Space Efficiency in Hotel Development

Master Thesis submitted in fulfillment of the Degree: Master of Business Administration with a Specialization in Real Estate Management and Development

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AFFIDAVIT

I hereby affirm that this Master's Thesis represents my own written work and that I have used no sources and aids other than those indicated. All passages quoted from publications or paraphrased from these sources are properly cited and attributed.

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ABSTRACT

The use of space is a central question in hotel development, which has significant implications throughout the lifecycle of a property in form of construction costs, operability, and appeal to guests. The feasibility of a project is greatly influenced by the various stakeholders' ability to plan a hotel that meets *financial*, *development* and *operational objectives* (Baltin et al, 1999, cited by Venter & Cloete, 2007). While space efficient hotel planning practices are discussed in literature, their impact on the above project objectives has not been researched. Definitions of space efficiency in the hotel business have evolved during the years and hotel concepts have undergone a major transformation. Although architectural scholars have documented elements of this change, space efficiency tends to be used as an umbrella term, covering several different concepts. To address this topic, the first part of this study recapitulates the fundamentals of hotel development and introduce key literature on the importance of space efficiency in the process, the different uses of hotel spaces across categories and presents best practices of space efficient hotel planning. To assess the real-life implications of these findings, primary research has been carried out, asking hotel development professionals' views on the most crucial points identified in the literature, in form of a standardized questionnaire. The pool of eligible participants included professionals involved in hotel development on a daily basis. Respondents working for various stakeholders within the hotel development process have been sought out, including hotel operators in a development function, real estate developers, architects, consultants, and investors. Their responses are summarized and analyzed to answer the proposed research questions concerning professionals' views on space efficiency in hotel development as well as industry best-practices.

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LIST OF ABBREVIATIONS

ADR – Average daily rate
BOH – Back of the house [areas]
C&B – Conference and banqueting
EBITDA – Earnings before interest, taxes, depreciation, and amortization
F&B – Food and beverage [outlet or department]
FF&E – Furniture fixtures and equipment
FOH – Front of the house [areas]
GFA – Gross floor area
HVAC – Heating, ventilation, and air-conditioning
KPI – Key performance indicator
NFA – Net floor area
RevPAR – Revenue per available room
ROI – Return on investment
TGFA – Total gross floor area
TSA – Technical services agreement
USP – Unique selling proposition
OS&E – Operating supplies and equipment

1 INTRODUCTION

1.1 Existing research

Existing literature on space efficiency or space efficient hotel planning practices can be sorted in two broad categories. The first category comprises books and publications by architects and hotel development professionals whose experience and academic work lays the groundwork for the theory on hotel real estate development. This thesis will rely extensively on these defining works. The second category includes publications and studies researching primarily operational aspects within the hotel industry and connecting these with spatial concepts within hotels. Apart from a few studies, however, research on the concept of space efficiency itself within hotel development is absent by and large. With space efficiency fast becoming a catch-all term within the industry, this thesis sets out to make a modest contribution to the literature by investigating what industry practitioners understand under this term.

1.2 Research aims and objectives

The aim of this thesis is to reduce ambiguity around the term space efficiency as it is used in hotel development today. In reaching this aim, five objectives were formulated, corresponding to five areas of the topic which call for clarification.

The first objective is to assess metrics currently in use to measure space efficiency in hotel development and test their perceived utility and the degree to which they are used in practice by hotel development professionals. Assessing whether there are further benchmarks, metrics or KPIs not detected in the literature review is also part of this research objective.

The second objective is assessing the perceived relevance of space efficient hotel planning practices in reaching basic hotel development objectives.

The third research objective is the assessment of the perceived relevance of space efficient hotel planning practices in various areas of the hotel.

The fourth objective is aimed at assessing industry practitioners' views on industry best-practices connected to space efficient hotel planning. These best practices include both well-established ones identified in the literature, as well as current trends observable in the hotel industry.

The fifth research objective concerns the assessment of industry professionals' views on the importance of achieving higher space efficiency as an objective in their own roles. This research objective may also be understood as a glimpse into sentiments regarding space efficiency as a key objective within hotel development.

1.3 Structure of thesis

The first part of this thesis will introduce existing literature on the hotel development process to provide a foundation for further discussions. The second part of the literature review will concentrate on the concept of space efficiency within hotel development. In this section, three main points will be discussed, namely definitions of space efficiency, use of space across different hotel concepts, and finally, industry best practices of space efficient hotel planning practices.

The following part of the thesis will move on to describe the methodology of the primary research conducted for this thesis. Here, the five research objectives will be described in detail. Furthermore, the research instrument and data analysis methods used will be introduced.

The subsequent results and discussions section will move on to introduce findings of the primary research following the structure of the five research objectives.

Conclusions will be summarized in the ultimate section of this thesis and recommendations for future research will be made.

2 LITERATURE REVIEW

2.1 Introduction

The aim of this chapter is to provide a theoretical background to the topic of space efficiency in hotel development. To achieve this, literature will be inspected in two main areas. Firstly, basics of the hotel development process will be outlined to set the groundwork for later discussions about the use of space and the roles of various stakeholders. Secondly, the use of space and the question of space efficiency will be scrutinized across various hotel concepts, including industry best practice cases of space efficiency in hotels.

2.2 Hotel development

The hotel industry is highly complex due to several unique characteristics, many of which can be explained by its evolution throughout the years. Perhaps the most crucial one is the split between ownership and operation of hotel businesses. Slattery (2012) provides an extensive summary of this process by highlighting that after the development of owner-operated inns and hotels, business models underwent a major transformation in the mid-twentieth century. As the ability to develop and operate hotels calls for two different types of resources (capital and knowhow), properties, whose owners did not possess both struggled to retain the owner-operator business model. As the post-World-War-II-period brought about a significant increase in demand, hotel groups identified an opportunity in splitting ownership and operations (Bell, 1993; Rutes et al., 2001; Rouse, 2004; Slattery, 2012). Ransley (2004) describes the search for funding needed for global expansion as one of the main dilemmas within the hospitality industry at the end of the 20th century, highlighting the fact, that operators alone do not necessarily have the financial means to keep up with the growth of global travel and therefore are reliant on the real estate industry. Most hotel businesses, as we know them today, are characterized by this duality. While being a service industry in their operations, hotel businesses are dependent on the capital-intensive real estate industry for their fundamental facilities i.e., the real estate. Hotel development, therefore, must clearly be distinguished from the hotel business in general. In their paper, Venter & Cloete (2007) stress this distinction by highlighting that although hotel development is used as a generic term which includes both property development and hotel business development, the former refers to real estate development, while the latter refers to the development of hotel businesses in their entirety. When referring to hotel development, this study shall refer to hotel property development (i.e., real estate development). The following sections will summarize the fundaments of the hotel development process, focusing on processes and key success factors, the collaboration of the stakeholders, and on the viability evaluation of hotel projects.

2.2.1 The hotel development process

In order to have an informed discussion about the details of hotel real estate development, the underlying processes that are part of a successful hotel project must be inspected. Literature on the topic offers several ways this development process can be broken down. In their book, Ransley & Ingram (2004, p. xxiii) characterize the hotel development process in five stages, namely *concept, planning, construction, operations, and asset management.* It is noteworthy, that in their model, they include the entire lifecycle of a property, not only the initial development stages. Covering the entire life cycle of a property is also apparent in Venter & Cloete (2007)'s model, which includes twelve stages, namely *idea inception, concept refinement, preliminary feasibility, gaining control of the site, feasibility analysis, contract negotiations, design and documentation, financing, construction, marketing, operations initiation, and asset management.* This latter model is somewhat more detailed and focuses on the initial stages, defining *contract negotiations*, as the *commitment point*, after which the project can be considered past the feasibility stage. Although the previous two frameworks are equally satisfactory, this paper will rely on the former definition as a broad characterization of the hotel development process, formulated by Ransley & Ingram (2004), especially focusing on the *concept* and *planning* stages. It must be reiterated that while there is an emphasis in this paper on the former two stages in Ransley & Ingram (2004)'s model, *operations* and *asset management* are not at all irrelevant. Indeed, they have crucial implications which must be considered during the *conceptualization* and *planning stages*. Although there is a tempting simplicity in the two stages of *conceptualization* and *planning*, there is a need to further elaborate them. Authors with an architectural background focus on exactly these two initial stages provide a more detailed breakdown relevant for discussing space efficiency in hotel development. Rutes et al. (2001 p. 361) characterize the initial steps of the hotel development process in the following steps: *evaluate the prospective site*, *complete a feasibility study*, *select the architect, and design consultants*, *prepare a facilities program*, *obtain financing*, *review the project design*, *monitor construction and hotel opening*. In their book, they make the vital point, that although the hotel development process is similar to that of other asset classes, the involvement of the hotel operator is continuous from the early stages. Indeed, inspecting the above sequence, it is apparent, that the input of multiple stakeholders is needed for the successful completion at different stages. Looking at the process, *site evaluation* and *completion of a feasibility study* can be considered part of the *concept* stage and the rest part of the *planning* stage in Ransley & Ingram (2004)'s framework. Differentiating between the two stages and assigning detailed steps to them clarifies the hotel development process and implies an increasing refinement in the subsequent stages.

Ronstedt & Frey (2014, p. 79-80) focus on the *concept* and *planning* process from beginning to implementation and define *concept development*, *space allocation plan*, *cost estimation*, *collection of planning specifications*, *ascertainment of functional attributions* as the steps that lead to the *preparation of the preliminary design* of a hotel. Noticeably more technical in nature

compared to the framework of Rutes et al. (2001), this classification further emphasizes the interdependencies of the involved parties and highlights the extent to which architects and designers rely on input from the (future) operator of the hotel in certain standards and functional attributes.

Although all the above categorizations are perfectly adequate, their degree of detail varies, as does their focus on various stages. As this thesis seeks to review a specific topic within hotel development (the use of space) which has implications throughout the hotel development process, the following model of the hotel development process is proposed in Figure 2-1 based on the theories discussed in this section (Rutes et al., 2001; Ransley & Ingram, 2004; Venter & Cloete, 2007; Ronstedt & Frey, 2014)

1. **Conceptualization**
   - 1.1 Site evaluation
   - 1.2 Idea Inception
   - 1.3 Concept refinement
   - 1.4 Functional area planning
   - 1.5 Preliminary cost estimation
   - 1.6 Feasibility analysis
   - 1.7 Contract negotiations
2. **Planning**
   - 2.1 Design and documentation
   - 2.2 Refined cost evaluation
   - 2.3 Approval of functional attributes and requirements
   - 2.4 Financing
3. **Construction**
4. **Opening**
5. **Operations**
6. **Asset Management**

FIGURE 2-1 GENERIC MODEL OF THE HOTEL DEVELOPMENT PROCESS

Source: Adapted from Ransley & Ingram (2004); Ronstedt & Frey (2014); Rutes et al. (2001); Venter & Cloete (2007)

The *Conceptualization* phase seeks to establish the type of real estate that can be developed and assesses whether this is in line with the original idea of the developer (Ransley & Ingram, 2004). During this phase, the architect (with input from the future operator regarding the room mix, necessary BOH areas and other functional requirements) will produce drafts of the functional area planning while also considering local building code and fire-, life- and safety regulations (Ronstedt & Frey, 2014). In other words, the *conceptualization stage* includes rough planning (or schematic design) which creates the basis for the project and outlines the physical limits of the real estate as a function of construction budget and the initial design brief (Rutes et al., 2001). If this initial phase improves the original vision and reinforces the involved parties of a positive outcome and the feasibility analysis yields positive results, the parties may commence

contract negotiations, which Venter & Cloete (2007) define as a commitment point. After this, the project may progress to the *planning stage*.

After having established the fundaments, the details of the property will be worked out during the *planning stage*. Here, the process becomes increasingly intricate to an extent that covering all the details will be out of the scope of this thesis. Planning done by the architect during this stage will extend to mechanical and structural aspects and will include exact layouts of each individual space in a way that other involved parties (e.g., the interior designer or specialized consultants) can start their work simultaneously (Venter & Cloete, 2007; Ronstedt & Frey, 2014). While the plans become increasingly detailed, projected costs will be reassessed and adjusted by the architect, with the objective of respecting the previously set budget (Ransley & Ingram, 2004).

It must be noted as a limitation, that the above denoted process outline is quite broad and does not specify all the steps throughout the hotel development process. Its main objective is to provide a framework for the main discussions of this thesis. Some further steps and details will be discussed in the following section, where stakeholders involved in the development process will be introduced. A further limitation of the outline in Figure 2-1 is the lack of focus on the latter stages of the hotel development process. This conscious limitation arises from the fact that although the following discussion will focus on the conceptualization and planning of hotels, latter stages have been included in order not to lose perspective of the overall life cycle of hotel properties.

2.2.2 Stakeholders and their contractual obligations

The previous section has provided a simple timeline of the hotel development process, however, still without focus on the stakeholders involved in them. However linear the hotel development process (as visualized in Figure 2-1) may seem, the needed collaboration of various stakeholders makes it even more complex. It is crucial to reiterate the difference between stakeholders involved in the hotel development process and the operation of a hotel property. This distinction, however, is not identical to the distinction between hotel operators and hotel real estate developers, as described previously. To be able to make the distinction clear, the hotel development process has been introduced in the previous section. Referring to The *Revised Model of the Development Process* by Ransley & Ingram (2004), they define *concept, planning, construction, operations and asset management* as the five stages of the hotel development process. Venter & Cloete (2007) define a similar, but more detailed twelve-stage property development process starting with *idea inception, concept refinement, preliminary feasibility, gaining control of the site, feasibility analysis, contract negotiations, design and documentation, financing, and construction*. What ties these frameworks together is the interdependency of the participating stakeholders in the development process. Ronstedt & Frey (2014) support this argument by claiming hotel planning to be an interdisciplinary task.

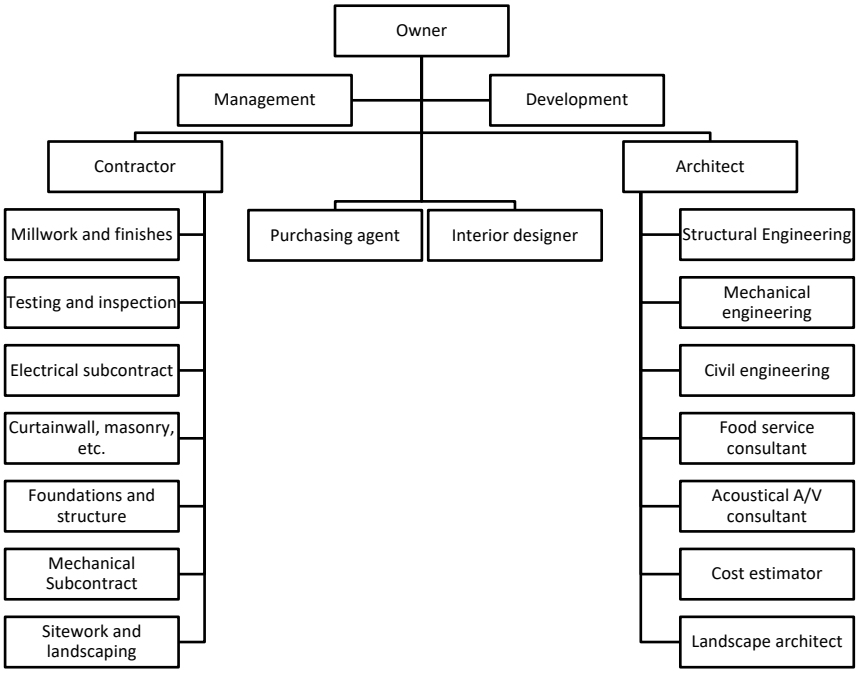

FIGURE 2-2 DEVELOPMENT TEAM FLOWCHART

Source: Rutes et al. (2001) – adapted

To depict and characterize the stakeholders included in the hotel development process, Rutes et al. (2001, p. 326) provide a great starting point (adapted and displayed in Figure 2-2). First and foremost, the three stakeholders on top, namely the *owner*, *management*, and *development* should be clarified. It shall be noted that their taxonomy primarily represents disciplines, not only stakeholders within the process. That is to say that although *owner* and *development* are depicted as separate disciplines, there are certain cases when these may overlap in one stakeholder (for instance, the owner of a project site may decide to develop a hotel with their existing knowhow). Nonetheless it can be agreed that the disciplines can be separated and are necessary for each project. Lawson (1995, p. 91), working with a slightly different theoretical model, states that *"The developer is the person or organization who initiates a project, bringing together the various resources to carry it out (site, finance, professional input)".* O'Fallon & Rutherford (2010) also support the view that the developer is the one initiating projects, taking the risk, and seeking the services of *hotel operators* in the running of the hotel. Going forward it is easiest to make the distinction between *owner* and *developer* by stating that the *developer* partakes in the organization of the project development (implying comprehensive real estate development knowhow) and may at the same time be the owner of that project and an *owner* owns the plot/hotel/project without actively partaking in the development of the property. In the following, when discussing the owner who also develops the property in question, they will be referred to as *owner-developer* in accordance with terminology used in the literature (Evanoff, 2016). *Management* (or an *operator*, or a *tenant*) is the entity principally responsible

for the day-to-day management of the hotel once it is opened as well as the preopening stage (Rutes et al., 2001). The *architect* is responsible to the *owner* and will plan the hotel in accordance with the objectives set forth by the *owner*, the *developer* and the *operator* working with several *subcontractors* (Rutes et al., 2001; Ronstedt & Frey, 2014). The *contractor* is primarily responsible for the implementation of the plans (i.e., the construction) and may work with their own *subcontractors* (Ronstedt & Frey, 2014). The role of the *interior designer* is to devise an interior design coherent with the overall concept of the hotel and are usually employed directly by the *owner* (Rutes et al., 2001). The *purchasing agent* has the practical task of coordinating the purchase and tendering of all FF&E for the hotel project and is employed similarly to the *interior designer* (Rutes et al., 2001).

These stakeholders are linked to each other in a multi-directional manner and rely on each other's knowhow for developing a successful project. As previously discussed, due to the historical development of the hotel industry, stakeholders tend to specialize in their own field of expertise and bring different resources to a project (e.g., capital, development- or operational knowhow) (Bell, 1993; Slattery, 2012). To facilitate the exchange of this knowhow, the parties are bound to each other by various agreements.

The owner-developer and the operator of a hotel foster a close working relationship throughout the life cycle of the property. The degree and nature of collaboration between the parties is highly contingent on the type of operating agreement that they chose to regulate their relationship (Ronstedt & Frey, 2014). Hotel management agreements have already been mentioned as the definitive agreement which separated ownership from operations (Bell, 1993; Slattery, 2012). In this setup, the owner of a property hires a professional hotel operator to manage the hotel on the owner's behalf, earning a management fee (usually a percentage of revenues and profit – referred to as *Base-Fee* and *Incentive-Fee* respectively) leaving risks associated with the real estate as well as the operations with the owner (Bell, 1993; Rouse, 2004; Bader & Lababedi, 2007; deRoos, 2010; Slattery, 2012). Another setup, more common in the German-speaking world, is the lessee-tenant relationship between owners and operators instituted by lease agreements (Slattery, 2012; Ronstedt & Frey, 2014; Evanoff, 2016). Lease agreements, in the classical sense, require the payment of a fixed fee (lease or rent) by the operator (tenant) to the owner, thereby placing the operational risk fully on the hotel operator (Bell, 1993; Slattery, 2012; deRoos, 2011a). Hybrid arrangements, such as lease agreements with variable rent contingent on hotel operating results, seek to balance the risk between owner and operator (while offering tax and accounting benefits in some cases) (deRoos, 2011a). To further facilitate their expansion, hotel groups embraced the franchising models for some of their brands – initially in the selected service category (Bell, 1993). In this setup, the hotel chains act as franchisors and provide the brand license to an operator under a franchise agreement, who will manage the hotel under the licensed brand, having access to some of the franchisor's resources (e.g., reservation system, market data, standards) in exchange for various fees set forth in the franchise

agreement (e.g., license fee, marketing contribution fee, loyalty program fee) (Udell, 1972; Bell, 1993; deRoos, 2011a). There are two relevant variations within the franchising model. The franchisee may be either the owner of the property, should they feel that they have the capability to successfully manage a hotel, but need a known brand and tried-and-tested operating formulas, or it could be a third-party hotel operator (a white label hotel operator) who operate the hotel under a franchise agreement with the franchisor and a lease or management agreement with the owner of the property (deRoos, 2011a).

