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Management of constraint generators in fashion store design processes

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Abstract

Purpose – Retail design concepts are complex designs meeting functional and aesthetic demands from various constraint generators. However, the literature on this topic is sparse and offers only little support for store designers to deal with such challenges. To address this issue, the purpose of this paper is to identify the most important constraint generators, investigating the types of constraints they generate, and providing guidelines for how to deal with constraint elicitation.
Design/methodology/approach – The three contributions mentioned above are developed through discussions of the literature and eight case studies of fashion store design projects.
Findings – The paper shows that the influence of the constraint generators decreases during the design process except for supplier-generated constraints, which increase in the final stages of the design process. The paper argues that constraints should be elicited close to their occurrence, and that doing so requires a solid understanding of relevant constraint generators.
Research limitations/implications – The paper provides a structured basis for further research and identifies areas warranting further study. Although, the paper's focus is on fashion store design, the findings may, to some degree, be applicable to other types of store design projects.
Practical implications – The understandings provided by this paper may help designers to deal proactively with constraints, reducing the use of resources to alter design proposals.
Originality/value – The paper: defines the most important constraint generators from the perspective of retail store designers, clarifies the types of constraints they generate, and provides guidelines for how to deal with constraint elicitation.

Keywords Design management, Design constraints, Constraint generators, Fashion store, Retail design, Store design

Paper type Research paper

Introduction

Most retailers and product brands are aware of the importance of focussing on retail store design as a part of their marketing strategy. This awareness has a solid foundation in the retail store literature, which holds considerable evidence that retail store experiences have a significant impact on consumer satisfaction, shopping frequency, purchase amount, loyalty, reputation, and image formation (e.g. Turley and Milliman, 2000; Wong and Sohal, 2006; Grewal *et al.*, 2009; Verhoef *et al.*, 2009; Puccinelli *et al.*, 2009; Jones *et al.*, 2010; Bagdare and Jain, 2013; Ballantine *et al.*, 2015).

Although the retailer makes the final decisions, it is the store designer who creates the store designs, as well as advising the retailer about the consequences of such decisions. Thus, in contrast to the focus in most existing literature, it is also relevant to understand this task from the perspective of store design bureaus. They are to provide design proposals that satisfy desires and demands from retailers, while ensuring that such proposals are realisable within economic and time constraints. This can be extremely complicated because of the many design variables involved and their interrelationships (Vazquez and Bruce, 2002; Haug and Münster, 2015).

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For example, choosing a certain floor material has consequences for the choices made about the walls, because the two materials will meet. Therefore, a practical solution for the joint must be found, and aesthetically, the mix of the surfaces must create a coherent and harmonious store appearance. Another issue that may complicate the retail store design task is the involvement of multiple stakeholders with differing opinions and interests. The many interdependent design variables and different stakeholder interests imply that, compared to product design, retail store design favours flexibility and a process of continuous problem solving over a more anticipatory approach (Kent, 2007).

Since constraints in store design projects typically emerge continuously throughout the design process and often point it in different directions (Vazquez and Bruce, 2002; Kent, 2007; Haug and Münster, 2015), dealing with such constraints only as they emerge requires altering store designs each time new and unsatisfied constraints are encountered. Thus, dealing with constraints in a more proactive and systematic manner may make it possible to avoid alterations and save on time and resources. One of the means to enable such an approach is a better understanding of relevant constraint generators (i.e. constraint-generating stakeholders and physical surroundings) and the type of constraints they generate. Despite the fact that fashion consumers have been studied extensively over the past 20 years (Michon *et al.*, 2015), academic investigation of store design – the environments in which these consumers make their purchases – is sparse, and does not provide adequately detailed answers from the designer's perspective (Haug and Münster, 2015). To address this issue, this paper aims to identify the most important constraint generators, investigating the types of constraints they generate, and providing guidelines for how to deal with constraint elicitation. More specifically, this paper answers the following three questions from the perspective of store designers:

(1) Who/what are the main constraint generators from the perspective of the fashion store designer?

(2) What types of constraints do the main constraint generators impose?

(3) How can store designers elicit such constraints?

Because of the highly context-dependent environmental factors associated with individual stores, retail store design is difficult to study from a general perspective (Van Rompay *et al.*, 2012). In order to delimit the focus, this paper concentrates on fashion stores. Fashion stores are of particular interest in relation to store design, since their design usually requires unique interiors capable of standing out from the competition; they need to appear exclusive, provocative, grab consumers' attention in other ways (Ballantine *et al.*, 2015; Haug and Münster, 2015). Furthermore, fashion stores demand a flexible interior since the fashion collections change frequently, creating a need for the store to convey new messages at regularly recurring intervals (Barnes and Lea-Greenwood, 2010). Fashion stores thus represent an extreme in terms of the demands of their store design, which makes them an ideal laboratory for this type of study. Other kinds of retail stores, where the requirements of the design are perhaps less exacting, may be able to utilise insights gained from the study of fashion store design. Thus, although the focus of this paper rests narrowly on the design of fashion stores, the findings may be applicable to other types of store design projects.

Literature review

This section summarises and discusses literature on retail store design, design constraints, and retail design constraint generators.

Retail store design

In the early 1970s, marketing research began to explore the subtler aspects of service environment design, not least because Philip Kotler (1973) drew attention to what he called

"atmospherics", or "the conscious designing of space to create certain effects in buyers" (p. 50). A central topic in this context is the effect of cues on consumers. Studies with this focus include investigations of the effects of visual, auditory, olfactory, and tactile cues (Bellizzi *et al.*, 1983; Bitner, 1992; Baker *et al.*, 2002; Chebat and Morrin, 2007; Ryu and Jang, 2008; Van Rompay *et al.*, 2012; Bagdare and Jain, 2013; Ballantine *et al.*, 2015). However, research addressing the holistic effects of a store's environmental factors is inconclusive. This is in part because environmental aspects are complex combinations of different types of stimuli linked to both intangible variables, such as colour and scent, and tangible variables, such as decorations, layout, and interior design elements (Van Rompay *et al.*, 2012; Ballantine *et al.*, 2015).

