the domestic economic environment. *GDP* was log transformed to ensure the stationarity of the series.

The following empirical model was developed to test the hypotheses for the total sample, or by ownership type, location and size:

$$CAPAR_{it} = \beta_1 DUMMYCYC_{it} + \beta_2 REVPAR_{it} + \beta_3 REVPARINDEX_{it} + \beta_4 NEWSUPPLY_{it} + \beta_5 GDP_{it} + \varepsilon_{it}$$

It is important to note that due to the fact that the dummy variable *DUMMYCYC* shared the same value at the same time for most hotels, the constant term was removed from the equation.

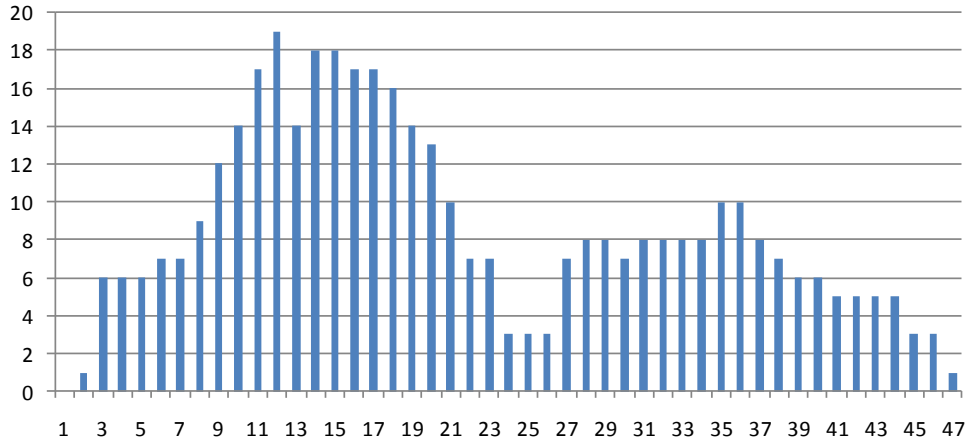
4.2 Data

Data for the sample was provided by major hotel operating companies and consisted of a total of 44 properties across 11 countries and 3 globally known hotel brands. The sample includes hotels in Continental Europe (16), the United Kingdom (24), South Africa (2), and the Middle East and Asia Pacific (2). The average age of the hotels in the sample is 51 years with a standard deviation of 112% (or 57 years) due to some very old hotels in the sample. The median age of the sample is 29 years. The average brand age, i.e. the number of years since the property was converted to the current brand, is 25 years with a standard deviation of 92% (or 23 years). The median brand age is 19 years. Out of the sample, 64% were purpose built for the brand they currently carry, while the remainder are conversion

properties. Most of the hotels in the sample are leased (36), while a few are owned (7) and one is managed. The average size is 283 rooms per hotel.

Figure 6 illustrates the number of data points by year (10 years yielding a total of 440 data points).

Figure 6: Total Data Points by Year (Year 1 – 47)



Historical capex figures were provided for ten years from 2000 to 2009 and operating figures for twelve years, from 1998 to 2009. This allows testing the influence of some of the variables on capex spending assuming a time lag.

4.3 Estimation Procedure

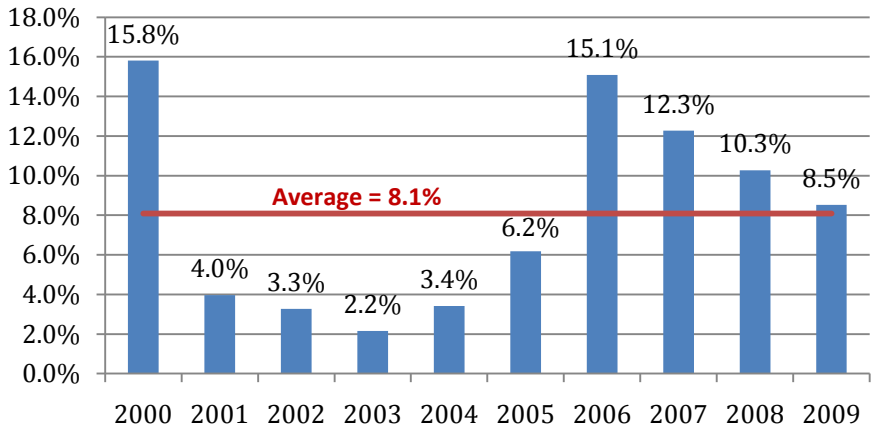
The parameters presented in the empirical model were tested using a Panel Corrected Standard Error (PCSE) procedure. As usual with time-series cross-section (TSCS) data, the model used had to allow for heterskedastic but uncorrelated errors (see Annex III for Breusch-Pagan and White tests for heteroskedasticity). Since the sample was fairly large in cross-sections (i.e. N=44) but limited in time-series length (i.e. T=10), the PCSE procedure was deemed appropriate (Beck & Katz, 1995).

5 Empirical Results

5.1 Descriptive Statistics

The average capex to total revenue ratio within the sample's 440 data points was 8.1% between 2000 and 2009. Figure 7 illustrates capex spending by observation year.

Figure 7: Capex to Total Revenue Ratio by observation year (2000-2009)



The 8.1% average capex to total revenue ratio provides further evidence that a 4% to 5% reserve for replacement is insufficient to cover capex in a hotel valuation and confirms Rushmore's projection from 2003 that a 7% to 11% reserve is more realistic in today's business environment. The CapEx 2007 study reported capital spending at full-service hotels of 5.1% of total revenue between 2000 and 2005 (Brooke & Denton, 2007). The considerably higher average observed in this study is due to increased spending during recent boom years, which were not part of the ISHC's study period. During the 2000-2005 period, the sample recorded an average capex to total revenue ratio of 5.8%, which is more in line with the CapEx 2007 study's finding. The sample recorded extensive capital spending of 11.5% on average between 2006 and 2009, which reflects the strong market conditions and growth economy at the time. As such, the spending pattern seems to strongly reflect the market sentiment and economic condition.