Although responsible for the operation of the hotel in the long term, the hotel operator (as well as the franchisor, if applicable) plays a crucial role during the development process by providing specialist knowledge on a variety of topics (Rutes et al., 2001; Penner, 2004). Standardization of hotel brands is a historical phenomenon and a logical prerequisite for worldwide expansion by hotel chains (Bell, 1993; Rutes et al., 2001; Ransley, 2004). Brand standards are usually set forth in construction guides or design manuals by the hotel chain in question, including the minimum necessary technical requirements as well as the desired outcome in less concrete terms (Penner, 2004; Ronstedt & Frey, 2014) In order to maintain these brand standards consistently in each project, most hotel chains tend to insist on a TSA (Technical Services Agreement) with the owner-developers. In exchange for a technical services fee, usually defined as a fix sum per unit (room or key), the operator supplies brand-specific knowhow and supervises the development, with specific focus on the planning, construction and fit-out and ensures that the completed project meets all brand standards (Rutes et al., 2001; Evanoff, 2016). It is via this agreement that the hotel operator, who understands guest needs and has extensive experience with the brand in question, can influence the physical characteristics of the real estate. The supplied services within the TSA include but are not limited to technical specifications, such as the number and size of rooms, minimum needed service and BOH area, circulation, fire and life safety standards, required IT systems and revision (Rutes et al., 2001). Evanoff (2016) argues that the knowhow supplied by some hotel chains during this process is highly valuable to the owner-developer, as for a relatively moderate fee they have the extensive assistance of the operator's experienced technical and design team, while Ronstedt & Frey (2014) express their critique on the matter. The likely difference lies most probably in the degree of experience with hotel projects of the architect and the owner-developer. It must be noted, that in private hotel projects, or in projects without an international operator requiring the official TSA structure, this exchange of knowledge is still likely to take place, albeit in a less regulated and structured manner.

As mentioned earlier, the architect is appointed by the owner-developer and is mainly responsible for the planning of the hotel and may work with a several subcontracted specialized consultants (Rutes et al., 2001; Ronstedt & Frey, 2014). Ransley (2004) depicts the architect as a part of the overall design team, in which their objective is to create the plans and layouts, chose the materials and form the overall appearance of the overall product. Categorized by Rutes et al. (2001), the architect's basic services include the preparation of a schematic design (rough

basic plans – to be approved by the owner-developer), design development, construction documentation (detailed planning) and monitoring the construction phase, making necessary modifications to the plan. The importance of a clear brief (preferably included in the architect's contract) is highlighted in the literature, as this document solidifies the desires and objectives of the owner-developer as well as the operator of the hotel (Ransley, 2004; Ronstedt & Frey, 2014). The architect's objective (contained in the brief) is to balance image, style, operating efficiency, and customer comfort according to Ransley (2004). A broader perspective on the architect's objectives is that they must plan the hotel taking into all criteria directed by brand standards as well as the local building regulations, while working within the budget constraints of the owner-operator (Ronstedt & Frey, 2014). In evaluating stages of the architect's work, Ronstedt & Frey (2014)'s classification is the most suitable, not only because it is the most recent, but because they approach the topic from an architect's perspective. Their approach is to define a five-step process which will be executed by the architect**.** The first one revolves around area planning, whereby the architect (relying extensively on input from the operator) will have to consider the space allocation mainly dictated by brand standards, the characteristics of the site as well as other objectives such as achieving the desired room-mix (Ronstedt & Frey, 2014). In the second step, building regulations will be verified by the architect, which include a plethora of categories including fire- life- and safety ordinances and general construction ordinances (Ronstedt & Frey, 2014). In the third step, the architect will develop a cost budget, which will serve as a crucial cornerstone document in the feasibility analysis (Ronstedt & Frey, 2014). In the fourth step, the architect (again based on extensive collaboration with the operator) will optimize the designed spaces from a functional perspective (Ronstedt & Frey, 2014). Once the previous stages of the planning are complete, the architect will proceed to develop the detailed design including floor-plans and the plans of the individual rooms or units (Ronstedt & Frey, 2014). Ransley (2004) places emphasis on the architect's role as a coordinator within the design team, who absorbs input from- and provides input to other team members, such as the interior designer, various consultants and engineers and consolidates these in the final design. It must be noted, that although the above-mentioned sequences are suggested by the literature as the optimum solution, in practice, a number of deviations from these steps are possible.

The interior designer (similarly to the architect) is commonly contracted directly by the owner and must collaborate closely with the architect to achieve the objectives set forth in the brief and create a cohesive product (Rutes et al., 2001). The interior designer's work must be conveyed to the architect for the overall plans to accommodate the interior design (e.g., electrical outlets, fixtures etc.) before the construction phase (Ronstedt & Frey, 2014). The interior designer's scope of work includes the areas of FF&E, finishes, graphics, uniforms, and some OS&E items; for which they require the assistance of specialist sub-contractors or consultants (Rutes et al., 2001). It is furthermore the interior designer's responsibility to consider their allocated budget and achieve the desired quality/image within that budget (Rutes et al., 2001). In accordance with the central and interconnected nature of the interior designer's work, as well as their

contractual obligations, approval for their designs must be received from the owner and the operator (Rutes et al., 2001). The creation of a mock-up room or a prototype room, is common practice which provides the opportunity to adjust the interior design based on the feedback of the owner-developer and the operator prior to final approval (Penner, 2004).

As indicated in Figure 2-2, the number of subcontractors and specialized consultants can be significant. Although these subcontractors provide expertise which are necessary for satisfying the increasingly sophisticated standards, there are possible overlaps in the provided services, causing a coordinative and budgetary strain on the project (Lawson, 1995; Rutes et al., 2001). According to Lawson (1995) it is the developer's role (and expertise) to be able to coordinate contractors in a way, that such costs and overlaps are minimized or avoided altogether.

The role of specialized tourism consultants, although absent from Figure 2-2, should also be mentioned, as they can have a significant impact on hotel projects, especially during the early stages. These specialized, independent consultants are usually hired by the developer and tasked with carrying out a *market feasibility study* (Rutes et al., 2001). The feasibility study serves as a document on which the involved parties rely for various reasons (Ward, 2004). As the success of a hotel business is decided by how well the product caters to market needs, one of the main objectives of the feasibility study is mapping the quantity and quality of supply and demand and proposing a matching hotel product which would be competitively positioned in the market (Lawson, 1995; Rutes et al., 2001; Ward, 2004). The feasibility study also contributes towards a better brief for the architect, especially in describing the product that the market needs as well as facilities that may draw guests in a given location (Ward, 2004). The feasibility study is also used for financing reasons, providing banks and potential lenders with information and justifications about the proposed project (Ward, 2004). Feasibility studies also provide information to local governments and municipalities during the permitting stage as well as to potential hotel operators during the negotiation phase (Ward, 2004). Some raise the criticism that the main objective of a feasibility study is projecting a favorable picture of the project to facilitate the obtainment of financing and neglects critical assessment of the actual feasibility (Rutes et al., 2001). Part of this observation is countered by the argument, that feasibility studies rarely state that a hotel project is not feasible, but rather try to steer projects towards feasibility, with consultants suggesting changes in order to meet market demand (Ward, 2004).

In summary, the collaboration of numerous specialized parties is necessary for successful hotel projects, as it is rather rare that one party would possess the knowhow needed for the development of a hotel property. In developing the hotel, the operator and the owner-operator will likely have some conflicts of interests due to their contrasting operating philosophies and objectives, however, the likeliness of conflict varies with the type of contract between the parties (Broten, 1962). One of the inherent conflicts of interest arise from the developer's goal to develop a building at minimum costs and the operator's concern about the attractiveness and operability of the property impacting their ability to market and operate the hotel successfully

(Broten, 1962). The architect often plays an intermediary role, attempting to balance operating and investment aspects of the proposed construct (Broten, 1962). These setups give way to other potential conflicts of interest or misalignments between objectives. One example would be compromises made in construction quality of a building when the developer has a forward-sale in sight (Broten, 1962).

2.2.3 Viability of hotel projects

The previous sections sought to introduce the initial stages of the hotel development process and conduct a brief stakeholder analysis to create a clear background to the following discussion on the topic of space efficiency. It has also been made clear, that throughout these processes, specialized stakeholders work towards a common goal (albeit sometimes with varying interests) which is the development of a hotel property. In this section, a somewhat broader perspective will be employed to gather the various factors that make a project viable. Based on the above discussion, viability of a project would mean that all the involved stakeholders are committed to pursuing the development, as they see it desirable for their own purposes. In overly simplistic terms, this would mean, that the owner-developer is confident that their venture will be rewarded with a profit (either by holding or by selling the asset) and the operator is confident that they will be able to successfully operate the property in the market, thereby earning themselves a higher management fee or an acceptable profit below their lease expenses. Literature supports this argument by highlighting the need of having the *financial*, *development* and *operational objectives* simultaneously in mind as the three pillars of successful hotel real estate projects (Baltin et al, 1999, cited by Venter & Cloete, 2007). This is in line with the assessment of Rutes et al. (2001), who state that defining facilities, financial analysis and detailed facility planning are crucial steps in developing successful hotel properties. Although the focus of this thesis is on the real estate element of the hotel business, these three aspects are interwoven to such a degree that they all must be understood separately to be able to fully grasp the viability of a hotel project. The creation of feasibility studies by independent consultants is commonplace in hotel development, and these documents focus precisely on the above-mentioned aspects Rutes et al. (2001). Venter & Cloete (2007), in line with Rutes et al. (2001) and Ransley & Ingram (2004) define *financial*, *market*, *physical*, *macro-environment* as the main topics covered by feasibility studies. A focus on market- and financial feasibility is highlighted by Ward (2004) as the defining objective which should guide hotel project.

Financial objectives are crucial for the owner-developer to assess in any real estate project and are not necessarily unique to the hotel industry. For each real estate project, several asset classes (or alternative uses) may be considered, and it is up to the developer to decide, based upon estimated returns and suitability, which asset class to develop (de Roos, 2004; Ward, 2004). Considerations include the calculation of necessary investments, expected (versus acceptable) returns, mode of financing, etc. (Baltin et al, 1999, cited by Venter & Cloete, 2007). At this point it is important to note that the valuation of a hotel property is commonly based on the

property's ability to generate future cashflows for its owner (Broten 1962; de Roos, 2004, Ransley, 2004). Although hotels are considered a relatively risky asset class due to the nature of hospitality products, its high investment costs, and project-related risks, they also offer potentially high returns (de Roos, 2004). During the feasibility process it will be estimated whether the property will be able to generate sufficient returns, acceptable for the project initiator. This phase has also been referred to as the *financial feasibility assessment* and it is influenced by a wide variety of decisions by the owner-developer (Venter & Cloete, 2007). Ransley & Ingram (2004) point to the emergence of highly standardized and cost-efficient midscale hotel brands during the late 20th century as a necessary move by hotel operators to create products that provide relatively short-term returns, thereby making hotels a more competitive asset class in the eyes of real estate developers. As financial returns depend on the relation between invested capital and bottom-line income, it is in all parties' interests for a hotel property to be cost-efficient to develop, operationally efficient, while appealing to its target market (Ransley, 2004). Although interests may vary depending on the type of contractual relationship between the owner-developer and the operator of the property, the argument holds in all cases; in case of management agreements, bottom-line profits are attributable to the owner, while in case of lease agreements, a higher level of lease to the owner-developer is justified in exchange for a building that is efficient to operate. There are, therefore, two sides to the equation which defines returns for the owner-developer, income, and capital expenses. Looking at the expense-side of this equation, construction costs make up a significant proportion (around 50-70%) of the initial capital expenditures and are therefore crucial to be managed in the quest for increased profitability (Rutes et al., 2001; Rawlinson, 2004). Ronstedt & Frey (2014) point out that *building volume* is the main driver of construction costs, therefore efficient planning of facilities is of essence. Rawlinson (2004) identifies several cost drivers, such as the inclusion of leisure facilities, costly FF&E, increased number of external walls and windows, and the increased number of floors in the building. Some procedural cost drivers are also apparent such as unforeseen changes in the planning or deviation from the project brief (Rawlinson, 2004). Absolute measures must be avoided regarding cost reduction, as increased costs and potential inefficiencies may be acceptable if there is a commercial justification (e.g., spa in a 5-star hotel, which is required as per hotel standard and drives average room rate) (Rawlinson, 2004). Ultimately, hotel design must balance appealing to the target market and fulfilling guests' needs in accordance with the proposed product (Baltin & Cole, 1995; Siguaw & Enz, 1999; Penner, 2004; Rawlinson, 2004; Venter & Cloete, 2007) and reducing construction costs (Rawlinson, 2004; Venter & Cloete, 2007; Rutes et al., 2001; Ronstedt & Frey, 2014). Among systematic methods to reducing costs are hiring the services of a cost consultant, investing enough time and effort during the initial phases to formulating a detailed project brief which avoids misunderstandings and changes, value management (focusing limited resources on main objectives of a project and striving for utility) (Rawlinson, 2004).Turning to the income side of the theoretical equation, there are a number of objectives stakeholders have to keep in mind during the initial planning phases to increase the financial viability of the hotel project. As discussed earlier, with property

value being a function of income (Broten 1962; de Roos, 2004, Ransley, 2004), the property will ultimately have to be able to generate the adequate level of revenues by fulfilling guest standards (Baltin & Cole, 1995; Siguaw & Enz, 1999; Penner, 2004; Rawlinson, 2004; Venter & Cloete, 2007), implying that a certain level of ADR and occupancy will be attainable by the hotel operator as by the good management of a well-developed property. While good management will likely reach the level of income, per guest or per room, attainable based on the market and the positioning, there are some ways the ability to increase the bottom line can be linked to the planning and development process. Such ways include planning and developing a hotel in a way that is rooted in market analysis and guest segmentation from the outset, intelligence likely to be supplied by the hotel operator or a hotel-savvy owner-developer (Baltin & Cole, 1995). Rutes et al. (2001) and Ronstedt & Frey (2014) mention maximizing the number of marketable guest rooms (up to an extent which makes commercial sense based on the market study) and the reduction of non-utilized space as practices which focus construction costs on revenue-generating spaces.

Development objectives are more concerned with the mapping potential risks and opportunities connected to the real estate development process (Baltin et al, 1999, cited by Venter & Cloete, 2007) and represent an equally relevant aspect for the viability of a hotel project. The opportunities a plot or an existing building offers will likely be limited by constraints, such as physical attributes (size), suitability as a hotel property, applicable zoning regulations, government or municipal directives, and construction costs (Baltin et al, 1999, cited by Venter & Cloete, 2007). Suitability of a plot or real estate to be developed as a hotel has been touched upon earlier, when discussing the best use of a real estate from the developer's point of view (de Roos, 2004; Ward, 2004). Questions, such as whether a hotel fits into-, and benefits from the location are assessed during the feasibility process (more specifically in feasibility studies) (Ward, 2004). Should it be established, that a plot is suitable for a hotel property, feasibility analysis should also consider the number of buildable units (rooms) as a function of plot size, physical attributes, building regulations and commercial goals (Ward, 2004). Ronstedt & Frey (2014) as well as Lawson (1995) argue for the maximization of the number of rooms in each property or choosing the smallest possible plot which could accommodate the desired number of rooms, as well as the reduction of building volume to reduce the cost per unit in the development, as key development objectives. As building costs are typically expressed on a per room (or per key) basis, this figure often serves as a crucial indicator in the feasibility of projects (Ronstedt & Frey, 2014). Among the pitfalls related to this benchmark number being excessive Ronstedt & Frey (2014) list increased costs due to the insufficient number of rooms or extensive costs-per-unit due to brand- or category standards, which might not be balanced by achievable returns by the operator. On this topic Broten (1962) emphasizes the role of the architect in development-related issues, by claiming that they should have a proper understanding of hotel operations and focus on functional aspects of the real estate and keep the economy of the designed structure in mind. Broader perspectives call for focusing on the initial planning phase and urge that developers use

this time to map factors which might (positively or negatively) impact their plans (Venter & Cloete, 2007), linking back to the costly nature of changes in and deviations from the original plans. Rutes et al. (2001) point to site selection and the composition of the development team as key development objectives, highlighting the real estate-specific success factors discussed previously, while underlining the importance of the alignment of various disciplines in the team. On the latter point, Venter & Cloete (2007) reiterate several key objectives, such as setting clear overall objectives for the project and making a realistic assumption about the involvement of the various stakeholders throughout the development process. Ward (2004) bridges the gap between development objectives and operational success of a hotel by claiming that thought should be given to choosing and designing facilities of a hotel in a way that responds to the shortcomings of local supply, and thereby creating a market advantage for the hotel property, catering to unfulfilled market needs.

Operational objectives in this context mostly relate to decisions regarding the owner-operator setup, which is contingent on the type of property, the operational knowhow, and the desired degree of involvement of the owner in hotel management. (Baltin et al, 1999, cited by Venter & Cloete, 2007). The various operational setups such as owner-operated properties, management agreements and franchise agreements were discussed in the previous chapters. Operational objectives and related decisions throughout the development process will likely have implications on the operational success of the hotel as well as the balance of financial risk and return for the owner-developer, which is not the main focus of this thesis. Having the operator, regardless of the owner-operator setup, involved in the development process is critical from a real estate planning perspective (Penner, 2004). Hotels require a distinct type of real estate due to the extensive operational specifications both in FOH and BOH facilities, operational planning is an imperative success factor in hotel development (Penner, 2004; Venter & Cloete, 2007; Ronstedt & Frey, 2014). The related operational planning knowhow might come from various sources within the project team. It is considered crucial that the architect has a certain understanding of hotel operations to begin with (Broten, 1962) and that they can work in collaboration with the hotel operator to create efficient functional planning (Ronstedt & Frey, 2014) or optimize the use of space (Ransley, 2004).

Hotel development and the hotel business is commonly cited as interdisciplinary in nature or as multidimensional (Ward, 2004), combining various elements, such as *real estate*, *operations,* and *FF&E* (Venter & Cloete, 2007). This section analyzed the main objectives throughout the development process which further highlighted three distinct areas of focus (Baltin et al, 1999, cited by Venter & Cloete, 2007). One of the main implications is that hotel projects will likely only be viable if all these objectives are met.

2.3 Space efficiency and the use of space in hotel development

After having established the basic processes within hotel development, the use of space and the notion of space efficiency should be introduced. The preceding discussion shone light on the various aspects and interests balanced in hotel development, such as building costs, adhering to the development program, as well as quality and brand-related specifications (Lawson, 1995; Rawlinson, 2004). As established, hotel design must appeal to the target market and be compatible with the proposed product (Baltin & Cole, 1995; Siguaw & Enz, 1999; Penner, 2004; Ransley, 2004; Rawlinson, 2004; Venter & Cloete, 2007) and do so while minimizing investment costs, thereby increasing ROI for the owner-developer (Rawlinson, 2004; Venter & Cloete, 2007; Rutes et al., 2001; Ronstedt & Frey, 2014). Although hotel design has various elements (one might think of astonishing visualizations, mood boards etc.), decisions regarding the use of space are at the core of the planning process. *Functional area planning* has been identified among the initial stages of the hotel development process and Ronstedt & Frey (2014) further emphasize the development flowcharts for defining the functional use of space within the hotel property and state that drawing-based (visual) plans should only be developed once functionality has been defined. Defining spaces within hotels can be done along departmental lines (i.e., guestrooms, F&B, public areas, BOH) or categorized based on function, including *revenue-generating*, *cost-contributing*, *non-revenue-generating* and *operational support areas* (Laswon, 1995). These areas within the hotel will likely vary across different properties due to the location, standards, positioning, and the offered facilities (Lawson, 1995). Having to plan along these lines, various projects will have different levels of space requirements. While some properties, such as resorts, will occupy extensive areas due to their facilities and the need to create a sense of privacy for guests, budget hotels in dense urban areas are geared towards making the most of the space available and balance space efficiency with hotel standards.

Space efficiency, therefore, is a crucial factor and indicator in hotel development. The achievable number of rooms will be naturally limited by site characteristics, regulations, and the budget, beyond which the ideal room count will have to be defined during the feasibility process (Rutes et al., 2001). As a general rule, however, designers will strive to maximize the space allocated to revenue-generating spaces, most importantly to rooms (Rutes et al., 2001). Among these physical and market-related limitations, designers will work to optimize the construct and achieve targets set by the brief. Minimizing building volume without hindering the envisioned hotel product is one of the main ways to optimize construction costs for a project (Rutes et al., 2001; Ronstedt & Frey, 2014). Such hinderances are likely to arise during the initial phases of the planning process such as neglecting BOH, technical, and circulation areas creating operational bottlenecks in the structure, frustrating guests during their stays and hindering safety (Ransley, 2004; Rutes et al., 2001). Minimizing the space requirements have previously been identified as a driver for lower cost intensity among budget hotels, in turn decreasing development risks and facilitating access to financing for the developer (Blanco et al., 2011; Ronstedt & Frey, 2014).

Beyond these criteria, designers and interior designers should strive for making the best use of the available space and minimize construction costs (Ransley, 2004; Ronstedt & Frey, 2014), as extensive spaces without purpose are inefficient.

Given the central role the use of space plays in the viability and efficiency of hotel properties, the notion of space efficiency shall be further inspected. The following pages are dedicated to exploring the various approaches to defining space efficiency and the varying the use of space across concepts. Some modern-day industry best practices of space efficiency will also be introduced from literature, as well from existing hotel development standards published by hotel brands.