Consumers generally prefer shopping environments that match their self-concept (e.g. Donovan *et al.*, 1994; Sirgy *et al.*, 2000; Yim *et al.*, 2007). Also, consumers' brand perceptions have a significant influence on their purchase behaviour (Diallo *et al.*, 2013), and the store becomes a means of communication between brand and consumer (Davies and Ward, 2005). The communication of brand identity through store design seems particularly relevant in fashion stores, where environmental cues grab the consumer's attention in a certain way. Faultrier de and Towers (2011) describe the approach to fashion store design in this way: "how the consumer can experience the brand identity, thanks to a specific choice of materials, lighting and fittings designed specially for the different brands and particular types of merchandise".

Besides communicating a specific identity, fashion stores must also meet consumers' need for interacting with the products. The store has both to inspire and to present the products in a way that makes it easy for the consumer to see, touch, and try them. The store must also accommodate social factors in both an direct and indirect manner (Brocato *et al.*, 2012; Baker *et al.*, 2002; Jones *et al.*, 2010; Wu *et al.*, 2013). Research also indicates that consumers with hedonic intentions place higher importance on the store environment than consumers with utilitarian intentions (Jones *et al.*, 2010; Kaltcheva and Weitz, 2006; Van Rompay *et al.*, 2012). Fashion shopping can to a large extent be categorised as particularly hedonic type of shopping, which obviously produces special demands in relation to store design.

A central aim of retailers is to create consumer loyalty. Studies have indicated that store loyalty can be predicted by consumers' self-congruity (the match between the brand image and consumer's self-concept), and that this self-congruity can be predicted by store dimensions such as atmosphere, merchandise, price, and promotions (Chebat *et al.*, 2009). Thus, the identity of the store needs to be clearly communicated in order to build the desired associations with the brand (Vazquez and Bruce, 2002; Godey *et al.*, 2009).

Bitner's (1992) framework for service environments addresses the nature of store environments and is one of the most widely cited of its kind. Bitner grouped the physical service environment into three categories: space and function; signs, symbols, and artefacts; and ambient conditions. Another way to understand retail environments is proposed by Berman and Evans (1995), who defined the four categories of atmospheric stimuli: external variables; general interior variables; layout and design variables; and point-of-purchase and decoration variables. Turley and Milliman (2000) added a fifth category called "human variables".

What the above-mentioned classifications make clear is that retail store design involves decisions for a wide range of interpreted variables, which can make store design an extremely complicated task (Vazquez and Bruce, 2002). Thus, as mentioned in the introduction, many stakeholder interests and the interdependency of these design variables imply that, compared to product design, retail design favours flexibility and a process of continuous problem solving over a more anticipatory approach (Kent, 2007). The design decisions related to these variables may be seen as compromises between the demands, interests, or preferences of relevant constraint generators, such as store owners, consumers, and legislators. In other words, it is the task of the store designer to define a store design

that considers such demands, interests, or preferences (i.e. constraints) to a satisfactory degree. Thus, store designers need to know who the relevant "constraint generators" are and what constraints they generate.

In retail design literature, fashion stores are often dealt with as a special case within retail stores generally. Examples include the marketing communication of fast fashion (Barnes and Lea-Greenwood, 2010), fashion store atmosphere (Parsons, 2011; Ballantine *et al.*, 2015), fashion store personality (Brengman and Willems, 2009), the relationship between hedonic and utilitarian fashion shopping (Scarpi, 2006), sensory aspects of fashion stores (Clarke *et al.*, 2012), lighting aspects of fashion stores (Schielke and Leudesdorff, 2015), the role of scent in fashion stores (Doucé and Janssens, 2013), visual merchandising vs brand attitude in fashion stores (Park *et al.*, 2015), private vs national brand fashion store images (Herstein *et al.*, 2013), and consumer vs retailer store image perception (Birtwistle *et al.*, 1999). As mentioned in the introduction, the explanation for the special treatment accorded to fashion stores lies in the fact that the demands of fashion store design are typically far more stringent when compared to other retail environments. Fashion stores require attention-grabbing interiors capable of standing out from their competitors, while at the same time requiring an interior flexible enough to accommodate frequently changing product lines (Barnes and Lea-Greenwood, 2010; Ballantine *et al.*, 2015; Haug and Münster, 2015).

Design constraints

Extensive searches in journal databases (Social Sciences Citation Index, Arts and Humanities Citation Index, and EBSCO) revealed that retail design literature dealing with "design constraints" is sparse. This is also the case for the adjacent fields of industrial and fashion design, as opposed to, for example, engineering and computing. In the following, the most relevant of the identified literature is summarised.

A design constraint is something that limits the possible design choices. Lawson (2006) distinguished between three design constraint dimensions: generator, domain, and function. Lawson divided constraint generators into designers, clients, users, and legislators. He further argued that the flexibility or optionality of the constraints is greatest in the designer-generated constraints, becomes increasingly smaller as one moves from clients to users, and eventually becomes rather rigid or mandatory at the legislator level. According to Lawson (2006, p. 91), one of the most important skills for designers to acquire is the ability to evaluate self-imposed constraints. This lets them eliminate unfruitful constraints instead of spending time on insuperable problems that, to a large extent, are created by the designers themselves.

According to Gedenryd (1998, p. 73), the standard view of constraints can be summarised as "restrictions on an acceptable solution that are specified in the instructions given to the designer" that are "non-optional (but indeed required) and thus beyond the designer's control". However, according to Gedenryd (1998, p. 71), within the design literature, there are many examples where constraints are not fixed restrictions given in advance, as well as examples where adding constraints proves helpful. More specifically, Gedenryd adopted Guindon's (1990, p. 297) conception that since specifications encountered in practice are typically incomplete, adding constraints is crucial to define the requirements that capture the desired functionality. Thus, according to Gedenryd, conceptions of what a design constraint is point in different directions, in the sense that a constraint may be helpful or a hindrance, fixed or optional, provided in advance or added during the design process, and given to the designer in the problem definition or imposed by the designer.