The sample registered a standard deviation in capital spending of 11.8%, which reflects the strong irregularity in capex spending at hotels and the fact that the "big bang" approach, as mentioned by Phillip (2003) is still the most common renovation procedure, despite its numerous critics. Figure 8 confirms the irregularity in spending by showing that, during most years, hotels spend minimally, i.e. less than 2% of total revenues but during certain years undergo major renovation projects, with capex of between 7% and more than 20% of total revenues. The commonly applied 4% to 5% of total revenue is the least frequent capital spending as a percentage of total revenues.

Figure 8: Average Capex to Total Revenue Ratio

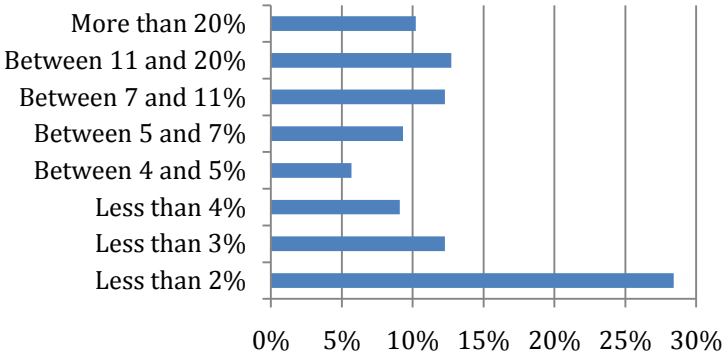
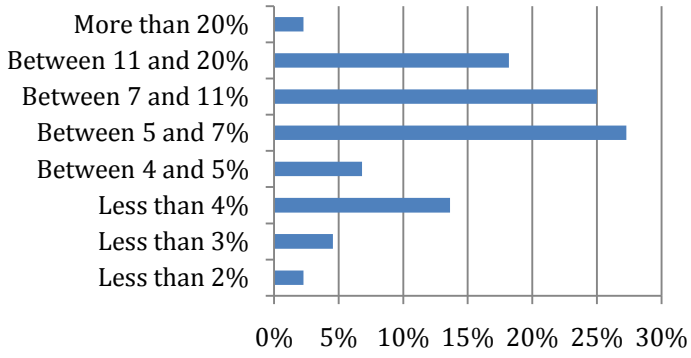


Figure 9 illustrates the average capex to total revenue ratio over a 10-year period between 2000 and 2009.

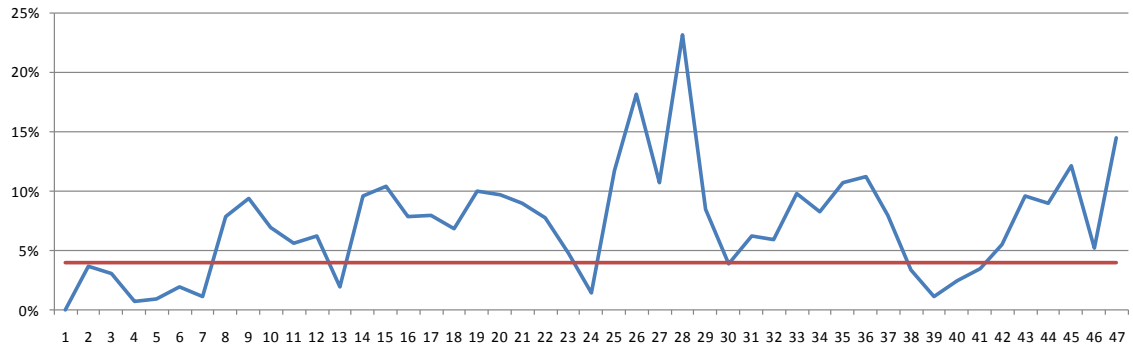
Figure 9: Average Capex to Total Revenue Ratio by Hotel over a 10-year period



When analysing average capital expenditure by hotel over a ten year period, most hotels (52%) spent between 5% and 11% of total revenues, which confirms the previous observations. Merely 27% of hotels spent less than 5% of total revenues over a ten-year period and a considerable 20% spent more than 11% per year on average. This large spread in spending is confirmation that various factors influence investments on an individual level.

Capital spending by year of age is illustrated in Figure 10.

Figure 10: Capex Spending Pattern (Years 1-47)



Note: Eight hotels were removed from this statistic as their buildings are between 90 and 250 years old.

Capex as a percent of total revenues remained below 4% during years 1 through 7 with an average of 1.6% before increasing to around 8% in year 8. The second decade shows fairly irregular spending pattern with an average of around 7.3%. The first few years of the third decade (years 20 – 24) show a strong drop in capital spending, in anticipation of major renovations taking place in the following years. In line with the CapEx 2007 study, the graph shows a clearly recognizable large-scale renovation taking place during the third decade of a hotel's life. Nevertheless, capex remains at 7.2% on average after the renovation years, reflecting the need to upkeep an aging building and preventing obsolescence.

5.2 Results of PCSE Regressions

Table 8 presents the results of the PCSE regressions for the entire sample, as well as by ownership type, location and size. All models are significant at the .001 level and present good levels of fit, with R-Squared values ranging from .39 to .53. The models were also tested for potential multicolinearity problems using Ordinary Least Square (OLS) to estimate the Variance Inflation Factors (VIF) of the independent variables. Table 6 shows the VIF, with values ranging from 1.25 to 1.01, well below the traditionally accepted upper limit of 10, and below the recommended limit of 5 (Hair et al., 1998). These results are consistent with the rather low intercorrelations between the independent variables, with the exception of the significant correlation between *REVPAR* and *REVPARINDEX* (see Table

7). The data also did not exhibit any specific pattern that would have required another specification as illustrated by the scatterplot matrix in Appendix IV.