2.3.1 Definitions of space efficiency

As observed in the previous sections, stakeholders within the hotel development process may have diverging interests. As such, they may also have a diverging opinion concerning the use of space. While a hotelier could insist that a spa with treatment rooms is a necessary facility to have at the property, the developer will likely need convincing that developing additional facilities (i.e., capital investment) will drive higher revenues and could translate into a higher return on their investment, or in the words of Ransley & Ingram (2001, p. 80) *"For the investor/operator constantly seeking higher financial returns, the twin scales of form and function, therefore, will remain firmly linked to cost"*. It is therefore advisable to start by exploring the various interpretations of space efficiency and "good" use of space in the literature. Although many of these interpretations may represent parts of the same "space-efficient concepts" they are often put forward by different stakeholders, motivated by different goals. Circling the term space efficiency this way should also help in distinguishing space-efficient industry practices from instances in which the term is being used as a buzzword.

One common and basic definition of space efficiency in real estate (not specific only to hotel properties) relates to the ratio between useful and total space (Marmot, 2006). In commercial real estate, however, the broad use of this KPI is limited, as it does not consider the utilization of the property in question. Relevant KPIs for space efficiency based on the relation between useful and total space differs between various asset classes. While in case of office buildings, area per worker may be used to express relative efficiency of a building (Miller, 2013), the hotel industry typically uses various benchmarks expressed on a per-room-basis, as guestrooms are the basic revenue generating units of the building (Broten, 1962; Rutes et al, 2001; Ronstedt & Frey, 2014). Average room size is quite an important figure in hotel development, with the differences between room sizes in various categories being quite significant (Lawson, 1995; Rutes et al., 2001; Ronstedt & Frey, 2014). This metric, however, fails to consider areas outside of the guestrooms. Gross floor area per guestroom on the other hand incudes both guestroom and public spaces and is a widely used metric gauging the use of overall space in hotel building (Ronsted & Frey, 2014) and is considered a crucial indicator during the feasibility process

(Lawson, 1995). It is widely observable, that hotels in lower categories have smaller rooms and a smaller extent of public areas, as they offer fewer facilities than hotels in higher categories or resort hotels do (Lawson, 1995; Baud-Bovy & Lawson, 1998; Rutes et al., 2001; Blanco et al., 2011; Ronstedt & Frey, 2014). *"Total area per room will depend on the extent of public facilities offered. These are dictated by location and marketing requirements"* (Lawson, 1995, p. 117). This suggests that there are limitations to space efficiency in this sense, as certain standards and expectations will have to be met in the different segments and balanced by a higher income. The ability to compare relative space efficiency between various hotel categories is also limited due to the discrepancy in objectives. The notion tying these metrics together is the objective to maximize useful space. Inspecting the change in square meters per gross floor area is a useful benchmarking tool, however, as Ronstedt & Frey (2014, p. 92) point out, *"It is not the gross floor area but the number of rooms which are to be built that is important for assessing site utilization"* moving the focus to the guestroom as a valuable revenue-producing unit. When discussing existing properties, where the general layout of the building is a given, Ransley & Ingram (2001) highlight the asset management practice of converting non-revenue generating spaces to increase the owner's yield and income for the operator. Such practices are widely observable in contemporary hotel concepts, such as small retail areas in awkwardly placed corners or the transformation of the standard lobby sitting area into a lean grab-and-go F&B unit. Such practices will be further discussed in the next sections.

Ransley & Ingram (2001) consider cost a good indicator of effective design. This view on space efficiency, best characterized as cost optimalization by the selective reduction of space (Rutes et al, 2001) and is quite closely related to the maximization of useful space. By reducing the extent of non-useful space (space not generating revenue or supporting operations) and therefore overall build area, construction costs per unit can be reduced, increasing the feasibility of the project for the developer (Ransley & Ingram, 2011). While construction costs increase by build area and represent the largest expense in the hotel development process, initial FF&E investment constitutes a significant expense, estimated at around 30-35% of total construction costs (Lawson, 1995; Ransley & Ingram, 2011) and a further annual 3% of total hotel revenues for the FF&E maintenance reserve during the lifetime of the property (Ransley & Ingram, 2011). Therefore, the reduction of superfluous FF&E and unnecessary spaces optimizes costs to a significant degree. It must be stressed, that this interpretation of space efficiency does not contradict the previously mentioned objective to maximize useful space, it rather complements it. Selective space reduction will be discussed in the coming sections in more detail as it spans almost all areas of the hotel and is central in modern hotel concepts.

There are multiple interpretations of the term space efficiency in the hotel business. So far, interpretations connected to the expanse of spaces have been discussed. Moving beyond this, a further interpretation, which have been receiving increasing attention as of late, is the flexibility of space. There are several approaches to defining flexibility, including adding multiple functions

to a single space or enlarging and reducing spaces to fit demand fluctuations. In a publication on the future of hotel concepts, Deloitte Consulting LLP (2016) explain that traditional hotel spaces have evolved to have a specific function per space, a concept which poses inflexibility and the necessity to develop additional space for additional facilities. Looking to future concepts based on the current trends, they foresee the embracement of more flexible use of spaces by the industry, such as using spaces for multiple purposes. A practical example, which is being used by individual as well as chain hotels, would include combining the bar and reception which turns the lobby lounge area as a sitting area for the bar allows for combining bar and reception staff. Staying with the example of public spaces, lobbies, for instance, have long been seen as areas designed as a hub for multiple facilities (Lawson, 1995; Rutes et al, 2001), however, it is an observable trend, that these facilities are more seamlessly integrated in public spaces (Deloitte Consulting LLP, 2016) allowing for a more flexible and fluid use of space. Lin (2011), in a master's dissertation in architecture, conducted a study investigating flexibility of space from a different perspective. His research centers the viability of developing hotel rooms and public spaces, whose size is adaptable based on demand. The case study is based on the notion of *polyvalence*, which *"[…] refers to buildings that can provide for a variety of different uses without the need to make major changes to the building itself"* Lin (2011, p. 36). A practical example for polyvalence is the ability to accommodate various setups within the same meeting room, depending on seating arrangements (Lin, 2011). As traditional development methods would require the architect to plan for maximum expected capacity, this would logically mean that during times of low demand, rooms and public spaces would be idle and there would be significant excess capacity. In essence, polyvalence assesses this inherent issue of fluctuating demand in rooms and public areas and the perishability of the hotel product by requiring less space to be developed. Practical applications of polyvalence will be discussed in the next sections.

In assessing the best use of a plot or a property, considering the creation synergies during the feasibility and planning stages can have impacts on the end-product. Mixed-use real estate developments combine various types of real estate asset classes in one project work on the principle of clustering demand generators and creating a higher utility than the sum of their parts (Rabianski et al, 2009; Ransley & Ingram, 2011). Similar positive effects have been discussed by industry professionals in case of hotels (Higgins, 2007), however, it is the underlying principle of mixed-use developments that is of interest while discussing the efficient use of hotel space. The extent and quality of the proposed facilities (e.g., restaurant, conference facilities) will be defined during the feasibility analysis, following a supply-and demand analysis by the consultant (Rutes et al, 2001). Some facilities may drive demand from outside the hotel (e.g., downtown hotel with a well-known bar or restaurant) or be the USPs of the hotel which attract guests in the first place, therefore removing them from the development on grounds of cost saving would be counterproductive. Research has examined the effect of meeting space capacity on operational performance and has found that meeting capacity has a positive influence on performance only in case the hotel has a high volume of it, while at low levels of meeting space, the

effect has been negative (Madanoglu & Ozdemir, 2016). This tradeoff between the increased construction cost of additional facilities and the possible positive impact on operating performance will be assessed by the primary research conducted in this thesis.

2.3.2 Use of space across various concepts

Hotel products are not uniform, rather there are several product types and grades. While discussing space requirements for hotel products, one must take such differences into account. Even in case of chain hotel products, there are discrepancies in standards based on geographic location, reflecting different guest needs (Baud-Bovy & Lawson, 1998). This section will attempt to map space requirement across various concepts and provide explanations regarding the apparent differences.

The question of what the concept or grade of a hotel is, is increasingly difficult to answer clearly. Truth of the matter is, there are trends today which are creating sub-categories for hotel products, but this does not mean a departure from an otherwise clear and broadly accepted segmentation of hotel products. Creating a universal categorization (or grading) scheme for hotels has never truly been achieved, as Lawson (1995, p. 5) observes *"In 1995, there were over 100 classification systems in operation".* The advent of the internet has brought about additional classification systems and further obscured the overview of hotel concepts (Minazzi, 2010; Sufi & Singh, 2018). Assessing the variation between different concepts will therefore be based on the positioning by operators rather than any third-party classification. As it can be seen in Table 2-1, Accor for instance, categorize their brands in a matrix consisting of comfort level and positioning, rather than on a linear scale, whereby comfort level corresponds to more established and historically used categories.

	Classic	**Collections**	**Lifestyle**	**Resorts**
Economy	Ibis Ibis styles Ibis budget		Greet Jo&Joe	
Midscale	Novotel Mercure		Mama Shelter Tribe	
Premium	Pullman Swissôtel Mövenpick Grand Mercure	Mantis M Gallery RIC	Mondrian 25h hotels Hyde	Angsana
Luxury	Raffles Fairmont Sofitel	Orient Express The House of Originals	Delano SLS SO/	Banyan Tree Rixos

*note. *Excludes long stay brands as well as private residences*

TABLE 2-1 CURRENT BRANDS OF THE ACCOR HOTEL GROUP CATEGORIZED BY POSITIONING

Source: Accor (2020)

The metric of TGFA per hotel room, on the other hand, has been identified as a consistently used KPI in literature (Lawson, 1995; Baud-Bovy & Lawson, 1998; Rutes et al., 2001; Ronstedt & Frey,

2014) as well as in the hotel industry broadly, which allows the comparison of different hotel products' space requirements. Beyond the necessity to plan adequate spaces to match the hotel category's minimum required standards, there are further factors influencing room sizes and TGFA. Among these factors are market emphasis and constraints of the given real estate (Baud-Bovy & Lawson, 1998; Penner, 2004; Ransley, 2004). With different classifications, scholars compared various concepts based on the total space requirement per guestroom, as summarized in Table 2-2.

		TGFA/room (m^2)	Average net room size (m^2)
Lawson (1995)	Budget inn	33	21,7
	Resort village	44	27
	Commercial/motor hotel	44,3	25,2
	Business hotel (high-class)	62,1	30
	Resort (high-class)	63	29,88
	Deluxe (5 star)	75	36
Baud-Bovy & Lawson (1998)	Economy (1 star)*	27,5	17,5
	Some comfort (2 stars)	35	21,7
	Average comfort (3 stars)	45	25,2
	High comfort (4 stars)	62	30
	Deluxe (5 stars)	75	36
Rutes et al. (2001)	Roadside inn (mid-scale)	50	29
	Roadside inn (first-class)	65	32
	Convention hotel (first-class)	79	32
	Resort hotel (luxury)	97	39
Ronsted & Frey (2014)	Low budget (2 stars)	15-20	17,5
	Standard (3 stars)	40-60	19
	Comfort (3-4 stars)	50-60	24
	First class (4 stars)	60-70	29
	Luxury (5 stars)	90-110	min. 35,7

Note: *shared shower or bathrooms

TABLE 2-2 DIFFERENCES BETWEEN SPACE REQUIREMENTS ACROSS VARIOUS HOTEL CONCEPTS

Source: Lawson (1995); Baud-Bovy & Lawson (1998); Rutes et al. (2001); Ronstedt & Frey (2014)

Being mindful of the differences between definitions used for hotel grades, the general observation holds, that average room size increases with the grade of the hotel, as does the TGFA per room ratio. Logically, hotels with extensive additional facilities, such as resorts or conference hotels have a high TGFA per room ratio, not necessarily attributable to the size of rooms but to the extent of their public areas. Due to the varied categorization used across literature, it would be careless to draw far-reaching conclusions about the historical progression of space usage,

however, there are some interesting observations that can be made. Baud-Bovy & Lawson (1998) observes an average room size for the lowest-grade hotels with private bathrooms of 21,7 m^2 and a TGFA per room of 35 m^2, while Ronstedt & Frey (2014) place these figures at 17,5 m^2 and 15-20 m^2 respectively. Although differences in the average room size may be put down to the fact that hotel rooms in America and developing countries are around 5-10% larger (Baud-Bovy & Lawson, 1998), the difference in the TGFA per room would still mean a notable reduction over time. Furthermore, comparing three-star hotels, Baud-Bovy & Lawson (1998)'s average room size of 25,2 m^2 is significantly larger than in Ronstedt & Frey (2014)'s estimation, while a notably larger TGFA per room is cited by Ronstedt & Frey (2014) for the same category, pointing to an increase in the share of public spaces. In the higher segments, five-star and resort room sizes seem to have stayed around 36-39 m^2, while an increase in TGFA per room is noticeable, presumably due an increase in the offered facilities.

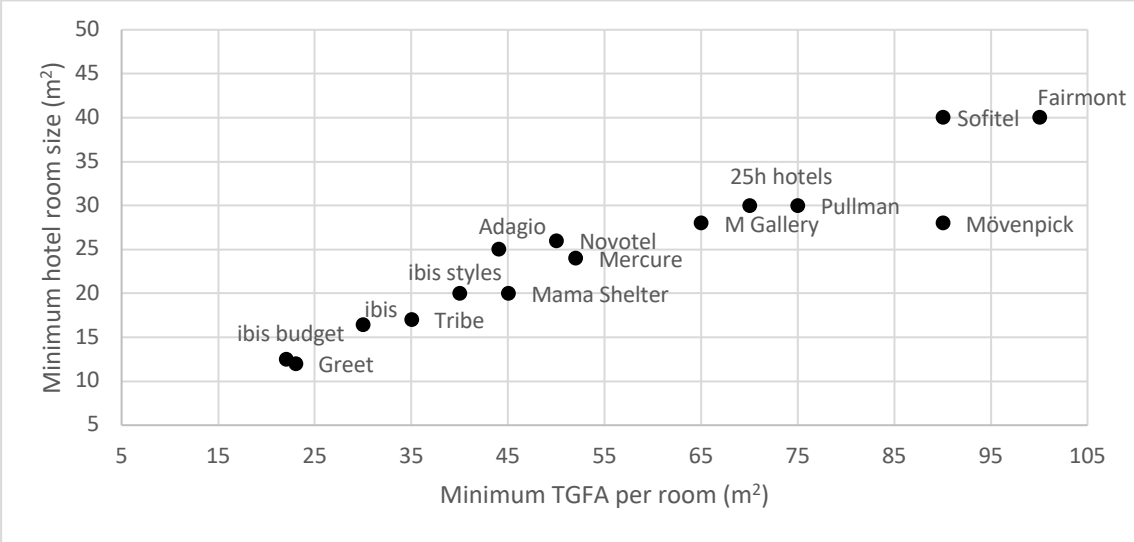

FIGURE 2-3 SPACE REQUIREMENTS BRAND FOR A SELECTION OF ACCOR HOTELS

Source: Accor (2021)

A current example is presented in Figure 2-3, with some of Accor's hotel brands plotted based on their space requirements. The choice of the French hotel group as a benchmark is due to the fact that their figures are published and publicly available. The brands of one hotel group may not be representative of the global industry but can provide a snapshot of current trends in the use of space across segments, especially in case of Accor, who have focused intensely in the past years on acquiring and developing new brands to cover the entirety of the market. A particularly interesting development is the addition of the Greet and Tribe brands to the portfolio, which are positioned as 'lifestyle' and fill the gap between existing products. Indeed, when talking about the hotel development trends in Europe, Blanco et al. (2011) note a sub-segmentation among budget brands, which they consider a response to the need for flexibility by real estate

developers in reaching a desired room count with limited space. Nonetheless, the general rule, that higher-grade hotels require larger rooms and TGFA per room still holds. As Blanco et al. (2011) observes, public areas are a significant cost-driver in hotel development and novel budget hotel brands especially seek to target reducing these (in some cases to 10% of the TGFA) to create financially attractive opportunities for hotel developers. Table 2-3 provides an overview of the proportion various areas occupy across different hotel types. As deRoos (2011b) notes, the category *service areas* are synonymous with *BOH*, with the latter expression being used more frequently as of late.

	Percentage of hotel area		
	Guestrooms	**Public areas**	**Service areas**
Motel, economy hotel	90	5	5
All-suite hotel	80	12	8
Urban business hotel	76	14	11
Resort	70	16	14
Convention hotel	65	20	15

TABLE 2-3 HOTEL SPACE PROGRAM: PERCENTAGE IN GUESTROOMS, PUBLIC, AND SERVICE AREAS

Source: Penner (2004)

The way in which hotel projects utilize space across all segments is significantly formed by their surroundings, as well as architectural constraints (Baud-Bovy & Lawson, 1998; Penner, 2004; Ransley, 2004). Nonetheless, hotel standards in various categories are relatively clearly defined by hotel chains, as these standards should correspond to guest needs. In the following sections, some noteworthy characteristics in various areas of the hotel and across different concepts will be described.

2.3.2.1 Guestroom floors

The term 'guestroom design' refers to the planning of individual rooms with guest comfort, hotel grade standards and compatibility in mind, while 'guestroom floor design' optimizes the use of space and architectural configuration of rooms and facilities. Both processes deserve an increased emphasis in any discussion about hotel spaces, as guestrooms occupy the largest portion of total area regardless of hotel type (Rutes et al., 2001; Penner, 2004; deRoos, 2011b). It has been observed in previous sections dealing with the planning process that the extent of buildable area will be defined by several factors, including site characteristics, building code and the desired number of rooms defined during the feasibility analysis. After the geometry and volume of the building is designed, aiming to achieve the desired number of rooms, and minimizing superfluous and expensive-to-build spaces, architects will plan the floor slab configuration. Floor slab configurations refer to the placement of the corridors, rooms, service areas and stairs on guestroom floors, which has a high impact on the space usage of the building as the layout is replicated on each floor (Lawson, 1995; Rutes et al., 2001; deRoos, 2011b). Basic

difference between slab configurations arises from the loading of the corridors (*single-loaded corridors* have rooms on one side, *double-loaded corridors* have rooms on each side) and the shape of the building (L-shaped, rectangular, circular, offset, or curved, for instance) (Lawson, 1995; Rutes et al., 2001). The choice of the floor slab configuration is influenced by several factors including building and site constraints, land costs, location of the stairs and emergency exits, placement of service areas (e.g., housekeeping storage) or other site and product characteristics (e.g., seaside location with offering an attractive view on one side) (Lawson, 1995; Rutes et al., 2001; deRoos, 2011b).

The largest extent of guestroom floors will be occupied by guestrooms. It is therefore within the design of these individual units, that could potentially provide the highest degree of space saving or wastage. In finding the most efficient guestroom floor design and guestroom design, Ronstedt & Frey (2014), as well as Lawson (1995) highlight that building width, due to the increased extent of external walls, is significantly costlier to construct than building depth and argue that in achieving the desired room size, architects therefore should minimize bay width and increase room depth to an appropriate extent.

Category	Bay width (m)	Room depth (m)	Area incl. bathroom (m^2)
2 stars	3,20	5,75	17,50
3 stars	3,45	5,75	19,00
3-4 stars	3,75	6,65	24,00
4 stars	3,95	7,60	29,00
5 stars	4,40	8,40	35,70

Note: optimal bay widths in city hotels

TABLE 2-4 TYPICAL BAY WIDTHS

Source: Ronstedt & Frey (2014, p. 107)

Bay width, in this context is the width of one standard room and is used as a benchmark by architects during the planning process. Table 2-4, adapted from Ronstedt & Frey (2014) summarizes the variation between hotel types. As a comparison, Rutes et al. (2001) cite similar room widths for the mentioned hotel categories and reiterate that increasing room widths above 4,1 m is not only inefficient due to increased construction costs, but also fails to improve interior arrangements. They also mention, that throughout the years, the tendency has been for budget hotels to reduce room width to optimize construction costs, while hotels in the luxury segment have been experimenting with an increased room width to allow for more exciting room arrangements.

The term *guestroom mix* refers to the number rooms across various categories as well as bed types in those units (Rutes et al., 2001; deRoos, 2011b) and it is defined by the operator, in accordance with brand standards. Considering and adapting the room mix throughout the planning of the guestroom floors will require attention from the hotel operator, architect, and the interior designer. Hotel rooms in different categories will have varying sizes, with their width usually defined in bays, standard rooms having a width of one bay and suites possibly up to multiple bays (Rutes et al., 2001). Some hotels will feature suites in different categories, often with multiple bay widths (Lawson, 1995), separate living-rooms, equipped with flexi-beds (also called murphy beds) (Ronstedt & Frey, 2014). Hotel suites are generally absent from budget hotels, but required in midscale hotels, sometimes referred to as a 'necessary evil' as suites in this category are less sought-after, while they may be effective at generating additional revenue in upscale hotels, where the clientele seeks out higher-category rooms (Ronstedt & Frey, 2014). The room mix will also consider hotel rooms with different bed types and connecting doors, impacting operational flexibility, which in turn will allow or hinder the operator's ability to sell the maximum amount of hotel rooms and to maximize revenue (Rutes et al., 2001).