Savage and Miles (1998) distinguished between three kinds of constraints that designers use: external constraints (economic aspects, such as the time and the cost to develop a product); internal constraints (domain knowledge, expertise, and intelligence); and task-inherent constraints (physical characteristics, such as the size of the product). To investigate such constraints, Savage and Miles conducted experiments by giving 100 students design tasks with

different constraining conditions. The experiments showed that removing the external task constraints of time and cost did not necessarily lead to an optimal solution, while the effect of increasing the task-inherent constraints (physical characteristics) was, at best, neutral. Furthermore, their study suggested that if the aim is to stimulate creativity and unusual designs, it is necessary to keep cost constraints and task-inherent constraints to a minimum.

Oak (2011) investigated how the conversational aspects of design can be examined from the perspectives of symbolic interactionism and conversation analysis. According to Oak, the designed object and the conversations about it represent a set of negotiations between creativity and constraints. Furthermore, Oak argued that "through talk, the creativity and constraints of design are continually being managed and performed by participants in practice" – and that the novel ideas for a new object do not always come from the designer, as clients may also produce innovative suggestions, which may be accepted or rejected on the basis of constraints such as cost, aesthetics, and available machining techniques.

Oygur and McCoy (2011) studied the role of the user and user involvement in the interior design process in a study where 14 students were introduced to a user-centred design process. The study indicated that the students utilised knowledge about the users both as an inspiration and as a source of constraints. The knowledge about the users produced constraints related to goals, barriers, expectations, requirements, and limitations in the project, while also fostering creativity (inspiration) and helping the students to develop concepts. The dynamic between these two roles varied during the project, as in the beginning (analytical phase and executive phase) the users were primarily seen as producing constraints, while later in the process (creative phase), the users were primarily seen as a source of inspiration.

Retail design constraint generators

As mentioned, Lawson (2006) divided constraint generators into designers, clients, users, and legislators. Although this categorisation may be well suited to explain the nature of design constraints, more nuanced descriptions are needed to support retail store designers in their work. Given the sparse literature on design constraints in retail store design, to identify relevant constraint generators, the focus was turned to literature dealing with stakeholders in retail store contexts.

On the basis of general stakeholder categorisations (i.e. Freeman, 1984; Greenley, 1989), Whysall (2000) defined 12 groups of stakeholders in retailing: customers; suppliers; competitors; government; financial community (e.g. in relation to in-store credit); service providers (such as haulage companies and store designers); employees; managers (such as store managers); landlords (e.g. in relation to rental agreements and property maintenance); owners (of the retail business); community (e.g. the retailer may take community services, such as dispensing post); and activists (e.g. trying to protect their local environments against retail development).

According to Kent (2007), stakeholders in retail design fit into three broad categories: those directly involved in the retail design and store development process, those directly affected by the process, and those indirectly affected. Directly involved stakeholders include the store development/property arm; the architect/building services team; the conceptual design team; the store planning and layout team; the local store management; and the buying and merchandising division. Directly affected stakeholders include the retailers' marketing department; the retailers' corporate brand management team; below-the-line agencies (POP, sales promotion, DM, etc.); and advertising and other above-the-line agencies. Indirectly affected stakeholders include staff; customers; adjacent businesses; the neighbouring community; competitors; the media; and shareholders and the financial community.

Other authors use the concept of stakeholders in retail research but do not engage in significant discussions of the concept. For example, Kent and Stone (2007) focussed on how a company's retail store design relates to its brand and corporate values through a study of The Body Shop. In relation to this case study, they mentioned the following types of stakeholders:

brand managers, retailers, manufacturers, consumers, and designers. Lai *et al.* (2010) discussed green retailing, and in this connection, they argued that retailers are under pressure from regulators, community groups, and customers for green practices and that retailers have the role as an intermediary between suppliers and customers in fostering such green practices. In relation to "green retailing practices", they defined the key parties as employees, suppliers, customers, and top management. Petermans *et al.* (2013) focussed on customer experiences in retail environments. To account for the stakeholders who have been involved in the design and functioning of actual retail environments, they interviewed the three types of stakeholders: retailers, designers, and customers. In other words, their study was based on the assumption that these three types of stakeholders have adequate insights to account for the relevant aspects in relation to the design and functioning of retail environments.

The studies by Haug and Münster (2015) produced nine major types of constraint generators in fashion store design projects from the perspective of the designer: supplier, store owner, brand owner, store personnel, consumer, landlord, legislator, competitor, and adjacent business. This categorisation of constraint generators differs significantly from the categorisations by Whysall (2000) and Kent (2007), in the sense that Whysall (2000) and Kent (2007) focus on retailing from an overall perspective, while the classification proposed by Haug and Münster (2015) takes the perspective of the store designers. Thus, as opposed to Haug and Münster (2015), Whysall (2000) does not include "brand owners" and "adjacent businesses", while Kent (2007) does not include "suppliers", "brand owners", "landlords", and "legislators". On the other hand, as opposed to Haug and Münster (2015), Whysall (2000) includes "financial community", "community", and "activists", while Kent (2007) includes "financial community", "neighbouring community", "below-the-line agencies", and more. These differences illustrate that it is a different set stakeholders that affect store designers, as compared to the set of stakeholders involved in retail from an overall perspective.

Literature discussion

In summary, the literature review showed that retail design projects are complex. It also underlined the importance of designers knowing the relevant constraint generators and understanding the types of constraints they generate. Furthermore, the literature review showed that although there are several examples of research on design constraints from a general perspective, research on constraint generators in fashion store design processes is scarce. Finally, although the literature refers to several types of constraint generators in action, it does not clearly describe how and to what extent they affect the design process. This gap, as previously mentioned, is addressed by this paper.

Research method

To address the questions raised by this paper, studies of eight fashion store projects were carried out. Besides delimiting the studies to fashion stores, further delimitations were made regarding brand and physical setting. For the brand aspect, stores can be either mono-brand or multi-brand. The studies focussed on mono-brand stores, on the assumption that the influence of brand aspects would be easier to detect in such cases. In relation to the physical settings, a retail store can be a street store, a store in a commercial building, such as a mall or an airport, or a so-called in-store in a department store. The contributions of this paper are relevant for the first three store types but only partly relevant for in-stores, since they involve slightly different constraint generator roles.