Table 6: Variance Inflation Factors (VIF)

Variables	*VIF*	*1 / VIF*
REVPARINDEX	1.25	0.802
REVPAR	1.25	0.803
DUMMYCYC	1.17	0.855
GDP	1.16	0.861
NEWSUPPLY	1.01	0.987
Mean VIF	1.17	

Table 7: Correlations Matrix

	CAPAR	*REVPAR*	*REVPARINDEX*	*GDP*
CAPAR	*1.000*			
REVPAR	*0.270**	*1.000*		
REVPARINDEX	*-0.081*	*0.443**	*1.000*	
GDP	*0.038*	*-0.006*	*-0.040*	*1.000*

Note: * p<.05; dummy variables are omitted

Hypothesis 2.3 tested for reinvestments related to the aging process. The hypothesis anticipates that capital spending occurs in regular cycles of 6 years. The hypothesis is validated as the coefficient is significant (p<.001) for the total sample, as can be observed in Table 8. Hotel owners tend to invest every 6 years from the date the hotel was opened or acquired, which confirms the findings of the CapEx 2007 study (see Figure 1). The study found that the first major cash outflow typically falls in year six. It also confirms Denton's view (1998) that a significant portion of capex is purely driven by the calendar.

Interestingly, the peak investment years for most hotels in the sample were 2000 and 2006, which corresponds with the economic peak years (see Figure 7). In this model, therefore, the renovation cycle variable overlaps considerably with the economic conditions, as measured by changes in GDP, a variable tested in hypothesis 5. The hypothesis anticipates that capital spending is positively related to growth of the domestic economy, as measured by percentage change in GDP.

Table 8: Results of PCSE Regressions

		by Ownership Type		by Location	
Model specification	**Entire sample**	**Owned/JV**	**Managed/Leased**	**Prime location**	**Secondary location**
Dependent variable: Capex per Available Room (CAPAR)					
Independent variables					
Renovation cyclicality	6269.555***(932.754)	4'939.368**(1'678.581)	6'636.646***(1'054.035)	4'994.703**(1'516.782)	8'621.759***(1'842.531)
REVPAR	62.762***(11.484)	34.636*(13.726)	65.543***(12.364)	67.440***(8.502)	99.866 (71.999)
REVPAR index	-22.129*(9.974)	-10.459 (13.278)	-22.584*(10.734)	-26.623**(8.743)	-45.338 (48.698)
GDP	-23'067.980 (15'368.160)	11'327.340 (28'826.770)	-31'524.08 (17'415.52)	-17'592.000 (28'211.91)	-46'128.45 (33'129.01)
New supply	1'006.263 (1'145.744)	-2'038.274 (1'855.215)	1'781.670 (1'317.576)	-1'306.153 (1'096.868)	5'042.197 (2'595.731)
Number of observations	440	70	370	320	120
Number of cross sections	44	7	37	32	12
Time series length (years)	10	10	10	10	10
R-Squared	0.4266	0.3883	0.4403	0.4503	0.4392
Wald $_X$2	286.66	49.24	253.43	128.95	97.21
Pr. > $_X$2	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

	by Hotel Size		
Model specification	**Less than 150 rooms**	**150 to 300 rooms**	**More than 300 rooms**
Dependent variable: Capex per Available Room (CAPAR)			
Independent variables			
Renovation cyclicality	9'566.455***(1'725.805)	5'129.284*(2'310.926)	5'952.931***(1'343.789)
RevPAR	167.8174***(43.782)	38.543*(16.497)	78.778***(12.104)
RevPAR index	-83.440*(32.956)	-7.227 (12.627)	-43.810***(12.267)
GDP	-27'209.95 (28'543.580)	-9'331.026 (39'728.930)	-22'188.940 (25'389.370)
New supply	-2'992.559 (2'046.743)	2'236.753 (1'257.052)	1'406.901 (2'176.15)
Number of observations	100	160	180
Number of cross sections	10	16	18
Time series length (years)	10	10	10
R-Squared	0.5310	0.4591	0.4266
Wald $_X$2	144.22	40.39	161.80
Pr. > $_X$2	<0.0001	<0.0001	<0.0001

**P < 0.05*
***P < 0.01*
****P < 0.001*

Based on the results of the model, the hypothesis is not validated ($p>.05$), a change in GDP is not positively related to capital spending. However, the 6-year renovation cycle variable proved to be the most significant influencing factor and overlaps strongly with the economic peak years during the observation period (years 2000 and 2006). Therefore, despite the rejection of hypothesis 5, it might be incorrect to completely discard the idea that capital spending and economic conditions are not related whatsoever. Furthermore, REVPAR by definition, a significant variable influencing CAPAR in this study, depends on demand for hotel accommodation, which in turn has proven to be related to GDP in various studies. Therefore, it may be assumed that economic conditions do influence capital spending to some degree, however more indirectly.

Hypothesis 3 anticipates a positive relationship between capital spending and the financial performance of a hotel. REVPAR was selected as a measure for financial performance. As expected, capital spending is positively related to REVPAR, meaning that during years of strong rooms revenues, owners tend to spend more on renovating their hotels than during years of weak revenue levels. The hypothesis is validated as the coefficient is significant ($p<.001$) for the total sample.

Hypothesis 4 anticipated a negative relationship between the competitiveness of a hotel and capital spending. Two measures were selected to test this, i.e. REVPAR index and new supply. Based on the REVPAR index variable, the hypothesis was validated ($p<.05$), the variables are negatively related. A decline in REVPAR index triggers capital spending, as was also the case for most groups, including managed hotels, hotels in prime locations, and small (less than 150 rooms) and large (more than 300 rooms) hotels.