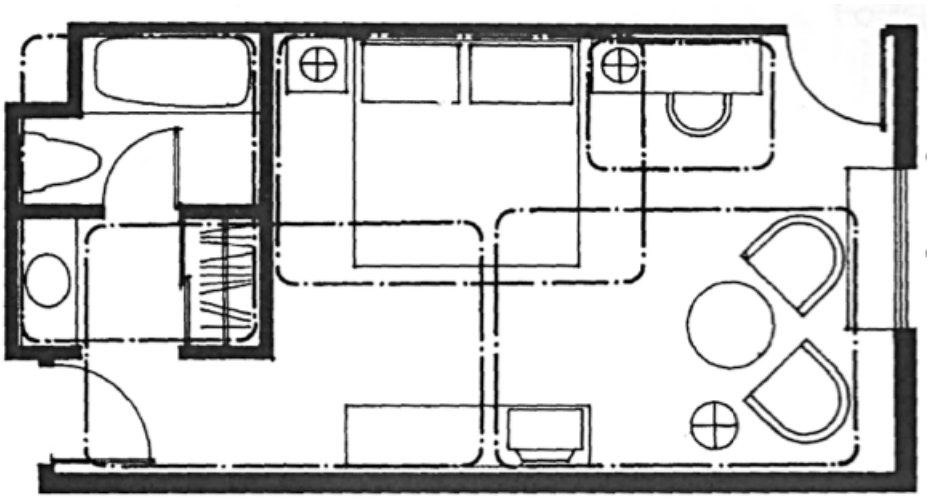

FIGURE 2-4 GUESTROOM ACTIVITY ZONES

Source: Rutes et al. (2001, p. 271)

Having defined the dimensions of guestrooms to fit the overall structure and the selected slab configuration, attention should be turned to how space is utilized within the individual units. The main features and fittings in a hotel room include the bed, a desk, and the bathroom. Lawson (1995), Rutes et al. (2001) and deRoos (2011b), however, highlight the importance of discussing hotel room design with the guests' perspective in mind, namely, focusing not on *what* is in the room, but rather, *how* guests use different areas of the room. An example of these guestroom activity zones is visualized in Figure 2-4, adapted from Rutes et al. (2001, p. 271), where the zones could roughly be characterized as lounging, working, sleeping, entrance and dressing, and the bathroom (deRoos, 2011b). Thinking about guestroom planning through the end-users'

perspective and how the units will be used is beneficial for two reasons. Firstly, while balancing objectives, such as optimizing space and minimizing construction costs, planners' sights should be set on satisfying the guests, an objective difficult to characterize by KPIs, although it should be mentioned, that the largest share of revenue within a hotel is derived from the rooms division (Lawson, 1995). Secondly, understanding what guests use in a hotel room and how they use it provides architects with opportunity to focus on areas of high importance, while possibly minimizing or combining areas which are of no particular utility to the guests. Indeed, a significant difference between hotel segments is that some of these activity zones may be combined or omitted altogether in lower categories, while in the higher segments, where more space is available, they may be optically separated to create a sense of luxury (Lawson, 1995). While some areas may be combined, regardless of hotel segment, there are several areas which should be kept strictly separate, in order not to interfere with one another and to create privacy where needed (Ronstedt & Frey, 2014). As an example, some contemporary hotel designs have experimented with blurring the barrier between the room and the bathroom, by introducing glass walls or open-plan solutions (Rutes et al., 2001), however, these have been criticized for the lack of practicality, as well as for the fact that although seeing the bathroom from the bed seems appealing on an architectural draft, the aesthetics change, once guests have stored their personal items in the carefully designed bathroom (Ronstedt & Frey, 2014).

Layouts of hotel rooms across all categories tend to be similar due to rather standardized room dimensions discussed above, with the bed occupying a central role and influencing options for the remaining available space within the room (Lawson, 1995; Rutes et al., 2001). Bathrooms across all segments are located on the corridor-side of the room to allow the living area to expand along the external wall and window(s) (Lawson, 1995; Ronstedt & Frey, 2014). The bed is then aligned to the longer wall, with its headboard mounted on the wall to save space and hide cables and fixtures, such as reading lamps and electrical outlets and to minimize damages caused by the moving around of furniture by guests or by housekeepers (Lawson, 1995). Ronstedt & Frey (2014) note an exception to this standard layout in case of luxury hotels, where higher room width allows the bed can be rotated, with the headboard mounted on the bathroom wall and allowing for a more creative use of space in the working- and lounging areas of the room. Hotel rooms may have balconies in certain cases; however, Ronstedt & Frey (2014) argue, that this only makes sense in case of holiday hotels. While city hotels may feature balconies as a specific USP, Ronstedt & Frey (2014) criticize the rationale behind the decision to dedicate extra investment for the construction, as guests are unlikely to spend a considerable amount of time enjoying the balcony in a downtown setting.

Differences between various hotel categories in room design are apparent in case of the entrance zones of guestrooms. These areas between the door and the living area of the room, along the bathroom wall are designed for storage on the practical side, and for a sense of arrival on the more abstract side (Ronstedt & Frey, 2014). In terms of storage, a coat rack and hangers

may suffice in some properties, whereas in higher categories and resorts (keeping in mind the longer average length of stay) cupboards are necessary (Ronstedt & Frey, 2014). Alternatively, if the room depth is sufficient, the storage/wardrobe area may also be positioned against the bathroom wall, next to the bed.

The rather uniform positioning of bathrooms across segments have been mentioned previously – bathrooms are positioned on the corridor side and usually in a way which allows neighboring rooms to share service ducts, thereby saving significant amounts of space (Lawson, 1995; Ronstedt & Frey, 2014). However, the actual design of these areas varies based on hotel category. As bathrooms occupy around 16-22% of the total room area (Ronstedt & Frey, 2014), hotels in lower categories, with lower unit sizes must be creative in shrinking the size of their bathrooms, while still satisfying guest demands. Ronstedt & Frey (2014) estimate showers to save about 0,4 m^2 space per unit and therefore they are widely utilized in lower category hotel as opposed to bathtubs. They mention that cultural preferences too, influence the demand for showers and bathtubs, with European guests opting for the former one, a reason for the widespread utilization of showers across higher-category hotels on the continent. It is estimated that hotel guests may spend up to half of the time they spend awake in the bathroom (Ransley & Ingram 2001), it is not surprising then, that many of the amenities offered by hotels are concentrated here, to elevate guest experience (Rutes et al., 2001). Lawson (1995) and Ronstedt & Frey (2014) note that higher category and luxury hotels may use upgraded bathroom design to elevate the guest experience. Examples they mention include featuring both a bath and a shower, placing the toilette in a separate room, including a bidet, a make-up desk, adding more shelves or perhaps even a dressing area, all made possible by the higher footprint of higher-category hotel rooms.

The utilization of the remaining areas, referred to as lounging and working zones in Figure 2-4, is rather diverse across various hotel concepts. Comparison of hotel room plans across various segments by Rutes et al. (2001) provides a great visual example of how increasing floor space is utilized to match the standards of each category. Generally, it can be said that that in lower segments, where less space is available, activity zones tend to be combined, whereas in higher segments and in resorts, where guests are likely to spend more time in their rooms, layouts tend to get more spread out, using separated seating areas and fully-fledged working areas. In higher hotel segments, due to the positioning and higher FF&E costs (Rutes et al., 2001), more furniture is featured to make use of the available space, featuring noticeably more loose furniture compared to lower categories. Some architects have expressed critique on features that are attractive to planners, however, are not used by guests; Ronstedt & Frey (2014) and Lawson (1995) warns that where possible, furniture should be fixed, rather than loose to save space and reduce possible damages caused by furniture being moved around by guests or by housekeeping.

A significant portion of guestroom floors is occupied by circulation, technical and BOH areas. These will be mentioned and assessed in the following sections.

2.3.2.2 Public areas

The lobby, circulation, F&B outlets, function space, and recreational areas are widely understood to be included within the public areas of a hotel (Lawson, 1995; Rutes et al., 2001; Penner, 2004; deRoos, 2011b; Ronstedt & Frey, 2014). The overall extent of public areas depends on the type of hotel, market emphasis, number of rooms, and the extent of external guests expected to use hotel facilities, such as the restaurant of conference space (Lawson, 1995). Penner (2004) highlights, that more than any other factor, the definition and design of public areas stems from operational activities and are refined in the design brief with significant input from the hotel operator. It has previously been touched upon, that the extent of public areas varies greatly between different hotel types (Rutes et al., 2001), with rooms occupying 90% of the total floor area in budget hotels, while they occupy only about 65% of total area in convention hotels for instance (Penner, 2004). The explanation for this is rather straightforward; budget hotels seek to minimize investment costs, while upper-scale hotels and specialized properties, such as convention hotels and resorts need to offer more facilities to appeal to their market segment (Lawson, 1995). Table 2-5, adapted from Rutes et al. (2001), provides an overview of how the extent of public facilities varies depending on hotel types. It must be noted that retail is included in their classification, which although still present in higher-quality hotels today, are not as widespread as they once were (Ronstedt & Frey, 2014).

Hotel type	Lobby	F&B areas	Function spaces	Recreation	Retail
Business (downtown)	Moderate	Small	Varies	Moderate	Moderate
Boutique hotel	Moderate	Small	Small	Small	Small
Suburban hotel	Moderate	Moderate	Moderate	Moderate	Small
Airport hotel	Moderate	Moderate	Large	Small	Small
Roadside inn	Small	Moderate	Small	Small	Small
Resort (golf/beach/tennis)	Moderate	Large	Moderate	Large	Large
Resort (other)	Small	Moderate	Small	Large	Large
Convention hotel	Large	Large	Large	Moderate	Large
All-suite hotel	Moderate	Moderate	Moderate	Moderate	Small
Super-luxury hotel	Small	Moderate	Small	Small	Moderate

Note: 'Small' means lobby < 0,56 m²/room; F&B areas < 0,7 seat/room; function spaces < 2seats/room; recreation area = small pool or health club plus limited other facilities. 'Moderate' stands for lobby 0,55-0,93 m²/room; F&B areas 0,7-1,2 seats/room; function spaces 2-4 seats/room; recreation area = pool and health club plus other facilities. 'Large' indicates lobby > 0,93 m²/room; F&B areas > 1,2 seats/room; function areas > 4 seats/room; recreation areas = extensive facilities.

TABLE 2-5 PUBLIC SPACE MIX

Source: adapted from Rutes et al. (2001, p. 282)

Apart from the varying extent of public areas, different types of hotels will also have these areas designed with a different goal in mind. Penner (2004) and deRoos (2011b) explain this best by

stating that architects must balance two objectives: design and function. According to them, lower scale hotels will focus almost exclusively on function, while upper-scale hotels will increasingly favor design to create the desired ambiance consistent with the positioning of the property.

Regardless of hotel type, a main starting point for the programming and planning of public spaces is understanding underlying operational activities (Penner, 2004), as well as guest and staff traffic flow patterns (Lawson, 1995). This concept, referred to as operational planning is best defined as: *"the concept of organizing the hotel* […] *to meet the requirements of both the user (hotel guest) and operator, rather than principally along aesthetic or design themes"* (Penner, 2004, p. 196). Rutes et al. (2001), Penner (2004), deRoos (2011b) and (Ronstedt & Frey, 2014) highlight the importance of considering how operational activities define the relationship and flow between various spaces in a hotel in a so-called schematic design (Figure 2-5), prior to planning these spaces in detail. The only considerable variation between hotel types in this regard is that hotel chains have a higher standardization when it comes to space programming, seeking to maintain efficiency across their properties (deRoos, 2011b).

2.3.2.2.1 Lobby

Hotel lobbies appeared in hotels as we know them today in the 19th century, as hotels progressed from being standard service providers (inns) to providing various amenities and services to their guests (Penner, 2004). While mainly serving a functional role before that, lobbies were transformed by hotel operators' economic principles in the 1970s (Rutes et al., 2001). In the literature, lobbies are considered to have two main objectives. As hotel lobbies are the first point of contact after entering the hotel, the first, more abstract objective, is to transmit the desired impression to the hotel guests entering the hotel, which is consistent with the hotel positioning; The second objective is a more functional one, namely, to act as circulation hub for both guests and staff, as well as to be a center for all hotel activities (Lawson, 1995; Rutes et al., 2001; Penner, 2004; deRoos, 2011b; Ronstedt & Frey, 2014). With such a dual purpose, lobby design balances transmitting the desired image and functionality (being an effective circulation hub for both guests as well as for FOH and BOH activities) (Rutes et al., 2001). There is general alignment in literature by the above-cited authors that regardless of hotel grade, the main objective for the hotel lobby is to act as an effective circulation hub. As such, hotel facilities will likely be clustered around the lobby to facilitate access for both guests and staff (Rutes et al., 2001; Penner, 2004).

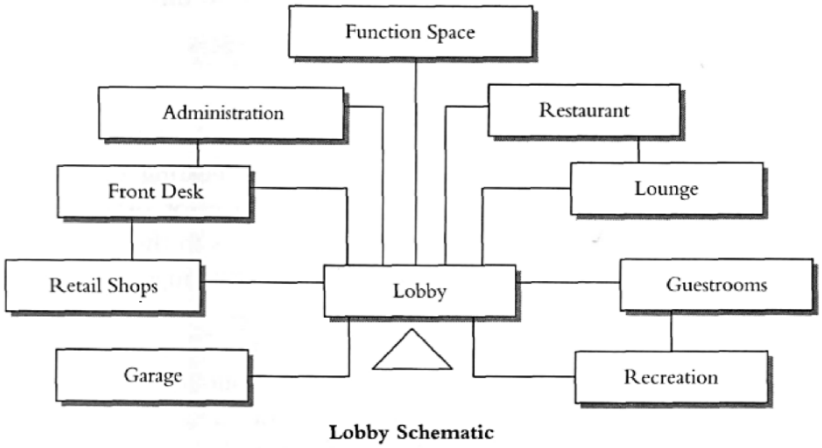

FIGURE 2-5 LOBBY SCHEMATIC

Source: Rutes et al. (2001, p. 311)

As the main elements of the lobby, Lawson (1995) lists areas with a circulation purpose, lounge area (10% of total lobby space), service areas (e.g., public guest restrooms), the front desk, other stations, such as a concierge desk or the bell captain's desk in higher categories, and retail space. Penner (2004) categorizes lobby space similarly stressing the fact that elements, such as a concierge or a bell captain desk are reserved for the higher categories, as are solutions which shift the focus from functionality to creating an impression. While this categorization certainly covers the traditional elements of a hotel lobby, more recent accounts note how certain functions are increasingly omitted. Ronstedt & Frey (2014), focusing on Europe for instance, note that retail space (except for a souvenir stand) makes little sense in hotels regardless of category, as they are mostly hidden from external shoppers.

Consistent with the pattern observable in several other hotel areas, lobby space too, is positively correlated with hotel size and positioning (Lawson, 1995). Ronstedt & Frey (2014) estimate that the lobby area per guestroom is around 0,6-1,0 m^2 in 2-star hotels, 0,8-1,2 m^2 in 3-star hotels, 1,0-1,5 m^2 in 4-star hotels and above 1,5 m^2 in 5-star-properties. The difference in size arises from different functions and facilities added to the lobby to match the requirements of the target market, rather than simply featuring larger lobbies with the same function (Lawson, 1995). This too, is due to the fact that various hotel categories will optimize for different objectives. Lawson (1995) notes that chain budget hotels have a high degree of standardization to maintain a familiar feel, as well as to optimize costs, while luxury hotels will optimize for providing individual attention to guests, and resorts will likely focus on linking their various recreational areas and making these connections visually apparent for the guests. Differences in lobby size are also attributable to the amount of guest flow and market specifics that it is expected to handle (Penner, 2004). While there are rules of thumb, such as including one FO station per fifty guestrooms or 0,05 m^2 of luggage storage space per guestroom, architects must keep in mind that different markets require a deviation from these norms (e.g., resorts need significantly more luggage storage space) (Lawson, 1995).

2.3.2.2.2 Circulation

Circulation areas play an important functional role in hotels, connecting the various functions and outlets of the hotel and make up a significant share of total built area (Lawson, 1995). During the design process convenience, operational efficiency, and safety standards must be considered (Lawson, 1995). Although there is a minimum requirement for safety standards, dictated by local regulation (e.g., minimum corner width, stairwell dimensions or the maximum length dead-end corridors), higher standards may be commanded by the brand or indeed the grade of the hotel (Lawson, 1995; Ronstedt & Frey, 2014). Indeed, the mentioned authors point out that typical corridor width increase with the grade of the hotel, presumably to improve the atmosphere experienced by guests. Lift lobbies or lift landings are considered a necessary space-inefficiency across all categories, as these create distance between the lifts and guest rooms, thereby reducing disturbance (Ronstedt & Frey, 2014). The number of necessary lifts is also tied to expected guest flows, with Ronstedt & Frey (2014) citing a lift per 100 guestrooms as a rule of thumb. Some hotel operators may tie the required number of lifts to expected waiting time by guests. Service lifts (which are accessible from the BOH areas and are used exclusively by the staff) are required above the lower mid-range category (Ronstedt & Frey, 2014).

2.3.2.2.3 F&B outlets

The lobby bar, café/coffeeshop, brasserie, main restaurant, separate (specialty) restaurant, nightclub, main bar, and satellite outlets (e.g., pool bar) are all examples of various F&B outlets (Lawson, 1995). As the bandwidth of different functions suggests, the inclusion of, and the extent of focus on F&B is highly product-specific and remains a differentiating factor for some hotels (Penner, 2004). Due to high overhead costs in its operation, F&B is generally not considered a 'money-maker' compared to the more profitable rooms division (Lawson, 1995) and is therefore minimized in lower-grade hotels (deRoos, 2011b). Such reduction of F&B space can take the form of combining of various functions in one room, which hosts breakfast, and transitions into a restaurant, café, or a bar in the later parts of the day (Penner, 2004; deRoos, 2011b). One of the main objectives of fluid F&B outlets is to consider (changing) eating habits and cater to guests' needs (Rutes et al., 2001). Indeed, research investigating this very question has pointed to the fact that millennials' preferences towards food and eating habits are different to that of their seniors', a change to which the industry reacted by experimenting with alternative F&B concepts, such as 24/7 grab-and-go stations and partnerships with food delivery companies (Mun et al., 2019). The latest concept to emerge due to changing guest preferences (and undoubtedly due to the preference of low-touch solutions after the Covid-19 pandemic) is exemplified by a pilot project by Marriott which seeks to replace the breakfast buffet in some of its properties by a vending machine stocked with warm and cold dishes and beverages (Romeo, 2021). Demand for F&B outlets can be assessed based on market demand and existing competition in the area (Rutes et al., 2001). In certain destinations (e.g., downtown hotels), the hotel bar or restaurant may cater to external guests, as well as hotel guests (Lawson, 1995), creating

additional planning requirements, such as the inclusion of a separate entrance for external guests (Ronstedt & Frey, 2014). The optimal number of F&B outlets will therefore be defined by the operator's degree of focus on gastronomy (Rutes et al., 2001), with some authors noting geographical differences, such as a higher number of F&B outlets per hotel in the Middle East (deRoos, 2011b). While there are some possible synergies, such as positioning outlets in a way that they share BOH facilities (Lawson 1995; Rutes et al., 2001), F&B outlets are generally space intensive, as they require their own planning for circulation and service areas (Lawson, 1995). Sizes of the main hotel F&B outlets serving breakfast, logically change with the size of the hotel, with Ronstedt & Frey (2014) mentioning some yardsticks, such as 0,7 seats per hotel room and 10-12 meters of buffet per 100 seats.

The inclusion of hotel bars, similarly to the extent of focus on F&B is primarily an operating decision (Ronstedt & Frey, 2014). Ronstedt & Frey (2014) characterize hotel bars in three categories; lobby bars, which are part of the reception (typical for lower-grade hotels), a separate bar that also acts as the beverage supplier for the hotel restaurant, and standalone bars, which work independently, often with their own entrance and kitchen. Lawson (1995)'s categorization includes the entertainment lounge and the executive lounge, both quite conservative outlets typical for higher-end hotels. Furthermore Lawson (1995)'s (perhaps somewhat dated) definition of the lobby bar is of an adjacent, but separate outlet in the lobby, occupying approximately 10% of lobby space.

2.3.2.2.4 Function space

The main types of function space are considered to include meeting-rooms, ballrooms, and various other banqueting facilities (Penner, 2004). From an operational viewpoint, function space can be a lucrative addition to a hotel property, especially attracting guests and attendees in the shoulder-season (Lawson 1995; Rutes et al., 2001). According to Ronstedt & Frey (2014)'s assessment, it is the only part of F&B (aside from breakfast service) that produces stable profits. Definition of the extent and type of function space is to be derived from the market demand (during the feasibility analysis). A significant (perhaps obvious) distinction in this topic, is that some hotels are considered convention hotels, with an explicit focus on conferences and other events. Hotels in this category may have around 6-10 m^2 function space per guestroom, with a host of support areas including breakout rooms (Penner, 2004; Ronstedt & Frey, 2014). Other types of hotels may include function space as an additional amenity, not necessarily aimed at drawing additional guest, but rather catering to the needs of existing ones (Rutes et al., 2001). Mid-range hotels with a mixed target group may fall into this category, featuring a limited number of multi-purpose occupying around 2-3 m^2 per guestroom (Penner, 2004; Ronstedt & Frey, 2014). Rutes et al. (2001) note the interesting example of some luxury hotels which feature ballrooms, not necessarily aimed at hotel guests, but rather providing an upscale event location for the local community.