When new stores are created, the interior is often based on a general store design concept, which is implemented in a test store and afterwards rolled out in other locations. Since it is only in the development of the store concept that all constraint generators are fully involved, it is the creation of the test store that is of interest to research. However, new store concepts are time- and resource-consuming projects, which are not frequently

created. Furthermore, the projects in focus had to be relatively recent in order for the designers to be able to remember them – and not all bureaus in charge of new mono store design projects are interested in sharing their experiences. Therefore, in the selection of designers, the main challenge was to identify suitable projects to study rather than to select them from a larger pool. To overcome such issues, among the eight projects, six had previously been studied by the authors, albeit with other focusses. The individual case characteristics are shown in Table I.

The eight projects were investigated through two rounds of interviews with each of the eight store designers in charge of the projects and by study of documents related to the projects. The interviews were carried out as semi-structured interviews, given on condition of anonymity, and digitally recorded. The eight interviewed store designers were Danish and worked for design agencies (as opposed to being employed by the brand or the store owner).

First, a pilot interview was made with a key informant in order to formulate appropriate interview questions. Next, semi-structured interviews with each of the eight designers were conducted. These eight interviews focussed on asking the designers to describe constraint generators, examples of constraints, and elicitation of constraints. These interviews lasted around 60 minutes each. After a few months, the same eight designers were interviewed again, this time focussing on the influence of the constraints produced by the identified set of constraint generators, and to check that what had been extracted from the previous interview round was in accordance with the perception of the interviewed designers. These second-round interviews lasted around 20 minutes each.

The analysis of the interview data was carried out in two corresponding rounds, one after each round of interviews. The data from the first round of interviews – that concerning relevant constraint generators – was analysed through the following steps:

(1) all constraint generators mentioned in the eight interviews were combined into an aggregate list;

(2) duplicate constraint generators (i.e. similar actor types described in different ways) were identified and eliminated, and closely related constraint generators were merged into ten final groupings;

(3) each of the constraint generators in the final constraint generator classification (produced in the previous step) was described, based on the descriptions provided by designers;

(4) examples of constraints produced by the constraint generators were organised according to the groupings established in step 2; and

(5) designers' accounts of elicitation processes and challenges were organised according to the types of knowledge involved in such processes.

Case	Market	Project duration[a]	Brand focus	Brand position	Designers in project	Education	Design experience	Store design experience
A	China	4 months	Women	Mid-end	3	MA Arch.	8 years	First project
B	China	7 months	Women	Mid-end	3	MA Arch.	8 years	2.5 years
C	Europe	8 months	Women	Mid-end	2	MA Arch.	11 years	9 years
D	Denmark	3 months	Men/women	High-end	2	MA Arch.	14 years	12 years
E	Sweden	11 months	Women	Mid-end	2	MA Arch.	6 years	3 years
F	Denmark	3 months	Men/women	Mid-end	2	MA Design	10 years	10 years
G	Northern Europe	3 months	Men/women/ children	Mid-end	1	MA Arch.	15 years	15 years
H	Europe	24 months	Men	Mid-end	4	MA Arch.	8 years	8 years

Table I.
Case characteristics

Note: [a]Period from brief to the opening of the first store

The interview data from the second round of interviews were analysed by the following steps:

(1) constraint generator influence scores given by the designers were organised in table form; and

(2) explanations for the scores given and deviances from general tendencies were elicited from designers.

The results of the analysis process described above are given in the following section.

A retail store constraint elicitation framework

On the background of the empirical studies, this paper addressed the three questions presented in the introduction:

(1) Who/what are the main constraint generators from the perspective of the store designer?

(2) What types of constraints do the main constraint generators impose?

(3) How should store designers elicit such constraints?

Main constraint generators

The studies carried out two changes to the framework proposed by Haug and Münster (2015). First, "adjacent businesses" was broadened to "site" to include additional relevant aspects, such as the store building and its surrounding areas. Thus, rather than being a stakeholder, "site" describes the physical context in which the store design is to be implemented. Second, "designers" were included as a constraint generator type. This is illustrated in Figure 1, which depicts the relationship between the eight external constraint generators, the designer, the site, and the store design. In the figure, the arrows represent constraints, and the small circles within the "store design" circle represent design elements. As seen, the "designer" manages the constraints that influence the store design at a particular site.

The ten constraint generators of Figure 1 are defined in Table II.

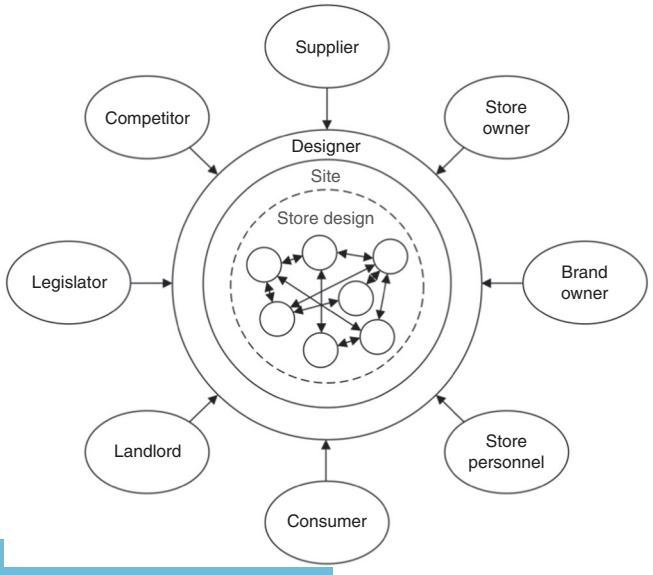

Figure 1.
Constraint generators from the perspective of the designer

Constraint generator	Description
Designers	Person or a group of persons (which can consist of senior and junior designers) given the task of designing one or more fashion stores; they may either be employed by the client or a design bureau
Suppliers	Persons or companies producing and delivering items for the store and the workers building the store
Store owners	One or more companies who own the store in question; in some cases, the store owner and the brand owner are the same company, but in many cases, they are separate companies connected through some sort of contractual agreement – a franchise or a sales-and-purchase agreement, for example
Brand owners	One or more companies that produce the products sold through the store; fashion stores may be either mono-brand or multi-brand, which affects the power of the brand owners
Store personnel	Sales staff, sales managers, decorators, and others hired to operate and maintain the store
Consumers	The group of people that the store targets
Landlords	One or more persons or companies owning the building in which the store is located; in some cases, the store owner or even the brand owner may own the store building, but often this is not the case
Legislators	The international, national or local officials who define laws and rules which the store design needs to comply with
Competitors	Other companies needing to be considered when designing the store; these may be direct competitors (companies offering similar products) or indirect competitors (companies offering products that are not directly interchangeable)
Site	All the physical aspects related to the building and surrounding area – architecture, neighbours, geography, location

Table II.
Descriptions of constraint generators

Constraints imposed by constraint generators

All eight interviewed designers could easily provide specific examples of constraints imposed by the identified constraint generator types. To illustrate the nature of these constraints, Table III provides the most illustrative examples of stakeholder-related constraints given by the eight informants.