However, hypothesis 4 is not validated when measuring new supply ($p>.05$). Although a new competitor in the market adds rooms and increases the competitiveness for existing hotels, a new hotel requires a few years to position itself in the market and build market share. As such, owners of existing hotels do not seem to invest because of new supply, based on the results of the models. A hotel's competitive positioning based on REVPAR penetration is a much more determining factor when deciding on capex projects

In Hypothesis 1, a difference in capital spending decisions was anticipated, based on ownership type. As can be seen in Table 8, the models vary slightly for the two different

ownership profiles. Both models, the one examining wholly and jointly owned hotels and the one examining hotels under a contractual agreement, show significant coefficients for the cyclicality and financial performance variables. This implies that capital spending decisions at all hotels in the sample, no matter which ownership type, follow a 6-year renovation cycle. And capital spending is in both cases positively related to REVPAR, i.e. during healthy years, capital spending is higher, while during years of REVPAR declines, capital spending is lower as well. Only the model for hotels under a contractual agreement (management or lease contract), however, shows a significant coefficient for the REVPAR index while the coefficient for owned or joint-venture owned hotels is insignificant. This result implies that capital spending in managed or leased hotels is influenced by the development of REVPAR indices, triggering capital infusions when the hotel is slipping in its competitive positioning. A reason for this discrepancy might be that a REVPAR index performance test often represents an owner's termination right in a management agreement, which incentivizes hotel managers to push for capital projects in order to maintain revenue levels. Owners who are tied to terms of management or lease agreements also typically need to invest a minimum amount every year, which is usually defined as a percentage of total revenue. Owners of wholly or jointly owned hotels, however, possess more freedom when making capital decisions because they are not as tied to contract terms. They may therefore spend less or less frequent than owners of managed or leased hotels. This is supported by the average capex to revenue ratio, which is 7.1% for whole or jointly owned hotels and 8.3% for managed or leased hotels in the sample. The R-Squared supports the difference between the groups. It is higher for the managed and leased hotel group than for the wholly owned or jointly owned hotels. This implies that wholly or jointly owned hotel owners more strongly focus on other factors besides the variables tested when deciding on capex projects.

Both models do not show significant coefficients for GDP, as a measure for the economic environment and new supply, as a measure for the competitive market environment. In conclusion, the results mostly support the hypothesis that there is a difference in capital spending depending on hotel ownership type.

Hypothesis 2.1 anticipates a difference in capital spending depending on the location of a hotel, i.e. whether it is a prime or a secondary location. The two models show different

results for each type of location. Capital spending at both groups follows a 6-year renovation cycle. However, the REVPAR and the REVPAR index coefficients are only significant for hotels in prime locations, while capital spending at hotels in secondary locations is not influenced by the hotel performance (REVPAR) or the competitive positioning of the hotel (REVPAR index). This might be due to the fact that hotels in prime locations are often strategic assets in owners' portfolios, generating disproportionally large amounts of cash compared to the remaining assets. Owners of hotels in prime locations are keen on maintaining the value of those assets to ensure continuous cash flows and to potentially sell when the time is right. Also, hotels in primary markets are usually exposed to bigger and stronger competitive supply than hotels in secondary markets, which requires owners to keep up with the competition. Hotels in secondary locations often suffer from low occupancies or average rate, which results in poor profitability. As such, owners tend to spend as little as possible in order to achieve their return targets. Based on these differences between hotels in prime and secondary locations, the hypothesis is validated.

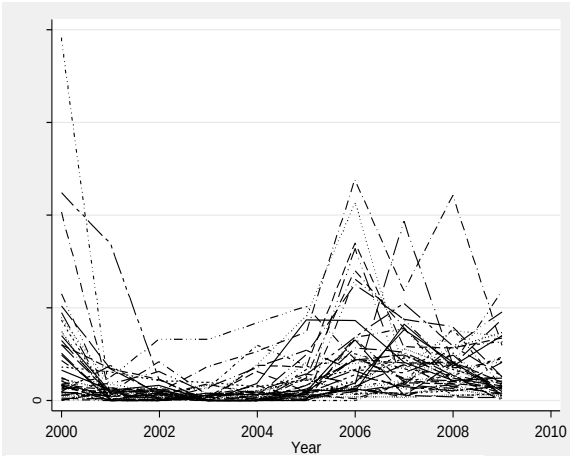
Hypothesis 2.2 anticipates a difference in capital spending depending on the size of a hotel. The models remain mostly the same for hotels of different sizes with the exception of medium-sized hotels where the REVPAR index becomes insignificant. As such, the hypothesis is not fully supported. Small hotels (with less than 150 rooms) display the highest R-Squared (0.531) out of the three groups. This might be an indication that, compared to smaller hotels where rooms are the main source of revenue, capital spending at larger hotels is more dependent on total revenue, including food and beverage, meeting or recreational facilities, which typically make up a substantial component of hotel turnover.

6 Discussion & Conclusion

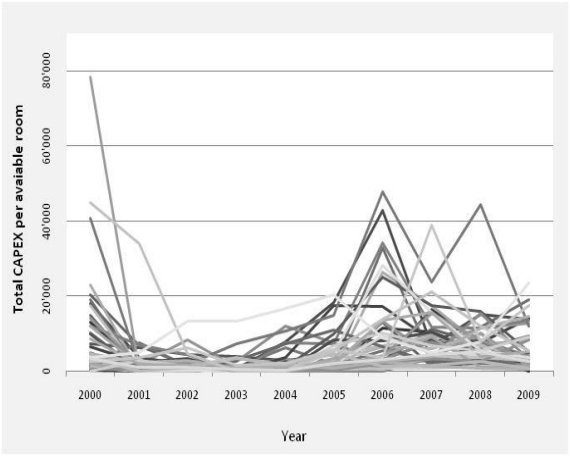
6.1 Potential Capital Expenditure Model

The first three graphs in Figure 11 present the derived capex model, based on the results of the previously described regression. Graph 1 displays the actual capital expenditures for each hotel in the sample (identical to Graph 4). Graph 2 illustrates the capital expenditures for each hotel, which the empirical model described previously, would have predicted based on the results of the regression.