Regardless of hotel grade, efficient planning of function space is essential. On the topic of creating flexible spaces, Ronstedt & Frey (2014) stress that hotels in all categories should create multi-use spaces instead of separate conference and banquet space. Furthermore, flexibility of room configurations is to be pursued (with moving partition walls) allowing a more efficient marketing and sale of the available space, with the largest room configuration amounting to maximum 60% of total function space (Penner, 2004; Ronstedt & Frey, 2014). Further planning objectives include clustering event spaces so that they share support areas, allowing for sufficient ceiling height and column-free spaces, as well as planning sufficient support areas (Rutes et al., 2001; Penner, 2004).

2.3.2.2.5 Recreational areas

Recreational areas (also referred to as wellness areas) are additional amenities hotels offer to their guests and include, among other facilities, fitness centers, whirlpools, saunas, and swimming pools (Ronstedt & Frey, 2014). As expected, the size and sophistication of recreational areas increase with hotel grade (Lawson 1995; Rutes et al., 2001; Ronstedt & Frey, 2014). For instance, Ronstedt & Frey (2014) describe low budget hotels not to have any recreational facilities, 2-star hotels to have an optional fitness center, 3-star hotels to have 0,2-0,5 m^2 of recreational area per guestroom optionally including a sauna or a whirlpool, 4-star hotels to have 0,4-0,9 m^2 of recreational area per guestroom including a sauna and a whirlpool, and 5-star hotels to have at least 0,8 m^2 of recreational area per guestroom with all amenities, including a swimming pool. More complex recreational areas tend to be cost-intensive and space consuming, due to the necessary technical facilities required to deal with increased humidity (Ronstedt & Frey, 2014). Although it can generally be stated based on the previously described literature, that recreational areas increase with hotel grade, Penner (2004) suggests that an 'amenity creep' occurs in the market when hotels attempt to create a competitive advantage in the market by including more facilities than typical for their own category. This is an especially curious phenomenon, given that according to some scholars, pools, for instance, while being a great differentiating factor or even a required one, are used by only a few guests (Rutes et al., 2001). It should be noted that recreational areas are the main focal point in case of resorts, however, since they are highly specialized products, the rather extensive literature on the topic will not be discussed in this thesis.

2.3.2.3 BOH and technical areas

Scholars categorize BOH areas similarly, although occasionally using varying names. The main areas include delivery and waste disposal, food preparation and storage, administrative offices and employee areas, laundry and housekeeping, and engineering and mechanical (Lawson 1995; Rutes et al., 2001; Ronstedt & Frey, 2014). Similarly invisible to the guests' eye are technical areas, including spaces occupied by air conditioning, water supply, wastewater systems and electrical installations (Ronstedt & Frey, 2014). Some scholars put the extent occupied by these

areas between 10-15% of the total floor area in regular hotels (Rutes et al., 2001), while others highlight the higher end of the scale with BOH occupying up to 30% in case of resorts with extensive leisure facilities (deRoos, 2011b). The importance of BOH areas is best described by Rutes et al. (2001, p.313) who claim that that *"the organization of offices and service areas greatly influences the staff's ability to provide efficient food and beverage, housekeeping, repair, and engineering services to the hotel"*. Ransley & Ingram (2001) argue from an asset management perspective, that BOH and service areas, however necessary for the operation of the property, are considered non-revenue earning space and therefore are sought to be minimized, converted to revenue-producing space, or relocated to less attractive parts of the property. The following sections will explore the extent to which various BOH areas change hotel size and complexity.

2.3.2.3.1 Delivery and waste disposal

Most supplies necessary for running the hotel will enter and leave via the delivery and waste disposal area, which should be planned to be invisible to guests' eyes (Ronstedt & Frey, 2014). The two functions should be separated in larger properties, whereas smaller ones may make do with one single entrance/exit (Rutes et al., 2001). An additional requirement in case of larger hotels is to ensure a crossing-free delivery and disposal system to maintain hygiene standards (Ronstedt & Frey, 2014). The extent of the delivery and waste disposal areas do change with the size of the hotel; however, the number of rooms are not only the only influencing factors, with F&B outlets adding significant space requirement (Rutes et al., 2001). Specialized convention hotels may require unique delivery areas which allow for the transportation of exhibits and displays, sometimes even vehicles (Lawson 1995; Ronstedt & Frey, 2014).

2.3.2.3.2 Food preparation and storage

Areas occupied by the kitchen and food storage areas are influenced greatly by the type of F&B outlets (Lawson 1995). While hotels offering only breakfast may feature only a restaurant whose size and in turn is planned based on the maximum projected occupancy, hotels with multiple outlets or extensive banquet facilities will likely feature a main kitchen, with satellite kitchens located adjacent to the respective outlets (Lawson 1995) and preferably planned in a way that the supporting areas are grouped together (Rutes et al., 2001). Planning the size of F&B outlets has been touched upon in the previous section. Planning the supporting BOH areas for the outlets in turn depend on the size of the outlet. While the kitchen will require significant attention during the planning phase due to its complexity (ventilation, drainage, and technical facilities), storage areas require attention too, as they are a crucial part of the F&B BOH areas (Ronstedt & Frey, 2014). Ronstedt & Frey (2014) provide one of the best overviews on the topic, displayed in Table 2-6.

	Guest area per seat (incl. buffet)	Guest area values (excl. utility rooms)					Total area requirement
		Kitchen	Storage	Cold store	total adjoining spaces		
	m^2	%	%	%	%	m^2	m^2
Restaurant (conventional)	1,5	50	60	20	130	2,0	3,5
Restaurant							
convenience level 60%	1,5	50	50	20	120	1,8	3,3
convenience level 80%	1,5	40	40	20	100	1,5	3,0
convenience level >90%	1,5	30	40	20	90	1,4	2,9
Restaurant (upscale)							
everything freshly prepared	2,5	50	60	20	130	3,3	5,8
convenience level 60%	2,5	50	50	20	120	3,0	5,5

TABLE 2-6 KITCHEN AREA REQUIREMENT

Source: Ronstedt & Frey (2014, p. 194)

The table provides not only general rules of thumb about the space requirement of different restaurant categories, but also shows how service quality (inversely denoted as convenience level) impacts space requirements. In other words, food preparation and storage areas are positively correlated with hotel size, as it is pegged to the number of seats, as well as with hotel/restaurant grade. This contrast between the space requirement of various concepts further explains the operative decision for the degree of focus placed on F&B in different hotel categories, which has been discussed previously. On the lower end of the service level spectrum, some budget hotels might limit F&B service altogether and offer only snacks in a vending machine, thereby minimizing costly BOH areas (Lawson 1995). This strategy, which reduces development costs, as well as operating costs is reflected in modern concept trends outside of the low-budget category, such as Marriott's previously described experiment to replace their breakfast buffets (Romeo, 2021). Table 2-6 highlights space requirement at the higher end of the service level spectrum, typically resorts, or hotels that place emphasis on F&B service must incorporate in their planning. Planning more complex kitchen spaces require planners to consider efficient circulation (Lawson 1995) as well as the total space requirement of various kitchen appliances and equipment (Ronstedt & Frey, 2014). While, based on the literature presented here, kitchen space is influenced mainly by hotel grade and the number of seats, Ronstedt & Frey (2014) note that kitchens have been generally shrinking over the years, presumably to achieve higher space efficiency.

2.3.2.3.3 Offices and employee areas

The degree of necessary administrative offices and employee areas is dictated mainly by hotel grade, size, degree of personal service, expected occupancy rates and the number of F&B outlets (Lawson 1995; Ronstedt & Frey, 2014). In terms of assessing the necessary office space there

are further factors to consider. One such factor is whether the hotel in question is the only one by the operator at the location, or whether some functions (such as sales) can be clustered, in which case the operator would likely house a larger team at one of its properties and have smaller offices at the others (Ronstedt & Frey, 2014). In case all functions are housed within the hotel, it would include the front office, executive office, sales, catering, accounting (Rutes et al., 2001), in some cases security, purchasing (Lawson 1995) and the housekeeping office (Ronstedt & Frey, 2014). Resorts, especially in remote areas, tend to require more office space as they may have more extensive administrative staff, their own engineering services and, in some cases, may even offer employee housing (Rutes et al., 2001). Budget hotels on the other hand, may have minimum space requirement in these areas, especially if they have limited F&B offering and therefore fewer staff (Rutes et al., 2001). Hotels in expensive locations with limited space may even consider renting office space off-property for some of their staff if there is a better use for the spaces that would otherwise be used as non-revenue-generating office spaces (Ronstedt & Frey, 2014). An area in this category which is observable by guests is the front office. As these will actively service guests and must ensure a seamless operation and customer-service, some rules of thumb are applied, such as providing two stations for the first 150 rooms and an additional station for each further 100 rooms (Rutes et al., 2001). Aside from the offices, administrative spaces include an archive room, as well as a separate IT utility room (the latter will have to be air-conditioned and cooled all year-around) (Ronstedt & Frey, 2014).

Other BOH areas related to staff within the hotel may include changing rooms including sanitary spaces (separate for in-house and outsourced staff), a cafeteria (whose space capacity should be based on the largest shift to take place in the hotel) (Ronstedt & Frey, 2014). A separate staff entrance is to be planned in all instances (Lawson 1995; Ronstedt & Frey, 2014). Aside from the extent of space dedicated to these BOH areas, the planning circulation is also crucial (Rutes et al., 2001). The general principle in this case is that BOH and areas used by guests should be strictly separated (Lawson 1995). The main planning objective is to allow access for employees to areas relevant for their role, without having to cross FOH areas, for which the clustering of connected functions is advisable (Rutes et al., 2001).

2.3.2.3.4 Laundry and housekeeping

According to Ronstedt & Frey (2014), main areas occupied by the housekeeping department include clean and dirty linen storage, uniform storage, guest supply storage, minibar supply storage, equipment and cleaning agent storage, the housekeeping office and guest laundry. The degree of space needed for these purposes increases with the number of rooms, as well as with hotel grade (Lawson 1995). Ronstedt & Frey (2014) put the total space requirement of housekeeping facilities per guestroom at around 0,35 m^2 for 2-star hotels and around 0,6 m^2 for 5-star properties. A significant part of this difference is explained by the differing linen usage between various service levels; dirty linen requires the more space than clean, freshly pressed linen and by approximately double the usage of linen per room in between higher-end and budget hotels

(Ronstedt & Frey, 2014). Storage of linen may be organized in a centralized manner or stored on separate floors to facilitate servicing the rooms (Ronstedt & Frey, 2014), it is required in both cases, that 3-5 sets of linen per room are stored at the hotel (Lawson 1995). The laundry itself may be located at the property, or outsourced to an external service provider, with larger hotels and resorts more likely to have their own full scale industrial laundry and limited-service hotels opting for the latter option (Rutes et al., 2001). Both options have benefits and drawbacks from an operational point of view, however in terms of space intensity and planning complexity, large scale on-site laundries occupy extensive areas and must be placed in a way that their noise, vibrations, and humidity does not interrupt other parts of the property (Lawson 1995). The circulation and layout planning of housekeeping areas requires added attention, as suboptimal usability by staff can seriously hinder the operator's ability to efficiently service rooms (Lawson 1995).

2.3.2.3.5 Engineering and mechanical

Necessary areas reserved for engineering in a hotel may include engineering offices, repair and maintenance shops, mechanical and electronic areas (Rutes et al., 2001), the latter category of which hosts air conditioning, water supply, wastewater systems and electrical installations (Ronstedt & Frey, 2014). On the question of space occupied by the engineering team, Lawson (1995) notes that hotels are increasingly moving towards outsourcing such services. Resorts may be noted once more as an exception, as they often require an in-house maintenance teams due to remote locations and complex facilities (Rutes et al., 2001). The space usage of technical and mechanical areas depends on the number of rooms, but also on the size of the building, hotel grade and the climate (Rutes et al., 2001).

2.3.3 Industry best practices

The previous segment of this thesis reviewed factors affecting the use of space in hotels and exemplified how space usage changes between various hotel concepts. A main objective within the conceptualization, planning, and development processes was minimizing the capital expenditure required for a project to increase financial viability (Rutes et al., 2001; Rawlinson, 2004). Ronstedt & Frey (2014) point out building volume as a significant cost driver within projects, explaining the motivation to minimize excess space and maximize the number of salable guestrooms during the planning (Rutes et al., 2001; Ronstedt & Frey, 2014). Ransley & Ingram (2001) add to this argument the investment costs of hotel FF&E (around 30-35% of total construction costs), highlighting the need for interior design to take heed of the economic implication of designing spaces. It should be reiterated at this point, that hotel functions are broken down into revenue-earning, cost-contributing, non-revenue-earning, administrative, and operational support areas (Lawson 1995). From an operational (profitability) viewpoint this means an approximate departmental cost of 25-30% for rooms, 75-85% for F&B and 60-80% for other operated departments (Lawson 1995).

Alternative definitions of space efficiency in hotel development have also been discussed. Literature features several key concepts which represent different approaches to achieving higher space efficiency in hotel design and development. These concepts can broadly be categorized as follows: *maximization of useful space*, *selective reduction of space*, and *flexibility of spaces*. It must be noted that these concepts are not mutually exclusive, but rather represent various approaches to the same broad topic of space efficiency in hotel planning. This section will conclude the literature review by providing best practice cases in space efficient hotel development from literature, as well as from real life examples.

2.3.3.1 Guestroom floors

It has been discussed, that as there are multiple similar guestroom floors within a property, the potential to save (or waste) space is especially high in this area (Lawson, 1995; Rutes et al., 2001; deRoos, 2011b). The dual scales of *maximization of useful space* and *selective reduction of space* translate to maximizing the number of rooms (revenue-generating units) and minimizing other areas, such as the elevator lobby, linen storage, or service areas (Rutes et al., 2001). Ronstedt & Frey (2014, p. 92) claim that "*It is not the gross floor area but the number of rooms which are to be built that is important for assessing site utilization.*", while they maintain that the extent of support areas should be dictated by hotel standards. A useful benchmark for the design of space efficient guestroom floor design mentioned by Ronstedt & Frey (2014) is 75% of GFA occupied by rooms, limiting circulation to the minimum extent dictated by local regulations.

Efficient use of floor space can be introduced by following the logic of the hotel planning process, moving from the design of larger units towards the smaller ones. Site characteristics and building geometry will likely pose architectural constraints and largely influence the final schematic design of guestroom floors (Rutes et al., 2001; Ronstedt & Frey, 2014). Without any limitations, it is considered that an offset floor slab or a rectangular floor slab with double-loaded corridors are the most efficient configuration, with guestrooms occupying up to 72% and 70% of floor space respectively (Rutes et al., 2001; deRoos, 2011b). Rutes et al. (2001) note that inefficiencies may be accepted not only due to site limitations, but also due to proposed premiums for doing so, a spectacular view for instance, calling for a single-loaded corridor setup, justified by increased room rates. Individual room design also influences the configuration of guestroom floors. Ronstedt & Frey (2014) mention the reduction of room width to maximize the number of rooms on a floor, and limiting external wall space, thereby reducing construction costs per room. Creative architectural solutions, such as swiveling walls between rooms may also make units more compact without impeding the guest experience, further optimizing the available space (Ronstedt & Frey, 2014). In the quest for minimizing room footprint, notably reducing room width (Rutes et al., 2001), one of the basic architectural best practices, which should be mentioned is mirroring adjacent rooms in a way that the bathroom can use a shared utility shaft (Ronstedt & Frey, 2014).

After the guestroom configuration has been selected, the room mix will be defined by the architects and the operator, which usually starts by the development of a typical unit (Rutes et al., 2001). Apart from the typical unit, several other room types (depending on bed size and type, wheelchair accessibility, connecting doors) and categories (suites) may be defined (Rutes et al., 2001; deRoos, 2011b). Deviation from the prototypical units is to be expected due to the building geometry and related architectural limitations (Rutes et al., 2001). As discussed in previous sections, the desired room mix will be defined by the operator and will mostly correspond to guest needs, however, poses a degree of operational inflexibility (e.g., having to sell suites at a lower rate, when standard rooms are fully occupied). New microhotel concepts, such as Motto by Hilton seek to provide a solution to this issue. With an average room size of 14 m^2, the Motto concept utilizes flexible furniture and connecting rooms, thereby providing guests with the option to rent either a small room, connect two rooms for larger traveler parties, or use two connecting rooms as a suite folding away the bed in one unit (Mest, 2018; Hilton, 2020)

FIGURE 2-6 MOTTO BY HILTON - PROTOTYPE CONNECTING ROOMS WITH FLEXIBLE FURNITURE

Source: Hilton (2018)

This configuration of flexible room mix is best described by the notion of *polyvalence*, a special form of spatial flexibility mentioned previously, and studied in the hotel context by Lin (2011). When planning the room mix of hotels, minimal deviation from the prototypical room types is desired, as furnishing unique rooms tend to increase costs (Ronstedt & Frey, 2014). An industry best-practice is placing suites, or larger rooms to corners or irregular areas on the floor, as the configuration of these units is more flexible than the limited-size standard rooms (Rutes et al., 2001).

To allow for the development of such compact units, individual guestrooms must be designed in a way which allows for the compression of units, without impeding guest satisfaction. Ronstedt & Frey (2014) point to the utilization of wall-mounted headboards behind beds as an effective way to safe space in the width of individual guestrooms, which, when multiplied, has significant impact on the achievable number of rooms per guestroom floor. This latter example constitutes a best practice by the *selective reduction of space*. Hotel companies experimenting

with this type of space reduction in guestrooms are closely monitoring guest needs and take care not to compromise the experience of their customers. The bathroom has been identified as an area of particular importance, where guests spend a significant amount of their time and are expecting quality and amenities (Ransley & Ingram, 2001). This notion seems to be confirmed by hotel industry practices with modern branded microhotels, such as Moxy by Marriott reducing room sizes, while maintaining the need to offer high-quality bathrooms, regardless of hotel grade (Sampson, 2019). This does not, however, mean maintaining bathroom size, but rather considering carefully what amenities guests are looking for, based on their demographics and user preferences (Rutes et al., 2001). While reducing average room sizes, some attention must be given to FF&E, as furnishings must adapt to the limited available space, while remaining a significant cost driver in hotel development (Lawson, 1995; Ransley & Ingram, 2001). One way of such adaptation can be achieved by combining activity zones discussed in previously by featuring multi-purpose furniture. An example is provided in Figure 2-7 showing the latest generation of Holiday Inn Express guestroom with a single adjustable desk combining the lounging and working areas traditionally mentioned in literature, saving valuable space.

FIGURE 2-7 A HOLIDAY INN EXPRESS GUESTROOM

Source: InterContinental Hotels Group (2020)

Further methods of *selective reduction* and *increased flexibility* in hotel room design include featuring sofa beds or wall beds, combining decorative and blackout curtains or lounge chairs with desk chairs (Rutes et al., 2001). These practices are more apparent in case of microhotels, such as Moxy, Motto, or Tribe, representing a current trend in the industry. The overall objective of such concepts is to reduce average room sizes, while being more generous with public spaces, thereby maximizing the number of revenue-generating units, improving project feasibility (Mest, 2018; Sampson, 2019). A further argument by these brands is that current guest needs are moving towards higher-quality amenities and facilities, rather than larger in-room spaces, therefore the budget saved on construction costs can be partially redirected towards furnishing

the property (Mest, 2018; Sampson, 2019). In an article by the Washington Post, Tripp McLaughlin, global head of the Motto by Hilton brand said that they are aiming to design guestrooms for guests, while designing public spaces for the locals, implying a desire to shift activities towards public areas in their new generation hotels (Sampson, 2019). Looking at the dual change in the reduction of space and increase in quality (Sampson, 2019), the traditional correlation between hotel grade and required space seems to be under strain, at least within this segment. Accor's newest brand, Tribe is on a similar trajectory, with space requirement defined for resorts, which feature notably smaller rooms than traditional resorts (Accor, 2021). It must, however, be noted that these brands are rather new, and their long-term viability is yet to be seen and decided by market forces.

2.3.3.2 Public areas

Hotel rooms may occupy most of a typical hotel's floor area, however, public area design also has a significant impact on space efficiency. The typical net hotel room size per hotel grade has been discussed and explanation has been given regarding the differing sizes. In case of space-efficient hotel room design, some explanation has been given regarding areas with the most potential for space saving. To discuss space efficiency in case of public areas, reviewing measurement methods may be a suitable staring point. The metric of TGFA per guestroom has been previously introduced as a tool helpful in comparing the total space requirement of various properties, as it compresses the overall space requirement of a hotel into a simple KPI. Ransley & Ingram (2001, p.84) describe the *grossing factor* as *"the percentage added to the total area of guestrooms on a guest floor to provide for circulation, services distribution, maids' rooms, etc."* which they identify as a further useful indicator of space efficiency. In their paper they further demonstrate, how an increase as slight as 5% can have a significant impact on construction costs (Ransley & Ingram, 2001). Among space efficiency practices generalizable for public spaces for existing, Ransley & Ingram (2001) mention the conversion of non-revenue generating areas into revenue generating outlets and the relocation of low-yield areas to secondary locations within the property. An example would be not to sacrifice a street-facing area within the lobby for the reception desk, but rather locate the bar/café there to attract external guests. While this is considered an established asset management practice for existing hotels, Ransley & Ingram (2001) note that design briefs for newly build hotels often lack a clear definition of efficient space utilization.