Examples of constraints provided by the store designers point to the different types of knowledge that store designers need to acquire to create successful store designs. The four types of knowledge defined by Lundvall and Johnson (1994) are useful guides in this context: "know-what", "know-who", "know-why", and "know-how". To further complicate matters, these four knowledge-types can be either tacit or explicit, in varying degrees (Scharmer 2001).

The eight cases showed that "know-what" is relevant for store designers in relation to all of the ten defined constraint generators. In relation to store owners, this concerns demands for price level, shop functions, style, etc.; in relation to brand owners, it concerns demands for style, merchandising the goods, store layout, etc.; in relation to store personnel, it concerns demands for visibility, user-friendliness, air and light quality, access to back office, etc.; in relation to consumers, it concerns desires for entertainment, presentation of goods, air and light quality, etc.; in relation to landlords, it concerns demands to follow local guidelines (e.g. in relation to signage and facade design); in relation to legislators, it concerns building laws and regulations; in relation to competitors, it concerns demands to make attractive shopping environments, which differ from the competitor stores; in relation to suppliers, it concerns material availability, production methods available, price levels, etc.; in relation to designers, it concerns creativity level, experience level, communication skills, cooperation skills, etc.; and in relation to sites, it concerns building architecture, the surrounding area, size of store, ceiling height, size of entrance, access to stockroom, etc.

The "know-who" needed by store designers concern having an understanding of the different constraint generators. The case studies showed that knowing the

Case	*Examples of constraints imposed by designers*
A	The designer lacked experience with certain inventory systems and materials, which made the design go in other directions
B	The designer's lack of presentation/persuasion abilities made it hard to convince the client about the quality of certain design ideas
C	The facade design was based on old craftsmen principles, which caused some problems because the design team did not have experience with the techniques used
D	The two designers in the project had problems sharing information from the store owner, which caused some problems
E	The designer lacked insights about the product being sold in the store (e.g. sizes and packaging), which produced great needs for analysis of the market and how competitors solved the task
F	The designer lacked knowledge about some relevant materials (e.g. epoxy floor drying time, smell and appearance), which affected which particular solutions were chosen
G	The designer understood that there were economic limitations, but did not understand budgeting well enough to help the client calculate the store's price level
H	In the beginning of the design process the designer did not feel capable of arguing well enough for a design proposal, because of not knowing the brand very well
Case	*Examples of constraints imposed by suppliers*
A	The designer was informed that local furniture suppliers had problems producing highly detailed items and therefore such details were avoided
B	On some instances, the delivered furniture was not produced fully according to the design specifications because of material unavailability
C	The client and the designer liked a floor material, which the supplier was not able to provide at the required price level
D	The short store design implementation period implied that there was a need for choosing rapid production methods and materials with short delivery time
E	An inventory supplier had great influence on which solutions were chosen because of insights into at price and quality issues
F	The elements in the store were only designed with a low level of detailing, after which it was up to the suppliers to provide input about further details (e.g. definition of drawer mounts)
G	The metal profiles preferred by the designer were not available at the local supplier, for which reason other profiles were chosen
H	Technological solutions needed to be implemented in the furniture, which the suppliers were not fully familiar with, which implied that the designer needed to cooperate with the suppliers on developing these
Case	*Examples of constraints imposed by store owners*
A	The preferences of the store owner were to a large extent considered in order to avoid rejections of proposals
B	The store owner made clear requests for certain looks, and often changed his mind (e.g. rejecting a wardrobe design that was later accepted upon seeing a prototype)
C	The store owner required that the store be easy for the staff to oversee, which conflicted with the ambition of creating a cosy atmosphere. Semi-transparent furniture was applied to solve this issue
D	The store owner had specific demands for the placement of certain item groups and for using a certain transparent material in a part of the store
E	The store owner made requests for the use of certain colours in the store and for a certain interior style in order to achieve a desired atmosphere
F	The store owner and the managing director both had strong opinions about where the brand and the store design should go. Often these ideas were conflicting
G	The store owner had difficulties in making up his mind about choice of floor material, which delayed the process, and in the end implied that the chosen solution was to keep the existing floor, because of time pressure
H	The designer created some glass walls in order to make an interesting store flow, but, the store owner, however, was afraid that the walls would block the flow, for which reason some of the walls were removed

(*continued*)