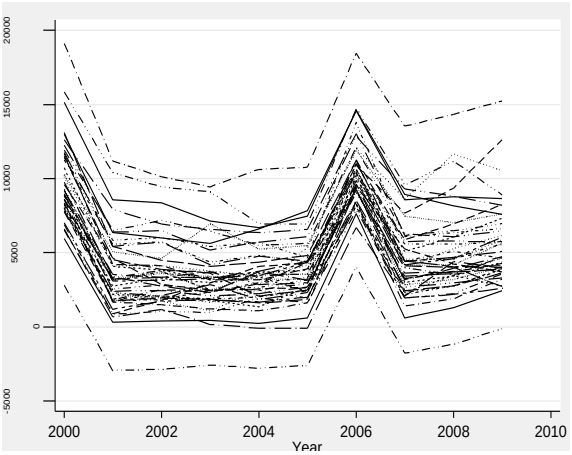
Figure 11: Comparison of Models



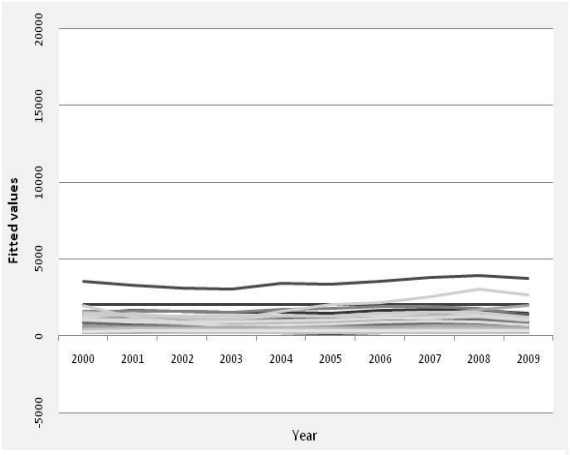
Graph 1: *Actual annual capex per hotel*



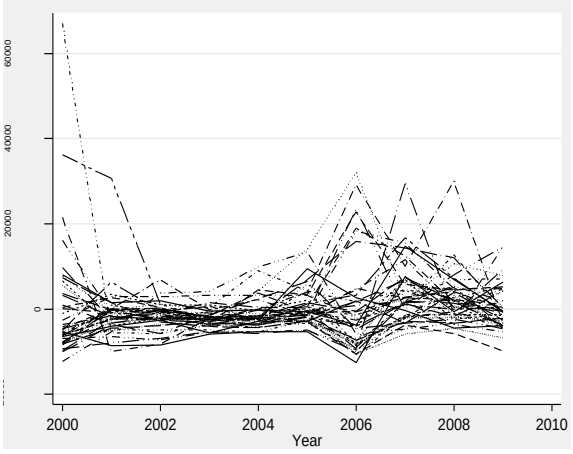
Graph 4: *Actual annual capex per hotel*



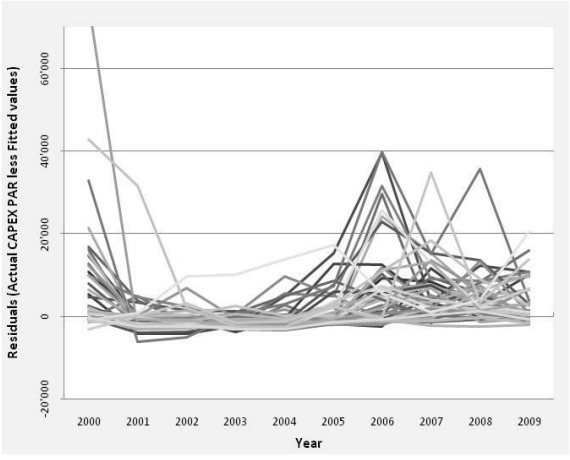
Graph 2: *Predicted capex by year based on the previously described model*



Graph 5: *Predicted capex by year based on 4% of total revenue*



Graph 3: *Errors of the predictions compared to actual capex*



Graph 6: *Errors of the predictions compared to actual capex*

Graph 3 displays the discrepancy between the actual historical capital expenditure (Graph 1) and the theoretical capital expenditures as suggested by the model (Graph 2). Based on the minimal discrepancy as seen in Graph 3, the predictions by the capex model present a close fit with the actual spending except for a small number of extreme cases, which mostly occurred in the years 2000 and 2006 to 2008. These were the peak investment years where some hotels underwent large-scale structural renovations. For example, one hotel underwent a renovation in 2000, which amounted to 85% of total revenues (apparent in Graph 1).

Such comprehensive renovation projects, which are necessary to prevent physical deterioration of the building and obsolescence, are outside the scope of this model and would need to be considered on a case by case basis in addition to the routine 6-year renovation cycle included in the capex model. Since hotels underlie three different reinvestment cycles, for the shell, technical systems and FF&E with various life expectancies, a model should account for the replacement of each element. While the 6-year renovation cycle captures mostly the shorter-lived FF&E, large-scale investments in building shell and installations must be estimated and timed according to their longer life span. These elements are also subject to cyclicality, however with longer periods in between, as could be seen in Figure 10, which showed a clearly recognizable large-scale renovation taking place during the third decade of a hotel's life.