2.3.3.2.1 Lobby

Hotel lobbies have been previously described as circulation hubs for both guests and staff, as well as centers for multiple hotel activities (Lawson, 1995; Rutes et al., 2001; Penner, 2004; deRoos, 2011b; Ronstedt & Frey, 2014). As these various functions take place in a single space, there are noteworthy opportunities for alternative uses of space. A more traditional planning philosophy is clustering (separate) outlets and functions around the lobby (Penner, 2004), limiting the

hotel lobby to a pure circulation hub and host of the reception desk and connected service areas. Lawson (1995) notes that some luxury hotels may optimize for individual attention to guests and opt for more private, segmented lobby designs. A recent trend is handling the lobby as a more fluid space, which hosts multiple functions (Ronstedt & Frey, 2014) and placing increased emphasis on public spaces in the guest experience (Sampson, 2019). A clear benefit of this approach, also mentioned by Lawson (1995), is that by including outlets, such as the lobby bar, lounge, and even meeting spaces in the lobby area, the necessary circulation areas will be absorbed within the same space instead of having to be built separately to link to functions in another space. This concept is visualized by Figure 2-8 depicting the prototypical lobby of a Moxy Hotel, whose relatively open plan allows semi-divided spaces to host several functions such as meetings, lounges, and the bar.

FIGURE 2-8 MOXY HOTELS - LOBBY ZONES

Source: Marriott International (n.d.)

While *selective reduction* is an effective space efficiency method, Ronstedt & Frey (2014) point to *increasing flexibility* in the hotel as an alternative. For example, midscale hotels offering more facilities and services, may consider planning the lobby in a way that some parts are detachable or separatable and allow the hotel to use these spaces for events and receptions while not requiring a separate conference area for such a purpose which is vacant most of the time, thereby *reducing necessary built area* and construction costs (Ronstedt & Frey, 2014). The Boilerman Bar located in the lobby of the 25 Hours Hotel in Munich exemplifies such a flexible planning, where the bar is separated via curtains during the day and becoming a part of the lobby during the night using the lobby lounge as seating for bar guests (Figure 2-9).

FIGURE 2-9 25 HOURS HOTEL MUNICH – SPATIALLY FLEXIBLE LOBBY AND BAR DESIGN

Source: Shreeram & Somani (n.d.)

As observed in case of room design, combining the uses of different items and areas can help reduce the required space. This practice is becoming rather widespread in lobby design, most noticeably by the combination of the bar and the reception desk. By combining these uses, built area can be optimized and if the operational concept allows, *operational synergies* can be achieved by cross-functional teams. This trend has emerged in case of chain hotels (Sampson, 2019), as well as in case of individual properties (Figure 2-10).

FIGURE 2-10 VOLKSHOTEL AMSTERDAM - COMBINED RECEPTION AND BAR

Source: Koller (2016), photo by Daniel Nicholas

As the previously examined case of the microhotel trend highlighted, some hotel concepts, such as Motto by Hilton are consciously shifting the guest experience from the rooms to the common

areas (Sampson, 2019). Considering the conclusion of previous discussions, this allows the planners to reduce the size of hotel rooms, thereby maximizing the number of units, while being more generous in the extent of public spaces. If the available public spaces are designed along a commercially founded design brief, this trend would match the practice of *maximizing the share of revenue earning spaces* within the hotel. To ensure a better yield on these revenue earning areas a general trend in hospitality design is to leverage locals by attracting them to hotels outlets, thereby increasing revenue per square meter in the public areas (Deloitte Consulting LLP, 2016; Sampson, 2019).

2.3.3.2.2 F&B outlets

In previous discussions about F&B, it has been established that the degree of focus by hotels on F&B is highly dependent on hotel grade (Penner, 2004; deRoos, 2011b). Indeed, a significant challenge for hoteliers is that in most locations, hotel F&B outlets are competing with external restaurants and cafés (deRoos, 2011b). While the lower profit margin of the hotel F&B division (Lawson, 1995) may serve as a disincentive for some hotels to take on more gastronomic complexity, research has investigated the decision behind this operational decision. Yeh et al. (2012) point out that various F&B units (such as a restaurant, bar, or banquet) have different levels of potential competitive advantage in a market and differing levels of profit margins. They use the concept of *comparative advantage creation* to describe how hotels may balance competitive advantage and business unit profitability by choosing a particular F&B mix to include in their hotels (Yeh et al., 2012). Further research has pointed out that in cases of deliberate focus on F&B, increasing the input of financial resources in their operations (e.g., salaries) has a positive effect on top-line and bottom-line performance in not only F&B but also in rooms division (Mun et al., 2019). This all points to the fact that F&B planning goes beyond simple space programming and requires intensive market analysis and operational input during the conceptualization phase in order to create a clear brief.

In lower-grade hotels (or long-stay products), where the F&B focus is intentionally limited and considered a necessary facility for guests, planning of outlets will likely be geared towards minimizing built area while maintaining hotel standards. Few examples have been mentioned previously, such as the inclusion of grab-and-go stations instead of a breakfast buffet or a restaurant (which wile being space efficient also reduces the number of required staff) (Mun et al., 2019; Romeo, 2021). Combining F&B spaces in a way that allows them to transition between various functions throughout the day can be seen in various hotel segments combining two or more functions from breakfast to dinner (Penner, 2004; deRoos, 2011b). A related best practice may be planning the breakfast buffet to function as a bar seating area, such as the case in the 25 Hours Hotel in Vienna. Reductions in the seating area may be facilitated by creative sitting arrangements or furniture design, such as the example featured in Figure 2-11.

FIGURE 2-11 MEININGER HOTEL FRANKFURT - SPACE EFFICIENT FF&E IN F&B

Source: Meininger Hotels. (n.d.)

In some cases, F&B may be outsourced to be provided by external service-providers housed in the hotel thereby offering guests additional amenities, but without the need for the hotel operator to increase their operating costs (Lawson, 1995). Regardless of positioning, the importance of adapting to eating habits has previously been highlighted (Rutes et al., 2001). Medina (2017) writes about the recent trend of fast casual dining, which combines the appeal of local produce, high quality ingredients, the efficiency and recognition of fast-food chains and the atmosphere of individual restaurants. Their article highlights how some hotels, mostly in the limited-service segment, may benefit from the presence of a regional and local fast casual restaurant brand (Medina, 2017). The implication for the property owner is two sources of rental revenue from the same property by specialized tenants.

Penner (2004) mentions the possibility of planning F&B outlets with sections that can be closed off to accommodate fluctuating demand and allow for alternative uses, such as private seating, or banqueting. Fluid utilization of space discussed in case of the lobby is also applicable for F&B outlets. A bar can be placed in the lobby, thereby creating a multi-functional space instead of rigidly separated ones. By being able to close off certain areas, as described by Penner (2004) and exemplified in Figure 2-9, *polyvalence* can be achieved in public areas. In an architectural thesis project, Lin (2011) proposes a fully polyvalent hotel design, whose planning managed to accommodate several different setups within the same space including various functions (Figure 2-12). The fact that such solutions are architecturally possible, does not mean that they will automatically be accepted by developers or hoteliers.

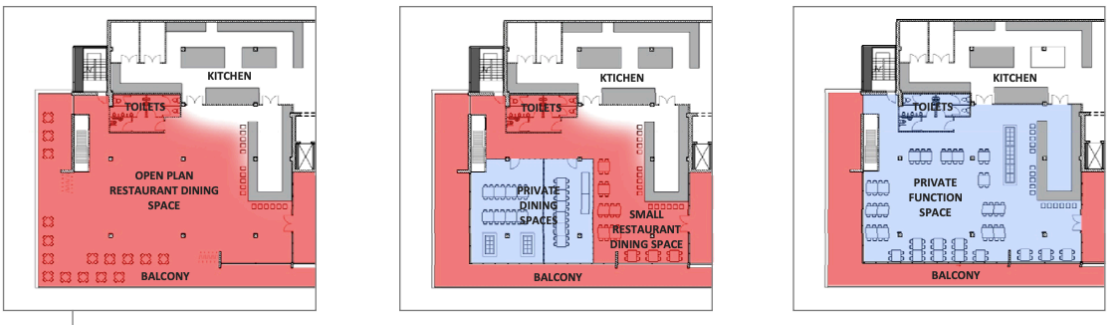

FIGURE 2-12 POTENTIAL CONFIGURATIONS OF FLEXIBLE SPACES

Source: Lin (2011)

2.3.3.2.3 Circulation

In circulation areas, *selective reduction of space* may be considered a best practice in hotel planning, in alignment with Ronstedt & Frey (2014), who claim that some circulation areas must be kept to the minimum accepted by local building regulations to reduce costly built area. Lawson (1995) suggests that it is generally recommended in public space design to avoid corridors where possible and instead combine the circulation function with other elements, thereby creating an open space and combining multiple functions. Such a combination of other uses mentioned by Lawson (1995) is apparent in some of the modern concepts introduced previously, such as the lobby of a prototypical Moxy hotel in Figure 2-8, where most of the circulation in the lobby happens through the lobby lounge and other functional areas.

2.3.3.2.4 Function space

Best practice cases of flexible design described by Lin (2011) and exemplified in Figure 2-12 are highly relevant for function spaces. Planning function spaces has embraced flexibility with subdivided rooms being a wide-spread standard, whereby the largest conference room is dividable into several smaller rooms, allowing the hotel to offer several setups. Some chain hotels may require some function space to be built, not to attract additional demand, but to be able to offer it as an amenity for their existing guests and key-accounts (Rutes et al., 2001). In such cases, increased flexibility may be welcome and variable setups, such as the one proposed by Lin (2011), may have a solid use-case. Suttell (2004) furthermore suggests that boutique hotels may even leverage some of their suites and use them as event locations for smaller events.

Furthermore, additional facilities, such as public toilets, required for increased function space may be placed strategically to be shared with other outlets. On this topic Ronstedt & Frey (2014) note that the distance of the restrooms from the venue is not necessarily crucial, which allows architects to plan these facilities in places which have limited potential for other uses.

2.3.3.2.5 Recreational areas

Recreational or wellness areas have been previously discussed only to a limited extent. The fact that the extent of recreational areas increases with hotel grade is clear from the literature (Lawson 1995; Rutes et al., 2001; Ronstedt & Frey, 2014). This means that lower grade hotels may omit recreational areas altogether as a space saving measure (Ronstedt & Frey, 2014), a practice which falls squarely in the category of *selective reduction of space*. On the other end of the spectrum, resort hotels feature recreational facilities as a main USP and are mostly located in remote areas with a limited space restraint, therefore reduction of space in these areas will likely have a reduced importance. Higher grade hotels in downtown locations, where limited space is available, must offer recreational facilities as per standard (Ronstedt & Frey, 2014). In such cases Ronstedt & Frey (2014) suggest placing wellness areas in spaces that would otherwise have a limited use case. The 25 Hours Hotel in Vienna, for instance, features a wellness area with a sauna, steam bath, and loungers, located in the basement, where an opening was created to the inner courtyard to allow for natural light to enter the space. As suggested by Ronstedt & Frey (2014) creative architecture can make great use of otherwise suboptimal spaces.

2.3.3.3 BOH and technical areas

Previously introduced literature on BOH areas makes it clear, that in most areas, the extent of space occupied by these areas is highly dependent on hotel grade and service levels (Baud-Bovy & Lawson, 1998); Rutes et al., 2001; Ronstedt & Frey, 2014). Kitchen spaces, most notably, are highly contingent on the sophistication of its operational model and the convenience level of food preparation methods, as well as on the size of the hotel (see Table 2-6) (Ronstedt & Frey, 2014). While discussing best practices for space efficiency in these areas, it must be noted, that the use of space will likely stay correlated to these factors and a significant change in necessary BOH areas can only be achieved by modifying the operational model of the hotel. F&B complexity has been identified to drive space requirements significantly in the kitchen, storage, delivery, and waste disposal areas (Rutes et al., 2001; Ronstedt & Frey, 2014). In projects with limited space available, adapting the gastronomic offering and especially food preparation methods may help reduce the required space, however, these solutions may only be available for lower-grade hotels (Lawson, 1995). In higher-category hotels, or hotels with extensive F&B facilities, a well-established practice is the sharing or clustering of main kitchen and storage areas, with satellite preparation stations situated directly by the individual outlets (Lawson 1995; Rutes et al., 2001). In case of resorts, whose BOH areas tend to be up to significantly larger than those of regular hotels (deRoos, 2011b), Baud-Bovy & Lawson (1998) mention the possibility to seasonally rent central food preparation facilities to be able to serve fluctuating demand more efficiently throughout the year.

The requirement of office space located on the property changes similarly with the complexity of hotel property (Rutes et al., 2001). The setup of the operating company has a significant role

in this question, as hotels with multiple properties in a given location may cluster parts of their administrative operations, thereby reducing required office space (Ronstedt & Frey, 2014). Notwithstanding the operational costs behind the decision, outsourcing maintenance and facility management services is a trend identified by (Lawson 1995), whereby the extent of space occupied by these ancillary functions may be reduced. A similarly widespread best practice in hotel design with in-house administrative F&B or purchasing staff to house these functions in, or adjacent to the delivery and kitchen areas allowing for better operational connectivity and reduced space requirements (Ronstedt & Frey, 2014).

Apart from downgrading hotels for feasibility purposes, optimizing space usage of BOH areas without significant hinderance of operational efficiency is perhaps best argued for by Ransley & Ingram (2001) who advocate the minimization and relocation of BOH areas, to maximize the ratio of revenue-producing to non-revenue-producing areas within the property.

2.4 Conclusion

This chapter sought to construct the basis for the proceeding research by introducing two crucial concepts within hotel development, namely the hotel development process itself and the use of space across various hotel types. Discussions regarding the hotel development process, including the various stakeholders (most notably the owner-developer, hotel operator, architect, consultant) highlighted their dependance on each other for the feasibility of hotel projects. The initial project setup and the pursuing collaboration must meet *financial*, *development*, and *operational objectives* to for a project to be considered viable (Baltin et al, 1999, cited by Venter & Cloete, 2007). It has also been analyzed how various contractual relationships impact the stakeholders' ability to form an effective project team.

While discussing space efficiency and different uses of space, the general guiding principle has proven to be the multidimensional nature of hotel properties combining *real estate*, *operations*, and *FF&E* (Venter & Cloete, 2007) a reminder, that oversimplification of the topic may be vulnerable to biases in favor of one of these factors. Literature on the use of space across various hotel concepts pointed to the general observation, that space efficiency has various degrees of importance across different types of hotels (deRoos, 2011b).

As expected, the term space efficiency has proven to include multiple interpretations in literature, depending on the authors' focus. The main definitions to emerge include *selective reduction of space* (with the objective to reduce construction costs), *maximization of useful space* (to increase the ratio of revenue-producing versus non-revenue-producing-areas), *increasing the flexibility of spaces* (either to reduce area requirements by combining multiple uses or create *polyvalence* to adhere to changing demand).

Research on best practices and trends in space efficiency point to increasingly creative solutions, which fall into the above-mentioned categories. However, the impact and perception of these practices has not been adequately researched.

3 METHODOLOGY

3.1 Introduction

The stated purpose of this thesis consists of two components. The first component, the summary of literature and current trends concerning space efficiency in hotel development, has been covered in the literature review. The second component is to assess the relevance of these to practicing hotel development professionals. In completing this latter objective, a standardized questionnaire has been sent out to eligible respondents who are involved in hotel development in their daily work. The following sections will describe how this primary research has been designed and what the utility of collected answers may be.

3.2 Research objectives

The main objective of this primary research is to clarify the ambiguity concerning the term *space efficiency in hotel development*. It aims to explore the subject at hand, rather than to generate statistically significant findings about one specific subsection of the topic. Existing research discussed in this thesis stems from limited number of academics and practitioners, who have contributed their knowledge on hotel panning in form of books and papers, drawing on experience and case studies. While the term space efficiency is widely used in the industry, academic studies critically assessing the topic are largely absent from literature, most likely due to the topic's niche position at the intersect of hospitality and real estate, as well as the practical nature of both industries. The absence of a significant body of academic research on the topic called for taking a larger perspective of the question to explore the topic and provide guidance for future, more targeted research. The main objective of this thesis is to gain an insight into hotel development professionals' views on space efficiency. To achieve this objective, several questions have been formulated, in accordance with the existing literature, which assess some the most important aspects of the topic. These questions include *identifying relevant KPIs for space efficiency*, *the relevance of space efficient hotel planning practices in reaching project objectives*, *effectiveness of space efficiency in various hotel areas*, *perceptions of industry best practices*, and the *perceived importance of increasing space efficiency in respondents' own work*.

3.2.1 Measuring space efficiency

One of the main motivators for this study was investigating the use of the term space efficiency in hotel development. In an everyday context, the term 'space-efficient', could describe a hotel concept, hinting superiority compared to concepts which may be less conscious of optimizing available space. In literature, when discussing the same term in a similar context, authors may refer to various items. The literature review outlined several commonly used metrics for space efficiency including the *percentage of space occupied by rooms vs. total space on guestroom floors*, *TGFA per guestroom*, *percentage of revenue generating space vs. total space*, and the

grossing factor (Lawson, 1995; Baud-Bovy & Lawson, 1998; Ransley & Ingram, 2001; Rutes et al., 2001; deRoos, 2011b; Ronstedt & Frey, 2014). Exploring measurement metrics of space efficiency is a logical starting point under the overall research objectives and a crucial one in interpreting general usage of the term. Two aspects have been selected for further investigation. One of them was the perceived usefulness of these metrics by respondents. The second one was the actual frequency of usage of the metrics by the respondents in their work. These two questions are designed to highlight potential discrepancies between theoretical utility and practical application of existing measurement metrics. To provide the possibility to enrich findings, the option has been given to respondents to indicate any other measurement tools they use to measure space efficiency int their work.

3.2.2 Objectives of space efficient planning practices

Another objective of this thesis is to assess where respondents see the impact of space efficient hotel planning practices and what they consider its main objectives. Respondents were asked to rate the effect of space efficient hotel planning on several key objectives in hotel planning and development. Some key items were identified in the literature which were tested in the primary research. *Enhancing project feasibility* is a central and rather broad objective merging the financial, development and operational objectives of the stakeholders involved (Baltin et al, 1999, cited by Venter & Cloete, 2007). Assessing whether professionals see space efficiency as contributing to project feasibility is an essential question to explore. *Reducing construction costs* is closely associated with increasing the financial feasibility of projects, which is highly relevant to the owner-developer (de Roos, 2004; Ward, 2004). *Reducing built area* can be associated with the space efficiency practice of 'selective reduction of space' (Rutes et al, 2001) and can also help in overcoming limitations of the project site, such physical constraints or zoning regulations (Baltin et al, 1999, cited by Venter & Cloete, 2007). *Increasing the number of rooms* has a profound impact on the improvement of space utilization within a hotel project, according to Ronstedt & Frey (2014). Although *increasing operational efficiency*, may cover a multitude of interpretations, this research wanted to assess whether respondents consider this factor a relevant outcome for increased space efficiency. Although there are numerous other items that could have been tested, the selection above was made with the objective of including the most fundamental concepts within hotel development and measuring their perceived connection to space efficiency practices. Extending the list further would likely have hindered response rates and the clarity of the question.

3.2.3 Space efficiency in various parts of the hotel

The next focus area of this primary research concerns how industry practitioners view the relevance of space efficient hotel planning practices in various hotel areas. The literature review discussed in detail how the space requirement of public areas as well as back-of-house and technical areas changes across hotel concepts due to various factors such as hotel grade, operational

activities, and number of rooms (Lawson, 1995; Rutes et al., 2001; Penner, 2004; Ronstedt & Frey, 2014). Room sizes too, have been shown to be influenced by hotel grade, required standards, building geometry and positioning (Lawson, 1995; Rutes et al., 2001; deRoos, 2011b; Ronstedt & Frey, 2014). It is expected from these findings that space efficient planning practices will be more applicable in some hotel areas than in others. A section of the primary research has been reserved to investigate exactly this question. Hotel areas to be tested were selected from the *guestroom floors*, *public areas*, as well as *back-of-house and technical areas*, based on existing literature. Two items were tested from the guestroom floors, namely the *guestroom* itself and *support areas on guestroom floors*. *The lobby*, *circulation*, *F&B outlets*, *function space*, and *recreational areas* are widely understood to be included within the public areas of a hotel (Lawson, 1995; Rutes et al., 2001; Penner, 2004; deRoos, 2011b; Ronstedt & Frey, 2014). The main areas of BOH and technical areas include *delivery and waste disposal*, *food preparation and storage*, *administrative offices and employee areas*, *laundry and housekeeping*, and *engineering and mechanical* (Lawson 1995; Rutes et al., 2001; Ronstedt & Frey, 2014).