Table III. Examples of constraints imposed by constraint generators

Case	Examples of constraints imposed by brand owners
A	The target consumers seem to like strong colours and gold ("bling-bling"), while the brand demanded more of a "Scandinavian cool" appearance
B	The brand wanted to position itself as being exclusive, but at the same time there was a request for more items in the store than in most exclusive brand stores
C	The brand wanted to position itself as a luxurious and feminine brand, which was satisfied by designing delicate spaces
D	The brand was associated with certain colours, which should be integrated in the store concept
E	The brand developed a visual identity, while making the store concept. This visual identity was to be reflected in the store design
F	The brand was formerly known as a maritime/sailor brand. This "feeling" was to be integrated in the store concept, but in a new and modern manner
G	The brand owner wanted to use existing brand images in the store to tell the story of the brand, so these needed to be implemented in the new store concept
H	The brand owner at some point insisted in adding an extra department to the store, although the designer had argued that the store was too small for this
Case	Examples of constraints imposed by store personnel
A	The designer considered the needs of the staff, e.g., by making space for storage in the cash desk area and by making space for the staff to help the consumers in the fitting room area
B	The store personnel had great difficulties in understanding the cleaning manual. Thus, the store concept was changed to make it easier to clean, while the client was informed about the need for training of store personnel
C	The merchandising/decoration of the shop was planned to make it easy for the staff to maintain
D	The store personnel had several requests, such as having big drawers in the sales desk to make room for large shopping bags
E	To improve the work conditions of sales personnel, a height-adjustable sales desk and a soft surfaced floor behind the desk was chosen
F	The store layout was designed to give the sales personnel easy access to the warehouse and to make it easy to oversee the store
G	In order to allow the staff to move around in the store, rather than being fixated behind a cash point, a freestanding counter unit was developed
H	In order to help the staff to keep the fitting room area tidy, an extra rack for was developed for temporary storing of clothing that had been tried on by the customers in the fitting rooms
Case	Examples of constraints imposed by consumers
A	The designer was informed that the target consumers often shop in groups, therefore there was a need to create waiting areas that supported this behaviour, i.e., of adequate size and seating possibilities
B	The designer knew that the target consumers often shop in groups, therefore there was a need for more space in the fitting room area as well as furniture to sit in while waiting
C	To support the target consumers assumed desire for a feeling of luxury while shopping, the fitting rooms were designed as a luxurious space with a delicate atmosphere
D	The consumer group was assumed to have certain preferences in relation to placement of goods and the use of mannequins, which were sought fulfilled
E	The consumer group was assumed to have certain preferences in relation to being able to touch the goods, which affected their placement
F	The designer was informed that the existing consumer group was slowly diminishing, for which reason the brand tried to attract a new and younger group without scaring the existing consumers away. It was challenging to find this balance
G	The designer made sure that the store had nice and comfortable fitting rooms, according to assumed consumer preferences
H	The designer knew that the jeans collection was difficult to overview for consumers, and thus created a specially designed jeans wall to make it overview the collection

Table III. (*continued*)

Case	*Examples of constraints imposed by landlords*
A	The mall in which the store was to be located had strict demands to the design, in particular, in relation to the store facade
B	The mall in which the store was placed had demands for the facade design, implying that logos and the canopies had to have particular dimensions
C	The designer was not confronted by landlord demands
D	The designer was not confronted by landlord demands
E	The landlord had certain demands for the design of the entrance and the hallway
F	The landlord had several demands in relation to the design of both interiors and the facade
G	The landlord demanded to keep an existing element on the shop front
H	The landlord demanded to maintain existing arches in openings between rooms in the store
Case	*Examples of constraints imposed by legislators*
A	Standard building rules (e.g. emergency exits) were considered in relation to the design
B	Fire legislation implied that a design with wooden columns was not allowed, for which reason aluminium columns were chosen instead
C	Emergency exit routes were considered in relation to the store layout
D	Fire routes, emergency routes, and fire divisions were considered in the store layout
E	Many type of legislations were considered in relation to fire and emergency legislation, as well as district plan demands for facade design
F	Legislation concerning how the two storeys were connected affected the design, while fire legislation and district plans placed demands on the facade design
G	The local rules demanded staff rooms to be of a certain size, which was implemented in the store design
H	Local demands were considered. France, for example, requires bigger fittings rooms for wheelchair users
Case	*Examples of constraints imposed by competitors*
A	Attention was paid to the store designs of the closest competitors in order to create a visual identity that was not to close to these, among others by using different colours
B	An inspiration was taken in more stores for more luxurious brands, which had a darker and more exclusive appearance
C	There was a strong need to look different than the stores of closely related brands by being darker and more classical, while inspiration was taken in store designs of other competitors
D	The store designs of competitors affected the design in relation to being inspired by quality solutions
E	References to other similar stores were made, while still giving the store a unique appearance
F	The designer did not believe to have being significantly affected by the store designs of competitors
G	A competitor used a specific surface on the metal furniture, which had been considered for the store, for which reason the designers decided to go with a different solution
H	A less popular brand released a façade solution similar to the solution, which the designer had considered. The designer therefore decided to change the design of facade
Case	*Examples of constraints imposed by sites*
A	The given store area made it challenging to include the desired number of items and to create good customer flow
B	The narrow layout made it challenging to fit in the desired design elements
C	The small size of the store made it challenging to fit in all the items and functions
D	The store space was long and narrow, which made it was challenging not to block the passage through the store
E	The store had low ceilings in one half of the store, implying that inventory needed to be made in multiple heights. This made it challenging to find ceiling spots, which could light up the goods properly
F	The same design needed to be implemented in multiple rooms of different sizes. Thus, it was chosen to avoid special solutions, but instead to use standard elements suited for rooms of different sizes
G	Existing beams and pillars influenced the layout of the store
H	Existing brick walls were reused as a part of the store design

Table III.

individual constraint generator helps the designer to better target designs. For example, one designer said:

> I experienced that a specific inventory supplier had great influence on which solutions were chosen because of insights into price and quality issues.

It was also mentioned that some suppliers have access to knowledge, machineries, and production methods that might be beneficial in the production of specific designs. Other designers talked about how some store owners expect to be very involved in design decisions, while others tend to leave such choices more up to the designer or the brand owner; and several designers mentioned that knowledge about the local legislators was helpful. For example, one designer said:

> In France the legislators require bigger fittings rooms for wheelchair users and they are very strict on fire requirements for specific materials.

The "know-why" needed by store designers means understanding why certain constraints are imposed by different actors. The case studies showed that by knowing why a certain actor imposes a particular type of constraint, the designer could better estimate the strength of this constraint and thus know to what extent it might be negotiable. For example, a designer stated that:

> The price level given by a store owner does often not concern cash flow issues, but is linked to an estimation of the store's expected turnover. Thus, the designer can make a store with a higher turnover, and in this manner make the store's price level renegotiable.

Likewise, it can be valuable for a designer to know why the store personnel have specific demands (e.g. the need for a drawer in a cash desk in order to hold big bags). More specifically, if the designer believes that these particular demands are problematic, either in relation to design quality or economic aspects, the designer would want to provide alternative suggestions (e.g. suggest making a big shelf for the bags in the cash desk or storing big bags in the stockroom). However, to do so, the designer needs to understand the deeper motives for these demands – i.e. know why the store personnel made these demands and use this knowledge to satisfy these deeper-level desires in another way.