The model's predictions are much closer to reality than the current industry norm method of applying 4% of total revenues, as presented in Graph 5. The percentage of revenue method displays a very steady capital spending pattern, while in reality capex is highly fluctuating, as was evident in the standard deviation of 11.8% and Figure 7. The percentage of revenue method fundamentally ignores when the last renovation took place and the property's effective age. As such, the capex model is much more accurate in capturing the cyclicality and timing of capex, which consequently renders a more accurate valuation.

The capex model also forecasts generally higher levels of capital expenditures than 4% of total revenue, which the CapEx 2007 study has proven to be insufficient. This is also evident in Graph 6, which indicates that 4% of total revenue is less than what was actually spent during the observation period (i.e. positive residuals). Even when applying a higher

percentage of revenue, for example the empirically derived 8.1%, the method still only yields an R-Squared of 0.0728. This is clearly below the capex model's R-Squared of 0.4266, which includes the renovation cyclicality and the competitiveness of the hotel.

Based on the results of the elasticities as presented in Table 9, a one percent increase in REVPAR causes a 1.3% increase in capex. The significant influence of REVPAR on capex was also confirmed by the validation of hypothesis 3. Therefore, revenue is the second most significant factor out of the examined set of variables, after the 6-year renovation cyclicality, influencing hotel owners to spend on capex.

Table 9: Elasticities

Variables	***Elasticities***
REVPARINDEX	-0.4914
REVPAR	1.3057
GDP	-0.0742

Another influencing factor seems to be the competitive environment, as measured by the REVPAR index. A one percent drop in REVPAR index triggers half a percentage point increase in capex, based on the model. This confirms Turner and Guilding's findings (n.d.), which stated that owners mention the need to remain competitive in the market place a more important factor than ROI when deciding on most capex projects. The influence of GDP is negligible when considering elasticities, which is in line with the results of the regressions.

A capex model should allow for differentiation between the groups that showed a significant variation based on the results of the regressions, i.e. the type of ownership and the location of an asset. As such, a model should adjust whether a hotel is wholly or jointly owned and managed or whether it is owned and managed separately. The different models would therefore account for the owner's profile. Also, a model should differentiate between prime and secondary locations as owners spend differently, depending on the location of the asset, as was observed previously.

In conclusion, a capex model, which is able to adequately forecast capital spending at hotels should be dependent on and adjust for the following factors:

1. **Hotel performance**: The model adjusts capex in relation to rooms revenues. For larger hotels, a percentage of total revenue might be preferable due to the larger proportion of auxiliary revenues (i.e. food and beverage, spa, meeting, recreational, and so forth).
2. **Competitiveness of the hotel** relative to its competitive market: The model adjusts capital spending in relation to changes in REVPAR index.
3. **Regular renovation cycles**: The model assumes 6-year renovation cycles.
4. **Effective age**: A qualified quantity surveyor should inspect the building in order to estimate the timing and dimension of reinvestments in building components, i.e. generate a long-term capex plan. This needs to be added to the capex model's forecast in the appropriate years.
5. **Ownership profile**: The model should take into consideration the ownership profile and the contractual agreement, which exists between the owner and the hotel management company.
6. **Location of hotel**: The model should differentiate between prime and secondary locations.

Table 10 compares the four existing capex forecasting methods with the capex model, as empirically derived by the regression.

Table 10: Comparison of Methods

	Considered Factors				Differentiation by	
Method	Hotel Performance	Life Expectancy	Effective Age / Cyclicality	Market Conditions / Competition	Owner's Profile	Location of Asset
Method 1	yes	no	no	no	no	no
Method 2						
Method 2a	no	yes	no	no	no	no
Method 2b	no	yes	no	no	no	no
Method 3	yes	yes	no	no	no	no
Method 4						
Method 4a	no	yes	yes	no	no	no
Method 4b	no	yes	yes	no	no	no
CAPEX MODEL	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**

The currently used methods cover only one or two of the influencing factors on capital spending. The hybrid method 3 is most similar to the capex model, however ignores the competitiveness factor, the location and the ownership profile. Interestingly, this method is

the most conservative one, projecting the highest capex out of all the methods, yielding the lowest market value. Considering that the CapEx studies proved 4% of total revenue to be insufficient, method 3 is most likely the most accurate model out of the existing ones.

The empirically derived capex model with the previously mentioned additions and differentiations covers all factors discussed in this study. The major advantage of the capex model would be the combination of occupancy- and time-driven elements, the consideration of curing physical deterioration and obsolescence, adjustments for the renovation history and current condition of the building, and, as an external factor, the consideration of the hotel's competitiveness, which proved to be a significant factor influencing capital spending. As a result, applying such a capex model would render more accurate and realistic valuations than the currently used methods.

6.2 Limitations and Further Research

As mentioned previously, there are several limitations related to the study, mainly due to the availability of data. A larger and more diversified sample in terms of brand affiliation and geographical dispersion would allow a more strongly supported and universal outcome. Due to the 10 year observation period in this study, an examination of longer renovation cycles, namely those concerning the building and installations, was not possible. A longer observation period would allow testing for time-driven investments, which underlie a longer renovation cycle. Further specifications could be made if capex data was available by category, i.e. FF&E, building components and technology and installations. Such a differentiation would allow testing for factors influencing each component individually and would assist in defining a model, which is capable of adequately composing occupancy- and time-driven elements. Further research might also test other possible influencing factors, such as changes in construction costs or interest rates. Most importantly, future efforts should be targeted at developing a practical tool for valuers, which comprehends the existing knowledge on the subject. A tool would need to be adaptable to each country's construction costs and frequently revised in order to stay current with new laws and regulations as well as changing customer preferences and brand standards, further shortening FF&E investment cycles. Due to a rapidly changing environment, continuous

research is necessary in order to stay up-to-date on the ever-changing capital requirements of hotel assets.