3.2.4 Perceptions of industry best practices

A section of the literature review in this thesis is dedicated to discussing best practices in space efficient hotel planning, connecting the theory to real-life applications. A segment of the primary research focuses on assessing how practitioners in hotel development perceive a selection of these examples. Several of the previously introduced practices were selected to be reassessed in the primary research in two main areas of the hotel, namely the guestroom floors and public areas. Although it would be desirable to assess more industry practices, due to the nature of the questionnaire and maintaining a questionnaire length which does not discourage respondents from completing the survey limited the number of investigated items. The following industry practices were selected, with the conscious effort to create a combination of conventional industry rules of thumb, as well as more contemporary space saving methods.

The first investigated item was the *optimization of building geometry*, a rather standard architectural practice and one that is well-established in literature (Rutes et al., 2001; deRoos, 2011b). *Reduction of room size* is a similarly conventional method of increasing space efficiency and in addition to having been covered by literature in the field (Ronstedt & Frey, 2014), is commonly cited by hotel companies to promote the space efficiency of their concepts (Sampson, 2019; Accor, 2021). *Reduction of room width* has also been investigated, as it has been highlighted as an effective method of increasing space- and cost efficiency in hotel buildings (Ronstedt & Frey, 2014). FF&E is an established cost driver in hotel development (Lawson, 1995; Ransley & Ingram, 2001), and attention has been directed at the possibilities flexible furnishing can unlock in hotel rooms (Ronstedt & Frey, 2014). The *usage of flexible furniture in guestrooms* has therefore been selected to be investigated in this research. *Inclusion of connecting rooms, which allow for multiple room configuration*s is a trend seen in concepts such as Motto by Hilton and it claimed to increase efficiency and flexibility (Mest, 2018; Sampson, 2019; Hilton, 2020).

As this trend is rather novel in case of traditional hotels, the item has also been selected for the questionnaire. An increasingly adapted practice in certain hotels is the *combination of public area functions* (e.g., reception with the bar) and one that is closely linked to the concept of polyvalence (Lin, 2011; Marriott International, n.d.) and was therefore included in the research. *Featuring an open plan-lobby* has also been mentioned in literature as a best practice in space efficient hotel planning (Lawson 1995; Ronstedt & Frey, 2014; Sampson, 2019) and has been included in the questionnaire. The concept of polyvalence in hotel planning has been covered by the item "designing parts of public areas to be detachable and used for another function". One of the most fascinating trends connected to space efficiency in F&B is the *substitution of full-scale outlets with self-service F&B solutions* (Mun et al., 2019; Romeo, 2021). While this practice certainly has its limitations in some segments, the opportunity to test the concept on respondents was an interesting one.

3.2.5 Perceived importance of space efficiency

Aside from exploring perceptions of space efficiency in hotel development in general, one of the research questions was aimed at finding out whether respondents consider increasing space efficiency an important task in their roles. A key characteristic of the hotel development process is its reliability on the collaboration of multiple stakeholders, who each have a significant role in forming the hotel real estate (Lawson, 1995; Ransley & Ingram, 2004; Venter & Cloete, 2007; Ronstedt & Frey, 2014). Although these stakeholders are collaborating in hotel projects, they may, by nature, have conflicting interests in certain situations (Broten, 1962). Given this particularity, a further interesting research objective could have been the comparison of various stakeholder groups' perception of increasing space efficiency in their own roles to see whether differences exist. Given the limited scope of this thesis, only a glimpse can be made in this direction, as statistically significant results are not possible to be drawn from the sample size at hand.

3.2.6 Eligibility of respondents

A key objective of this research is to gauge the perceptions of those professionals who are actively involved in the development of hotels. While this criterion that knowingly narrows the number of eligible respondents, its inclusion is deliberate. The qualifier for eligible respondents is the criteria that they should actively work in hotel development. The question controlling for eligibility of submitting a response required respondents to select the type of company they actively work for. The provided options are based on the main stakeholders identified in existing literature (Lawson, 1995; Ransley & Ingram, 2004); Venter & Cloete, 2007; Ronstedt & Frey, 2014) and are narrowed down to six options (*hotel operator*, *hotel developer*, *hotel investor / owner*, *architect (with experience in hotel planning)*, *consultant (with a focus on tourism and hospitality or real estate)*, *contractor / construction company)*. The research was conscious of possible overlaps that may occur, if a respondent is working for a company that covers more functions (e.g., owner and operator), therefore multiple choices were allowed. Regardless of

respondents' roles, a control question was included to verify eligibility. In this question, respondents had to confirm that their current role requires them to be regularly involved in hotel developments. It must also be stressed that respondents are categorized based on the type of company they work for and not based on their training.

3.3 Research instrument

To carry out the primary research, a standardized online questionnaire has been designed and sent out to potential respondents. The full questionnaire is included in Appendix 1: Questionnaire. The questionnaire has been circulated in the author's professional network, which included a large number of eligible respondents. Responses were accepted between July 5, 2021 and August 1, 2021 during which period 36 valid responses have been received. Given the highly specialized target group, care has been taken to keep the questionnaire brief to ensure a higher response rate and avoid abandoned responses. Questions were posed similarly, with similar response options, making the completion of the survey less cumbersome. Majority of the research objectives were connected to the evaluation of certain existing concepts, metrics, and industry practices. To achieve the desired richness of responses while maintaining a simple format, a six-step Likert scale was employed for the evaluative questions. Questions 4, 5, 6, 8, 9, and 10 have been designed this way.

Question 1 aimed to categorize the type of stakeholders completing the survey. As explained previously, selection of multiple options was allowed, as certain respondents work for companies involved in multiple disciplines within hotel development. The handling of such multi-disciplinary participants will be discussed in the data analysis section.

Question 2 was included as a control question for respondent-eligibility. A basic requirement for respondents was set to be the regular involvement in hotel development.

Question 3 was designed to enrich responses by requiring respondents to indicate the number of years they have been involved in hotel development.

Question 4 intended to establish how important respondents feel increasing space efficiency is in their respective roles. In other words, how actively they are involved with the topic. The 6-step Likert scale employed ranged from *not at all important* to *extremely important*.

Question 5 was designed to establish the perceived usefulness of metrics used to measure space efficiency. The 6-step Likert scale employed ranged from *not at all useful* to *extremely useful*. Question 6 asked respondents to indicate the frequency they use the same metrics during their work. Question 7 was an open-ended question asking whether respondents used any other metrics, not listed in the previous questions, to measure space efficiency during their work.

Question 8 sought to establish the perceived relevance of increased space efficiency in achieving each of five basic project objectives established in the literature. The six-step Likert scale employed ranged between *not at all effective* and *extremely effective*.

Question 9 aimed to establish the relevance of space efficient hotel planning practices in various hotel areas. The six-step Likert scale employed ranged between *not at all relevant* and *extremely relevant*.

Question 10 focused on respondents' perceptions of eight industry best practices. The six-step Likert scale assessed how relevant respondents find these practices in increasing space efficiency in hotels.

3.4 Data analysis

The received data was analyzed using descriptive statistics analysis, due to several particularities of the research conducted. One such particularity is that the dependence on a highly specialized group of respondents yielded a lower number of responses (36 in total for this research) and therefore reaching a statistically significant result using other analytic methods would have be difficult. Conscious of this potential limitation, research objectives have been formulated to focus on the tested items, rather than respondent groups. The inclusion of respondent groups (stakeholder types) is to be considered an enrichment of data. Data analysis has been conducted using the SPSS statistics software.

Variables in questions 5 to 10 have therefore been tested on all 36 participants without categorization based on occupation, only the absolute number of responses was considered. Responses to each variable have been tested by generating the *minimum value*, *maximum value*, *mean* and *standard deviation* of responses given on the six-step Likert scale, all provided by the descriptive statistics within SPSS. Due to the standardized nature of these variables, comparisons can easily be made across various questions.

Question 4, which measures respondents' focus on increasing space efficiency, has been tested on all 36 participants, however the data allowed for a segmentation of responses based on respondents' roles. A particularity arising from the data is the possibility for respondents to mark multiple disciplines they are working in, which yields cross-categories apart from the four basic ones (architect, consultant, developer, operator, and owner-investor) marked italic in Table 4-3. For the analysis of question 4, however, cross-category respondents have not been listed separately, but have been individually included in the relevant category. As a practical example, the response of a participant who is active both as a developer and owner-investor, would appear in both categories separately. For the analysis, a multiple response set has been defined with the five stakeholder types and a multiple response frequency analysis was run for the selected response set. The result of the analysis is displayed in Table 3-1.

		N	Percent	Percent of Cases
Stakeholders[a]	Operator	12	26.7%	33.3%
	Developer	7	15.6%	19.4%
	Owner-Investor	7	15.6%	19.4%
	Architect	2	4.4%	5.6%
	Consultant	17	37.8%	47.2%
Total		**45**	**100.0%**	**125.0%**

a. Dichotomy group tabulated at value 1.

TABLE 3-1 STAKEHOLDERS FREQUENCIES

To analyze responses per stakeholder group, five variables have been added to the dataset, each indicating one of the stakeholder groups. These were binary coded with 1 or 0 for each response based on whether a respondent marked the discipline in their answer to question 4. For the analysis five separate descriptive analyses were run (one for each discipline) by way of case selection. In other words, data has been filtered based on their selection of each stakeholder group and analyzed separately. The results of these analyses are summarized in the results and discussion section of this thesis.

4 RESULTS AND DISCUSSION

4.1 Perceived importance of space efficiency

Question 4 assessed respondents' perceptions on the importance of increasing space efficiency in their own roles. Figure 4-1 visualizes responses given to the question by the 36 respondents. Rather strikingly, 89% of respondents gave a positive response (4-6= somewhat important – extremely important).

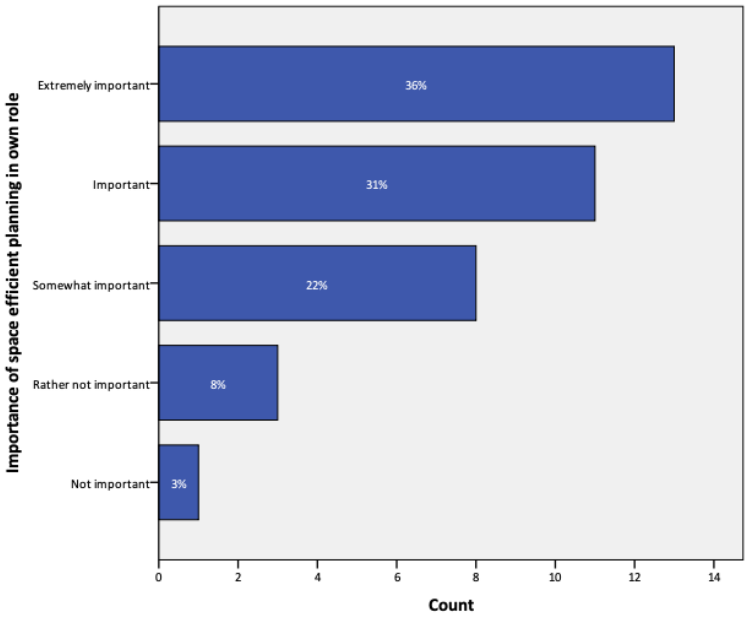

FIGURE 4-1 RESULTS: IMPORTANCE OF INCREASING SPACE EFFICIENCY IN OWN ROLE

Stakeholder Frequencies

		Responses		
		N	Percent	Percent of Cases
Stakeholders[a]	Operator	12	26.7%	33.3%
	Developer	7	15.6%	19.4%
	Owner-Investor	7	15.6%	19.4%
	Architect	2	4.4%	5.6%
	Consultant	17	37.8%	47.2%
Total		45	100.0%	125.0%

a. Dichotomy group tabulated at value 1.

TABLE 4-1 RESULTS: FREQUENCIES OF STAKEHOLDER DISCIPLINES AMONG REPONDENTS

As discussed in the previous section, handling of responses given to question 4 have been handled somewhat differently for the purposes of further analysis. As participants were able to indicate multiple disciplines, they are active in, their responses have been analyzed per discipline

and not per individual respondent. Table 4-1 provides an overview of the indicated disciplines respondents were active in, which produced a total number of 45 cases.

Table 4-2 is a summary of five different descriptive statistics outputs from SPSS, as described in detail in the previous chapter. Responses per discipline are rather similar, indicating a mean value of 4,71 to 4,86 with the notable exception of architects, whose mean of 5,50 is somewhat higher. It must however be noted that skewedness of the result may arise from the low number of respondents indicating their affiliation as an architect. To assess the differences in the prioritization of space efficiency in hotel planning is outside the scope of this paper. Nonetheless, further research would do well to discover the topic more in detail with more robust respondent numbers.

Descriptive Statistics

Importance of space efficient planning in own role

		N	Minimum	Maximum	Mean	Std. Deviation
Stakeholders	Architect	2	5	6	5,50	0,707
	Consultant	17	2	6	4,82	1,286
	Developer	7	4	6	4,71	0,756
	Operator	12	3	6	4,83	1,115
	Owner-Investor	7	4	6	4,86	0,690

TABLE 4-2 RESULTS: INDICATED IMPORTANCE OF SPACE EFFICIENCY IN OWN ROLE BASED ON DISCIPLINES

A key indication, however, of responses given to question 4 by respondents is that increasing space efficiency in hotel planning is indeed a highly relevant objective for most professionals in the industry.

4.2 Responses

As previously mentioned, altogether 36 valid responses have been received in the 28-day collection period. It was not necessary to remove any responses due to ineligibility. Table 4-3 provides an overview of respondents based on the type of company they work for. As discussed previously, there have been six respondents, who marked multiple disciplines they actively work in. These respondents are marked italic. Notably, two respondents have marked that they work as owner-investors who also develop properties, one respondent said they work both as an operator and a developer, a further respondent indicated working as an owner-investor, an operator, and a developer and one respondent indicated to be an owner-investor and operator. Notably, one respondent marked more than three disciplines, namely operator, developer, owner-investor, and a consultant. The different categorization of stakeholders in data analysis has been discussed previously.

	Frequency	Percent
Architect	2	5,6
Consultant	16	44,4
Developer	2	5,6
Developer, owner-investor	*2*	*5,6*
Operator	8	22,2
Operator, developer	*1*	*2,8*
Operator, developer, owner-investor	*1*	*2,8*
Operator, developer, owner-investor, consultant	*1*	*2,8*
Operator, owner-investor	*1*	*2,8*
Owner-Investor	2	5,6
Total	**36**	**100,0**

TABLE 4-3 SUMMARY OF RESPONDENTS INCLUDING MULTIDISCIPLINARY RESPONDENTS

The control question regarding involvement in hotel development on a regular basis was answered positively by all respondents, and therefore no exclusions from the dataset were necessary on these grounds. Concerning the amount of experience respondents have in their current role is summarized in Table 4-4.

	Frequency	Percent
1-5 years	15	41,7%
5-10 years	5	13,9%
10-20 years	9	25,0%
more than 20 years	7	19,4%
Total	**36**	**100,0%**

TABLE 4-4 EXPERIENCE OF RESPONDENTS IN CURRENT ROLE

The following sections of Results and Discussions will analyze responses given by participants of this study organized along the lines of the previously discussed research objectives.

4.3 Measuring space efficiency

The three questions targeting the measurement of space efficiency sought to establish perceived usefulness of existing metrics measuring space efficiency (question 5) and to gauge how often respondents use each metric (question 6) and explore whether there are any additional metrics they may find useful for this purpose (question 7).

Table 4-5 summarizes the answers given to question 5, measuring the perceived usefulness of various space efficiency metrics. Interestingly, all included metrics have been evaluated as both "1=not at all useful" and "6=extremely useful". Overall, *TGFA per guestroom* has been evaluated as the most useful metric with a mean of 4,72 and the lowest standard deviation in the set of 1,186.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
% of space occupied by rooms on guestroom floor	36	1	6	4.31	1.390
TGFA per guestroom	36	1	6	4.72	1.186
% of revenue generating space of total space	36	1	6	4.39	1.440
Grossing factor	36	1	6	3.89	1.450

TABLE 4-5 RESULTS: PERCEIVED USEFULNESS OF SPACE EFFICIENCY METRICS

Percentage of revenue generating space of total space and *percentage of space occupied by rooms on guestroom floors* have been evaluated similarly with a mean of 4,39 and 4,31 respectively. Within the selection, *grossing factor* was perceived as the least useful by respondents with a mean of 3,89.

Table 4-6 on the other hand summarizes responses given to question 6, asking respondents about how often they use the same metrics (1=never, 6=very often).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
% of space occupied by rooms on guestroom floor	36	1	6	3.56	1.520
TGFA per guestroom	36	1	6	4.92	1.204
% of revenue generating space of total space	36	1	6	4.08	1.574
Grossing factor	36	1	6	3.42	1.574

TABLE 4-6 RESULTS: FREQUENCY OF USAGE OF SPACE EFFICIENCY METRICS

Ranking of the metrics in terms of frequency of use mirrors the ranking in the previous question, reflecting a logical link between perceived usefulness and effective utilization. *TGFA per guestroom* has been indicated to be the most-used metric among respondents with a mean value of 4,92 and a standard deviation of 1,204. The minimum and maximum values of 1 and 6 indicate a pronounced difference approaches to evaluating space efficiency on and individual bases within the industry.

Table 4-7 shows answers given to the open-ended question 7 (answers are displayed as given by respondents, except of grammatical mistakes and typos). Overall, 10 answers have been received for this question.

Metric	Stakeholder
Percentage of Total Gross Floor Area vs. Total Net Floor Area	Architect
EBITDA per sqm	Consultant
Dividing the total usable square meters of the object by the number of planned rooms	Consultant
Amenity space per guestroom in sqm	Developer, owner-investor
BOH space % of total public spaces	Operator
for F&B - sqm/seat and seat/rooms. For C&B *[author: conference and banqueting]* - sqm/room	Operator
We look at GFA per bed rather than guest room, since we have four standard room categories with 2/ 4/ 6/ 8 beds per room and will vary from them with 3/5/7 bedrooms if space in conversion projects requires	Operator
Useful GFA	Operator
Revenue per total GFA sqm for the building. Revenue per sqm for each separate area	Operator, developer, owner-investor
Gross vs net area	Operator, owner-investor

TABLE 4-7 RESULTS: ADDITIONAL METRICS USED BY RESPONDENTS

A metric mentioned by two separate respondents (although worded differently) is the *percentage of total net floor area of total gross floor area*, measuring, in essence, the efficiency of planning, i.e., how much supporting areas are necessary within the building (walls etc.). *Usable space per guestroom* and *useful GFA* have also been added to the list by two respondents. Although these metrics are similar to *TGFA per guestroom*, definition of useful floor space may provide a further layer within this metric that may be practical for benchmarking. Hotel operators contributed several interesting metrics used. *Amenity space per guestroom in m^2* expresses the ratio of auxiliary spaces and hotel guestrooms, whose usage is rather useful in properties with a high proportion of amenities (e.g., resorts). *BOH space as a percentage of total public spaces* is a metric that scrutinizes the degree of support areas within hotel operations and may be useful for assessing the space efficiency of service areas. A respondent mentioned two separate KPIs used in different areas of the hotel. *[F&B] Floorspace per seat and seat per guestroom* were indicated to be useful metrics in F&B, while *[conference and banqueting] floorspace per guestroom* were mentioned for measuring space efficiency of conference facilities. An operator noted that they utilize *GFA per bed* instead of TGFA per guestroom, as their properties have hotel rooms with various bed counts (e.g., a hostel) and therefore a modified version of the metric yields a higher utility. A consultant added *EBITDA per m^2* as a regularly used benchmarking tool during their work, which measures the profitability of the property relative to floor space. A multi-disciplinary respondent indicated that they use *revenue per TGFA* to benchmark entire hotels, while they use *revenue per m^2* for the evaluation of separate hotel areas.

4.4 Objectives of space-efficient planning practices

The perceived impact of space-efficient hotel planning on various project objectives was assessed via question 8 in the questionnaire. Results are summarized in Table 4-8.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Reducing construction costs	36	2	6	4.36	1.150
Reducing built area	36	1	6	3.81	1.470
Increasing the number of rooms	36	2	6	4.97	1.158
Enhancing project feasibility	36	2	6	4.58	1.131
Increasing operational efficiency	36	3	6	4.72	1.059

TABLE 4-8 RESULTS: PERCEIVED EFFECTIVENESS OF SPACE EFFICIENT HOTEL PLANNING ON PROJECT OBJECTIVES

Space-efficient hotel planning practices have been rated to have the highest effect on *increasing the number of rooms* with a mean of 4,97 and a standard deviation of 1,158. *Increasing operational efficiency*, *enhancement of project feasibility*, and *reduction of construction costs* were also rated to be rather effectively influenced by space efficient hotel planning practices (with respective mean values of 4,72; 4,58; and 4,36). Rather surprisingly, *reduction of built area* was rated to be the least effected by space efficient hotel planning practices within the selection (albeit with a relatively high standard deviation between responses of 1,470).