The "know-how" needed by store designers means understanding how to create, present, and negotiate design solutions on the basis of the constraints imposed in a particular project. The case studies showed that this type of knowledge was often at play. For example, one designer said:

> Fire legislation implied that a design with wooden columns was not allowed, for which reason we decided to make aluminium columns instead.

The designer initially suggested wooden surfaces in a store where local authorities demanded a higher fire resistance than wood can provide and he used his know-how to find another solution. In another case, a brand owner described a certain style desired for the store, which the designer had to decode and encode into the store design.

As demonstrated above, these four general types of knowledge may also be useful for organising and understanding the types of knowledge that store designers need.

Eliciting store design constraints from constraint generators

To elicit store constraints efficiently, it is important to understand the relevance of the constraints generated by the different constraint generators at different points in a project. Thus, the designers were asked to estimate their influence across a design project, divided into four equally long time periods, as shown in Table IV. It should be noted that the designers found it too difficult to estimate the influence of the constraints that they generated themselves, for which reason this evaluation was omitted.

As the eight case studies showed, the influence of the different constraint generators varied from case to case. However, a rather clear general pattern seems to be at play. More specifically, in all the cases, the influence of all the constraint generators decreased during the design process, except for the influence of the suppliers, which increased. The designers

		Design process																													
		1st quartile								2nd quartile								3rd quartile								4th quartile					
Store owner	Designer A-H	5	4	3	4	4	4	3	5	4	4	2	3	4	3	2	5	3	3	3	2	2	2	3	1	2	3	3	3	1	2	1
	Avg.					4.0							3.4							2.6								2.0			
Brand owner	Designer A-H	5	5	5	4	5	5	3	5	4	4	3	5	4	5	2	4	3	4	3	5	3	4	2	3	1	4	4	5	2	3	2	1
	Avg.					4.6							3.9							3.4								2.8			
Personnel	Designer A-H	4	3	2	3	2	4	2	3	2	3	1	3	2	2	3	1	2	2	1	2	2	2	1	1	2	2	2	2	2	2	2	1
	Avg.					2.9							2.1							1.8								1.8			
Consumer	Designer A-H	4	2	3	2	2	3	4	3	3	2	2	2	2	1	4	4	1	1	1	2	2	1	2	1	1	1	1	2	2	1	1	1
	Avg.					2.9							2.5							1.4								1.3			
Landlord	Designer A-H	5	4	4	4	4	5	1	2	3	4	3	2	3	2	4	4	1	4	4	2	2	2	1	2	1	4	2	2	2	1	1	2
	Avg.					3.6							3.1							2.3								1.9			
Legislator	Designer A-H	5	4	3	2	4	5	1	2	3	4	2	2	4	2	2	4	2	3	2	4	1	2	3	2	1	4	2	2	3	1	1	2
	Avg.					3.3							2.9							2.4								2.0			
Competitor	Designer A-H	5	5	5	4	5	4	1	5	4	5	3	4	4	3	3	3	2	4	3	4	2	3	3	3	1	4	3	4	1	3	1	1
	Avg.					4.3							3.6							3.0								2.3			
Supplier	Designer A-H	3	3	3	2	3	4	1	2	4	3	2	2	4	4	1	2	5	3	2	2	5	3	4	4	5	3	3	4	3	3	4	5
	Avg.					2.6							2.8							3.5								3.8			
Site	Designer A-H	5	5	5	5	4	5	2	5	4	4	3	4	5	3	3	5	2	2	2	2	1	2	2	2	1	2	2	2	2	2	1	2
	Avg.					4.5							3.9							1.8								1.8			

Notes: 1, none; 2, little; 3, some; 4, much; 5, very much

Table IV.
Influence from constraint generators during store design processes

explained this pattern with the fact that the constraints imposed by constraint generators other than the suppliers mainly concerned overall design decisions, which were made early in the design process; for the more detailed choices made later in the process, the designer had greater latitude. The reason given for the increasing importance of supplier-generated constraints during the course of a project was that as the level of detail increased, it became possible to make more supplier-related choices.

One aspect of the data in Table IV in particular may seem surprising, namely, the relatively low influence of consumers' preferences and desires on the designers' choices. In fact, of all the constraint generators, the consumer-generated constraints had the least significant influence on store design decisions. The explanations given by the designers revolved around two key aspects. First, by considering other constraint generators like store owner and brand owner demands, the designers assumed that the consumers were indirectly considered. For example, designers claimed:

> I was informed that the target consumers often shop in group, therefore there was a need to […].

In this context, it should be noted that clients are often more familiar with the particular consumer group than the designers are, since they target this group all the time, while designers sometimes target different consumer groups in different projects. Constraints imposed by the other groups of constraint generators can therefore be said to indirectly consider consumers' needs. Another example of this could be the need to provide the store's personnel a visual overview of the store. In meeting this demand, the designer addresses the personnel's need for watching over the store, and at the same time addresses the customer's need for eye-contact with a person who can provide service. Second, it was argued that meeting consumer preferences was to some extent not even a conscious act, since preferences are not always explained consciously, but also emotionally, which can make them difficult to explain in words (Damasio, 1994; Leder *et al.*, 2004). For these reasons the consumer-related constraints presented may be less specific than the other constraint generator types. This should not be taken to mean that the designers ignored consumer preferences – on the contrary. According to the interviewed designers, consumer preferences and desires consistently received considerable attention.

As mentioned above, sometimes the designer needs to consider differences in demands or desires of different constraint generators, which may not necessarily correspond. This type of conflict is illustrated by the following statement:

> The target consumers seem to like strong colours and gold ("bling-bling"), while the brand demanded more of a "Scandinavian cool" appearance.