6.3 Conclusion

The study offers new insights into the influencing factors impacting capital spending in hotel real estate and the significance of each factor. Based on the empirical results, recommendations could be made as to what a capex model should include in order to adequately account for and project capital spending in an appraisal process. As such, the study's aim, to contribute to an improved methodology, was accomplished. Based on this and other existing studies, however, further research needs to be aimed at developing a practical model, which hotel valuers can utilize on a daily basis. Most importantly, all industry stakeholders, especially lenders and investors, must recognise the need for an improved model and support efforts towards the development of a tool for the international valuation community.

The output of a tool, however, will always remain a best guess and may never entirely reflect the future. Capital spending will always be influenced by additional factors specific to the hotel asset, the circumstances, and the parties involved in the decision making.

7 References

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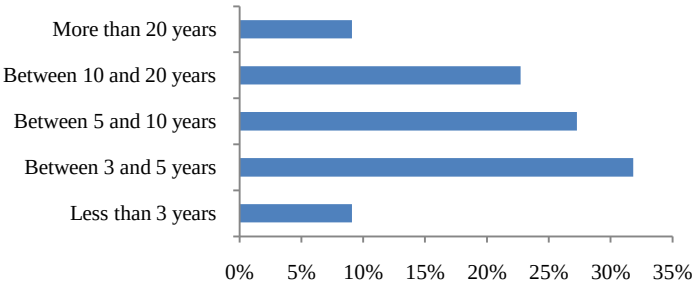
8 Appendix I: Valuation Questionnaire

Performed: May - June 2010

Surveys completed: 22

Origins: USA (5), UK (7), Greece (1), Switzerland (6), not disclosed (3)

Participants' work experience:



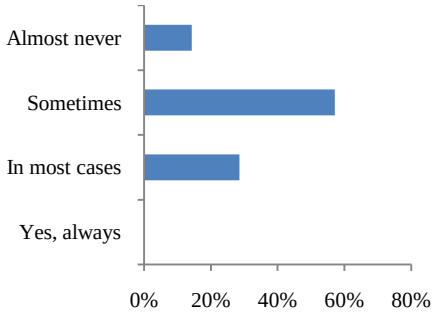
1. How would you define 'Capex'?
2. How would you define 'Reserve for Replacement'?
3. How do you estimate the Reserve for Replacement in a hotel valuation? Please detail how you call it and how you determine it.

Between 1% - 4% of Total Revenues (ramp-up during the first few years of operation)	12%
Between 3% - 4% of Total Revenues	8%
~ 4% o Total Revenues	4%
Between 2% - 5% of Total Revenues	4%
Between 3% - 5% of Total Revenues	4%
Between 4% - 5% of Total Revenues	12%
Annual depreciation depending on the economic life of the property / investment plan	20%
Standards estimated by the International Society of Hospitality Consultants	12%
Percentage of total revenue or annual depreciation based on replacement cost	8%
In line with contract terms	16%

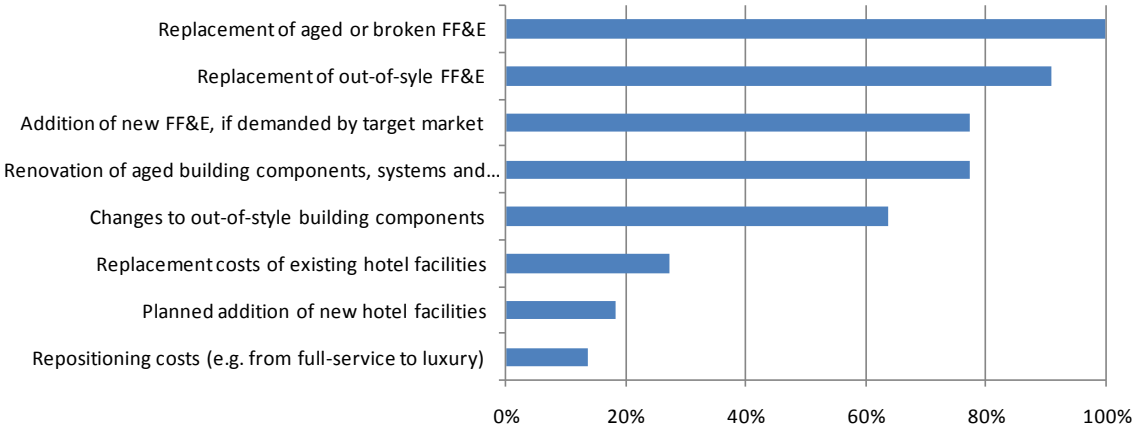
4. How often do you work with a Quantity Surveyor or have a building survey conducted to better understand the condition of the building?

Yes, always	0%
In most cases	30%
Sometimes	50%
Almost never	20%

5. Do you believe that the Reserve you typically deduct in a hotel valuation generally reflects the actual capital investment an owner makes after the date of value?