4.5 Space efficiency in various parts of the hotel

Question 9 investigated respondents' views on how relevant space efficient hotel planning practices are in various hotel areas. Results are summarized in Table 4-9. Inspecting the minimum and maximum values, all items have been rated as '6=highly relevant', while the lowest possible rating (1=not at all relevant) has only been applied to four hotel areas. *Guestrooms* have been rated as the most relevant hotel area in terms of space efficient hotel planning with a mean value of 5,11 and a standard deviation of 1,214. This finding is consistent with literature, emphasizing the importance of hotel room design, due to the multiplied effect a particular design may have on a building when repeated multiple times on guestroom floors (Ronstedt & Frey, 2014).

F&B outlets and *function areas* were both rated highly in terms of relevance, with the former receiving no rating lower than 3 (mostly not relevant). Most items were rated rather similarly with mean values between 4,00 and 4,39. Two noteworthy exceptions were *offices and employee areas* and *engineering and mechanical*. The literature review has touched upon the particularities of these two areas, namely that they are both rather standardly depend on the size of the hotel and the number of rooms and therefore provide limited scope for space optimization.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Guestrooms	36	2	6	5.11	1.214
Support areas on GR floors	36	1	6	4.25	1.339
Lobby	36	2	6	4.28	1.186
Circulation	36	2	6	4.39	1.153
F&B outlets	36	3	6	4.53	.971
Recreational areas	36	1	6	4.19	1.283
Delivery and waste disposal	36	1	6	3.69	1.327
Food preparation and storage	36	2	6	4.14	.990
Offices and employee areas	36	2	6	4.00	1.146
Laundry and HSK	36	2	6	4.14	.931
Engineering and mechanical	36	1	6	3.86	1.397
Function areas	36	2	6	4.42	.967

TABLE 4-9 RESULTS: RELEVANCE OF SPACE EFFICIENT HOTEL PLANNING PRACTICES IN VARIOUS HOTEL AREAS

4.6 Perceptions of industry best practices

Question 10 assessed perceptions on nine selected best practices from the literature concerning various hotel areas. Responses are summarized in Table 4-10.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Optimizing building geometry (floor slabs)	36	2	6	4.44	1.423
Reducing room width	36	1	6	3.53	1.521
Reducing room size	36	1	6	3.92	1.481
Flexible guestroom furniture	36	1	6	4.00	1.309
Connecting rooms (multiple configurations)	36	1	6	3.92	1.442
Combining public area functions	36	2	6	4.89	1.141
Open-plan lobby	36	2	6	4.75	1.204
Detachable public areas	36	2	6	4.47	1.207
Self-service F&B	36	2	6	4.03	1.134

TABLE 4-10 RESULTS: PERCEPTIONS OF INDUSTRY BEST PRACTICES

The two practices with the highest rating were *combining public area functions* and *featuring an open-plan lobby*. These two practices have been discussed previously as rather wide-spread in the industry in some new-generation hotels. *Featuring detachable public areas* (discussed in the literature review as a typical practice focusing on *polyvalence*) has been also rated rather highly within the selection with a mean value of 4,47. The fourth highest rated practice was the *optimization of building geometry*, which has been characterized as a rather standard and fundamental practice in hotel planning. *Reduction of room size* and *reduction of room width* were rated low, relative to the other practices, somewhat contradicting results introduced in Table

4-9 as well as literature. *Featuring connecting rooms* has also received a rather low mean evaluation of 3,92.

5 CONCLUSION

The stated aim of this thesis was to reduce ambiguity around the term *space efficiency in hotel development*. This thesis satisfied this aim by summarizing various concepts related to the topic in existing literature and existing definitions of space efficiency within the industry and conducting primary research on industry practitioners' views the subject. By doing so, this thesis maps several directions in which future research can help build a better understanding of the discussed phenomena, mostly guided by industry practices and are otherwise largely absent within academic studies. The five research objectives served as the framework for this thesis, can be answered as follows.

In assessing the first objective, investigating metrics used in the industry for measuring space efficiency, the conclusion may be drawn based on this research that practitioners find standard metrics generally useful, however in practice prefer using *TGFA per guestroom*. Respondents indicated that there are additional metrics they may use for assessing space efficiency. Some of these metrics provide a more detailed insight into the use of space in certain parts of a hotel (e.g., *BOH as a percentage of total space*) or inspect the topic from another viewpoint, such as that of the owner or developer (e.g., *EBITDA per m^2*). One response highlighted the fact that care should be taken when benchmarking various concepts, as metrics connected to the number of guestrooms may not entirely be relevant for lodging products with differing business models (e.g., hostels), where KPIs must be changed to reflect the particularities of the product (e.g., *TGFA per bed*).

The second objective was to assess the perceived relevance of efficient hotel planning practices for reaching hotel development objectives. Respondents perceive this relevance rather positively across all inspected objectives. Although sample size and the number of investigated items may be limiting for drawing broad conclusions, it seems clear that space efficient planning practices are perceived to have a favorable effect on hotel projects and therefore should be investigated further.

The third objective concerned the assessment of perceived relevance of space efficient hotel planning in various areas of the hotel. The findings of the primary research support existing literature on the topic, indicating that spaces that occupy a large proportion of space, such as guestrooms are the most in need of increasing space efficiency, while some areas that are mostly dependent on the number of rooms and hotel size, such as technical and BOH areas are more difficult to reduce.

Assessing best practices as the fourth objective, however, indicated that practitioners rated best practices where public areas were optimized somewhat higher. This phenomenon may be explained by the fact that space efficient planning of public areas is more noticeable than a marginal improvement of a guestroom's footprint which is than multiplied across the whole

building. In any case, this phenomenon should be further researched to provide practitioners and scholars with a better understanding of the nature of space saving in hotels.

The fifth objective was to assess how practitioners see the importance of increasing space efficiency in their respective roles. 89% of respondents provided a positive answer to the question, making it rather clear that the topic is indeed a crucial one in the industry. Although differences in answers given by practitioners in various capacities were inspected, due to the limited sample size, a significant difference could not be detected. Future research would do well to explore differences that may exist in this regard.

5.1 Future research

Given the exploratory nature of this thesis and the research into a broad topic, further academic investigation of the topic is recommended. Firstly, repetition of the same study may be considered with higher respondent numbers, with a more detailed profiling of respondents to be able to detect significant differences between stakeholders' perceptions of the various questions. Industry organizations incorporating a large number of active professionals would be in an ideal position to carry out such research effectively.

Secondly, separate bodies of research should target elements of this thesis to establish a more detailed view on the questions discussed here. For instance, the exact usage of metrics could be catalogued to increase understanding of their usefulness in certain situations and help spread industry best practices. A further example would be the detailed assessment of current trends in space efficient hotel planning, evaluating not only sentiments and perceptions tied to them, but also a monetary value or guest perceptions. A factor likely to remain a significant obstacle to research in the field is the handling of many practices as trade secrets and the reluctance to share details.

6 BIBLIOGRAPHY

Accor. (2020). 'Our brands, our services'. Available: https://group.accor.com/en/brands - retrieved on: 23 Feb. 2021.

Accor. (2021). 'Compare our brands'. Available: https://group.accor.com/en/hotel-development/brands/compare-our-brands - retrieved on: 27 Feb. 2021.

Bader, E., & Lababedi, A. (2007). Hotel management contracts in Europe. *Journal of retail & leisure property*, *6*(2), 171-179.

Baltin, B. et al. (1999) Hotel Development, *The Urban Land Institute: Washington*.

Baltin, B., & Cole, J. (1995). Renovating to a target market. *Lodging Hospitality*, *51*(8), 36-38.

Baud-Bovy, M., & Lawson, F. (1998). *Tourism and recreation: handbook of planning and design*. Architectural Press.

Bell, C. A. (1993). Agreements with chain-hotel companies. *Cornell Hotel and Restaurant Administration Quarterly*, *34*(1), 27-33.

Blanco, A. C., Oehmichen, A., & Frood, S. (2011). European hotel development–Focus on budget hotels. *Journal of Retail & Leisure Property*, *9*(5), 373-379.

Broten, P. R. (1962). Building Profitable Hotels. *Cornell Hotel and Restaurant Administration Quarterly*, *2*(4), 4-9.

Deloitte Consulting LLP (2016). *'The hotel of the future'*. Available: https://www2.deloitte.com/content/dam/Deloitte/us/Documents/consumer-business/us-cb-the-hotel-of-the-future.pdf – retrieved on: 20 Feb. 2021.

de Roos, J.A. (2004) Project finance. In Ransley, J., & Ingram, H. (Eds.), *Developing Hospitality Properties & Facilities* (pp. 79-94). Oxford, UK: Elsevier Butterworth-Heinemann.

deRoos, J. A. (2010). Hotel management contracts—Past and present. *Cornell Hospitality Quarterly*, *51*(1), 68-80.

deRoos J.A. (2011a) In Sturman, M. C., Corgel, J. B., & Verma, R. (Eds.). *The Cornell school of hotel administration on hospitality: cutting edge thinking and practice*, (pp. 293-308). John Wiley & Sons.

deRoos, J. A. (2011b). Planning and programming a hotel. (Electronic version). *Cornell University, School of Hospitality Administration*. Available: http://scholarship.sha.cornell.edu/articles/ 310 – retrieved on: 28 Feb. 2021.

Evanoff, M. (2016). *The international hotel management agreement: Origins, evolution, and status.* Cornell Hospitality Report, Vol. 16, No. 11

Higgins, S. M. (2007, 16 Jul.). 'Panel: mixed use gets it done'. *Hotel & Motel Management*. 24-25.

Hilton. (2018, Oct 23). Hilton Announces Innovative New Hotel Brand; 'Motto by Hilton' Will Deliver Affordable Style in Coveted Urban Destinations. Available https://newsroom.hilton.com/corporate/news/hilton-announces-innovative-new-hotel-brand-motto-by-hilton-will-deliver-affordable-style-in-coveted-urban-destinations. – retrieved on: 14 May 2021.

Hilton. (2020). 'Motto by Hilton development brochure'. Available: https://www.hilton.com/en/corporate/wp-content/uploads/2020/02/Motto-by-Hilton-Development-Brochure-emea_20200213.pdf. – retrieved on: 14 May 2021.

InterContinental Hotels Group. (2020, 22 July). IHG® opens Europe's largest Holiday Inn Express® in Amsterdam. Available https://www.ihgplc.com/en/news-and-media/news-releases/2020/ihg-opens-europes-largest-holiday-inn-express-in-amsterdam. – retrieved on: 24 May 2021.

Koller, M. (2016, Apr.). VISO 04-2016 – Thema / Thème – Volkshotel Amsterdam/NL. *Atelier Koller*. Available: http://www.atelierkoller.com/2016/07/viso-04-2016-thema-theme-volkshotel.html. – retrieved on: 18 May 2021.

Lawson, F. R. (1995). *Hotels and resorts: planning, design and refurbishment.* Architectural Press.

Lin, B. (2011). Flexible hotel design – *'Rethinking hotel design to address short-term demand fluctuations.'* Dissertation. Victoria University of Wellington. Available: https://core.ac.uk/download/pdf/41339781.pdf – retrieved on: 20 Feb. 2021.

Madanoglu, M., & Ozdemir, O. (2016). Is more better? The relationship between meeting space capacity and hotel operating performance. *Tourism management*, *52*, 74-81.

Marmot, A. (2006). Promoting space efficiency in building design. *Space Management Group*.

Marriott International. (n.d.). Moxy hotels. Available: https://mgscloud.marriott.com/public/hostedfiles/vr/virtualtours/moxy-hotels-model-room/brochures/brochure.pdf. – retrieved on: 19 May 2021.

Medina, K. (2017, 30 Mar.). Hotels missing out on fast-casual dining trend. *Hotel Management*. Available: https://www.hotelmanagement.net/food-beverage/fast-casual-dining-has-taken-all-but-hotel-industry-by-storm. – retrieved on 20 May, 2021.

Meininger Hotels. (n.d.). Available: https://www.meininger-hotels.com/en/hotels/frankfurt-main/hotel-frankfurt-airport/. retrieved on 18 May 2021.

Mest, E. (2018, 23 Oct.). Hilton goes micro with new brand, Motto. *Hotel Management.* Available: https://www.hotelmanagement.net/development/hilton-goes-micro-new-brand-motto. Retrieved on: 14 May 2021.

Miller, N. G. (2013). Changing Trends in Office Space Requirements: Implications for Future Office Demand.

Minazzi, R. (2010). Hotel classification systems: a comparison of international case studies. *Acta Universitatis Danubius. Œconomica*, *6*(4), 64-86.

Mun, S. G., Woo, L., & Paek, S. (2019). How important is F&B operation in the hotel industry? Empirical evidence in the US market. *Tourism Management*, *75*, 156-168.

O'Fallon, M. J., & Rutherford, D. G. (2010). *Hotel management and operations*. John Wiley & Sons.

Penner, D. (2004) Operational planning and relationships. In Ransley, J., & Ingram, H. (Eds.), *Developing Hospitality Properties & Facilities* (pp. 195-214). Oxford, UK: Elsevier Butterworth-Heinemann.

Rabianski, J. S., Clements III, J. S., Tidwell, O. A. (2009). Mixed-Use Development and Financial Feasibility. *Real estate issues*, 11-17.

Ransley, J. (2004) Concepts. In Ransley, J., & Ingram, H. (Eds.), *Developing Hospitality Properties & Facilities* (pp. 3-22). Oxford, UK: Elsevier Butterworth-Heinemann.

Ransley, J. (2004) The design team. In Ransley, J., & Ingram, H. (Eds.), *Developing Hospitality Properties & Facilities* (pp. 115-139). Oxford, UK: Elsevier Butterworth-Heinemann.

Ransley, J., & Ingram, H. (2001). What is "good" hotel design. *Facilities*, *19*(1-2), 79-87.

Ransley, J., & Ingram, H. (2004). *Developing Hospitality Properties & Facilities*. Oxford, UK: Elsevier Butterworth-Heinemann.

Rawlinson, S. (2004). Building costs. In Ransley, J., & Ingram, H. (Eds.), *Developing Hospitality Properties & Facilities* (pp. 140-161). Oxford, UK: Elsevier Butterworth-Heinemann.

Romeo P. (2021, April 6). Marriott tests replacing the breakfast buffet with vending machines. *Restaurant Business.* Available https://www.restaurantbusinessonline.com/operations/marriott-tests-replacing-breakfast-buffet-vending-machines – retrieved on: 25 Apr. 2021.

Ronstedt, M., & Frey, T. (2014). *Hotel Buildings: Construction and Design Manual*. DOM publishers.

Rouse, C. (2004) Legal Agreements and Contracts. Ransley, J., & Ingram, H. (Eds.), *Developing Hospitality Properties & Facilities* (pp. 95–111). Oxford, UK: Elsevier Butterworth-Heinemann.

Rutes, W. A., Penner, R. H., & Adams, L. (2001). *Hotel design, planning, and development*. WW Norton & Company.

Sampson, H. (2019 , Oct. 16). Why microhotels, or hotels with tiny rooms, are becoming all the rage. *The Washington Post*. Available https://www.washingtonpost.com/travel/2019/10/15/why-microhotels-or-hotels-with-tiny-rooms-are-becoming-all-rage/. – retrieved on: 14 May 2021.

Shreeram A., & Somani M. (n.d.). Highlights from Neni Munich & The Boilerman Bar. *Trail-Stained: Walk Everywhere*. Available: https://trailstainedfingers.com/neni-munich-the-boilerman-bar/. retrieved on: 18 May 2021.

Siguaw, J. A., & Enz, C. A. (1999). Best practices in hotel operations. *Cornell Hotel and Restaurant Administration Quarterly*, *40*(6), 42-53.

Slattery, P. (2012). The economic ascent of the hotel business. *Oxford: Goodfellow Publishers.*

Sufi, T., & Singh, S. P. (2018). Hotel classification systems: A case study. *Prabandhan: Indian Journal of Management, 11*(1), 52-64.

Suttell. R. (2004). Smaller is better: boutique hotels transform the concept of meeting spaces. *Buildings & Buildings Interiors*, August 2004, 60-63.

Udell, G. G. (1972). The franchise agreement. *Cornell Hotel and Restaurant Administration Quarterly*, *13*(2), 13-21.

Venter, I., & Cloete, C. E. (2007). A framework for successful hotel developments. *South African Journal of Economic and Management Sciences*, 10(2), 223-237.

Ward, T. (2004) Feasibility. In Ransley, J., & Ingram, H. (Eds.), *Developing Hospitality Properties & Facilities* (pp. 23-42). Oxford, UK: Elsevier Butterworth-Heinemann.

Yeh, C. Y., Chen, C. M., & Hu, J. L. (2012). Business diversification in the hotel industry: A comparative advantage analysis. *Tourism Economics*, *18*(5), 941-952.

APPENDICES

Appendix 1: Questionnaire

1. Select the type of company you are actively working for: *

Tick all that apply.

- O Hotel operator
- O Hotel developer
- O Hotel investor / owner
- O Architect (with experience in hotel panning)
- O Consultant (with a focus on tourism and hospitality or real estate)
- O Contractor / construction company
- O Other:

2. Are you regularly involved in hotel development projects as part of your job? *

Mark only one option.

- O Yes
- O No

3. How long have you worked in the above-mentioned field? *

Mark only one option.

- O 1-5 years
- O 5-10 years
- O 10-20 years
- O more than 20 years

4. How important an objective is increasing space efficiency in hotel panning in your role? *

Mark only one option per row. 1=not at all important, 6=extremely important

1	2	3	4	5	6
O	O	O	O	O	O

5. How useful are the following metrics in measuring space efficiency within hotel planning? *

Mark only one option per row. 1=not at all useful, 6=extremely useful

	1	2	3	4	5	6
Percentage of space occupied by rooms vs. total space on guestroom floors	O	O	O	O	O	O
Total Gross Floor Area per guestroom (in sqm or sqf)	O	O	O	O	O	O

Percentage of revenue generating space vs. total space	O	O	O	O	O	O
Grossing factor (defined as the percentage added to the total area of guestrooms on a guest floor to provide for circulation, services distribution, maids' rooms, etc.)	O	O	O	O	O	O

6. How often do you use the following metrics for measuring space efficiency within hotel planning in your work? *

Mark only one option per row. 1=never, 6=very often

	1	2	3	4	5	6
Percentage of space occupied by rooms vs. total space on guestroom floors	O	O	O	O	O	O
Total Gross Floor Area per guestroom (in sqm or sqf)	O	O	O	O	O	O
Percentage of revenue generating space vs. total space	O	O	O	O	O	O
Grossing factor (defined as the percentage added to the total area of guestrooms on a guest floor to provide for circulation, services distribution, maids' rooms, etc.)	O	O	O	O	O	O

7. Do you use any other metric to measure space efficiency? If yes, please indicate which one:

8. How effective is space efficient hotel planning in achieving the following outcomes? *

Mark only one option per row. 1=not at all effective, 6=extremely effective

	1	2	3	4	5	6
Reducing construction costs	O	O	O	O	O	O
Reducing built area	O	O	O	O	O	O
Increasing the number of rooms	O	O	O	O	O	O
Enhancing project feasibility	O	O	O	O	O	O
Increasing operational efficiency	O	O	O	O	O	O

9. How relevant is space efficient planning in the following hotel areas? *

Mark only one option per row. 1=not at all relevant, 6=extremely relevant

	1	2	3	4	5	6
Guestrooms	O	O	O	O	O	O
Support areas on guestroom floors	O	O	O	O	O	O
Lobby	O	O	O	O	O	O
Circulation	O	O	O	O	O	O
Food and beverage outlets	O	O	O	O	O	O
Recreational areas (fitness and wellness)	O	O	O	O	O	O
Delivery and waste disposal	O	O	O	O	O	O
Food preparation and storage	O	O	O	O	O	O
Offices and employee areas	O	O	O	O	O	O
Laundry and housekeeping	O	O	O	O	O	O
Engineering and mechanical	O	O	O	O	O	O
Function areas (meeting rooms)	O	O	O	O	O	O

10. How relevant are the following practices for increasing space efficiency in hotels? *

Mark only one option per row. 1=not at all relevant, 6=extremely relevant

	1	2	3	4	5	6
Optimizing building geometry / floor slab configuration	O	O	O	O	O	O
Reducing room width	O	O	O	O	O	O
Reducing room size	O	O	O	O	O	O
Using flexible furniture in guestrooms	O	O	O	O	O	O
Including connecting rooms, allowing for multiple room configurations (e.g., Motto by Hilton)	O	O	O	O	O	O
Combining public area functions (e.g., reception and bar)	O	O	O	O	O	O
Featuring an open-plan lobby	O	O	O	O	O	O
Designing parts of public areas to be detachable and used for another function (e.g., as meeting space)	O	O	O	O	O	O

Using self-service solutions in food and beverage (e.g., vending machines or grab-and-go stations)	O	O	O	O	O	O