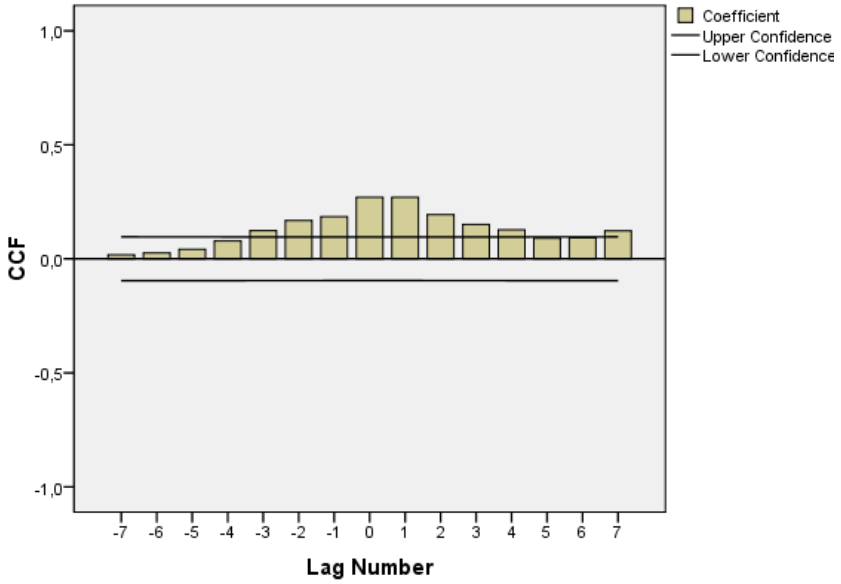


6. Which components should be included in the Reserve for Replacement?

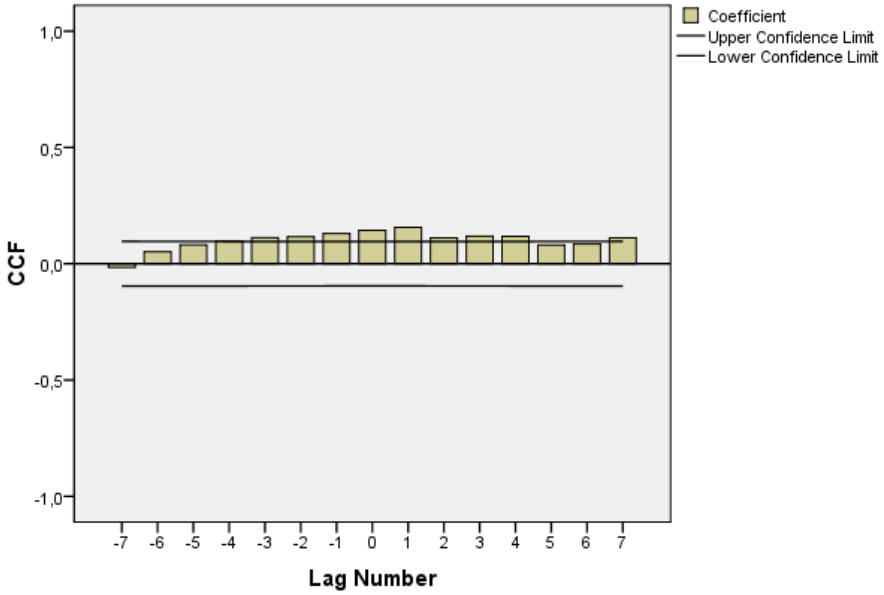


9 Appendix II: Time Lag Effects

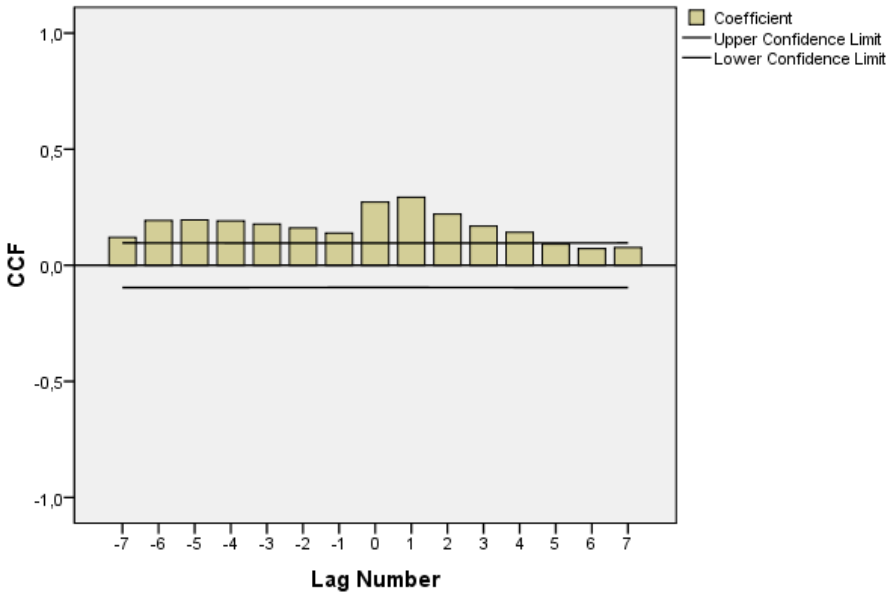
Time Lag Effect between REVPAR and CAPAR



Time Lag Effect between Occupancy and CAPAR



Time Lag Effect between GOPPAR and CAPAR



10 Appendix III: Breusch-Pagan and White Tests

As usual with time-series cross-section (TSCS) data, the model used had to allow for heterskedastic but uncorrelated errors.

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance
Variables: dummy_cycl revpar_lag0 revpar_index gdp_changes new_supply

chi2(5) = 30.86
Prob > chi2 = 0.0000

White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity

chi2(18) = 46.33
Prob > chi2 = 0.0003

11 Appendix IV: Scatterplot Matrix

Scatterplot Matrix

12 Ehrenwörtliche Erklärung

Ich erkläre hiermit, dass ich die vorliegende Masterthesis

„The Consideration of Capital Expenditures in Hotel Valuations"

selbst angefertigt habe. Die aus fremden Quellen direkt oder indirekt übernommenen Gedanken sind als solche kenntlich gemacht.
Die Arbeit wurde bisher keiner anderen Prüfungsbehörde vorgelegt und auch nicht veröffentlicht.

Zürich, den 13. August 2010

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Gabi Baumann