While the constraints generated by the site are relatively static, and the ones generated by the designer do not need elicitation, the constraints generated by the eight external constraint generators (i.e. excluding designer and site) require the continuous collection of information. This is the case because the constraints produced by the constraint generators may develop during the design process. Constraints are easier to elicit as close as possible to the point in time when they impact a given design decision, since a design proposal becomes increasingly more detailed; this also reduces the risk of constraints changing before they become relevant. That does not mean, however, that the solution is to employ a "just-in-time" strategy for eliciting constraints, since one cannot expect to be able to elicit a constraint exactly when it is needed. For example, if the production of a new floor causes problems, and the surface turns out differently than expected, the designer and the client may need to visit the site before deciding whether to change the floor completely; accept the floor, even though the surface is different than expected; or try to resurface the floor. Thus, some sort of time buffer is required. This is illustrated in Figure 2. In the figure, the cost of eliciting constraints is shown as exponentially decreasing up until the point when the

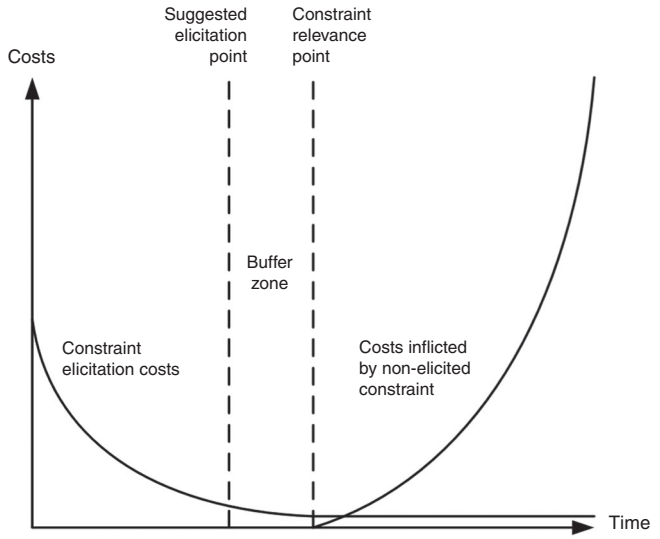

Figure 2.
Time of constraint elicitation

constraint becomes relevant; after this time, the cost of eliciting constraints remains stable and minimal. The rationale behind this is that the closer one gets to the point of constraint relevance, the more detailed the design proposal becomes. Thus, the number of possible solutions for which possible constraints should be elicited decreases exponentially. The cost of failing to elicit a constraint before it becomes relevant, on the other hand, is shown as exponentially increasing. The rationale behind this is that a design choice that is based on a false premise and violates a constraint may give rise to several other design choices that also violate this constraint; this in turn may give rise to even more design choices that violate the constraint.

Figure 2 visualises that with regard to constraint elicitation, the designer's focus should be on getting the timing right – not too early and not too late. Failure to elicit the most basic constraints (e.g. the price maximum and style-related demands) would cause the designer to work on assumptions that are likely to differ from the actual constraints, thus producing design proposals with a higher risk of rejection. On the other hand, eliciting detailed client demands prior to the design process could be very resource demanding, since the entire design is new and must be developed and described before it can be reviewed in the first place. Furthermore, with an unknown design, there are multiple potential paths that need to be considered – and a considerable risk of overlooking demands. Last but not least, there is also a risk that unduly restrictive constraints might block innovative ideas.

All the cases studied showed several examples of constraints being elicited so late in the design process that it resulted in extra work to change designs in progress – extra work that could have been avoided if constraint elicitation had been done proactively. A characteristic of many of these changes was that with a little effort they could have been elicited earlier in the project, provided the issue had been given more attention. In particular, it seems that spending more time on eliciting constraints before initiating the design process would have led to fewer encounters with constraints that made it necessary to change design proposals in progress. On the other hand, continuously having to alter aspects of the store design because of encountering non-elicited constraints can be costly in terms of time and resources. Thus, it seems that in many cases, there could be significant benefits in eliciting certain demands before initiating the design process. The question, however, is how the

designer should approach this; in other words, how many constraints should be elicited prior to the design process, and when should the remaining constraints be elicited? The answer is that it makes sense to elicit readily collectable constraints as well as the ones that affect decisions at the beginning of the project before the design process is initiated. On the other hand, some constraints can only be elicited after a certain development of the designed project. With regard to the constraints to be elicited before the design phase is initiated, the cases generally showed that during the course of the project, the constraints affecting design decisions gradually changed from a general to a more specific nature.

Finally, based on the interviews, it seemed that the more experienced the designer was (e.g. in terms of knowledge of materials, consumers, and regulations), the less time he/she needed to elicit constraints.

Conclusions

This paper has addressed three main questions from the perspective of fashion store designers: Who/what are the main constraint generators in fashion store design? What types of constraints do they impose? And how should store designers elicit these constraints?

On the background of the literature review, eight fashion store design projects were studied by analysing project materials and conducting interviews with eight retail designers. This led to the identification of ten major constraint generators from the perspective of fashion store designers: designer, supplier, store owner, brand owner, store personnel, consumer, landlord, legislator, competitor, and site. The relevance of these constraint generators was supported by specific examples of the constraints they imposed in the projects studied.

A general pattern across the eight projects was that the influence of the constraints generated decreased during the course of a design process, except for the supplier-generated constraints, whose influence increased. Of the ten constraint generators, consumers (i.e. preferences and desires) generated the least significant constraints. The explanations offered by the designers was that consumer preferences and desires were assumed to be considered by store owner and brand owner demands, and that consumer preferences and desires do not produce specific constraints similar to those produced by the other constraint generators. However, it could be argued that if designers had a better understanding of the consumers, they might be able to target their store designs even better, and they would have stronger arguments for their design choices in discussions with their clients.

With regard to dealing with constraint generators, the paper discussed the types of knowledge required by drawing a distinction between know-what, know-who, know-why, and know-how. The use of this distinction revealed substantial differences in the knowledge required to deal with different constraint generators. Next, the paper argued that a more thorough design preparation phase than observed in the cases would be beneficial, and that emerging constraints should be elicited close to their point of relevance, albeit with a reasonable time buffer.

The studies showed that the different constraint generators may have opposing interests, and that many constraints are not known beforehand but emerge during the design process, as decisions are being made. The complexity of dealing with continuously emerging constraints, which may point in different directions, was addressed by the main contributions of this paper. More specifically, by basing their work on the definitions of constraint generators and constraint management guidelines provided in the paper, store designers may be able to address constraints in a much more structured and proactive manner. Furthermore, the definitions presented in the paper provide a foundation for teaching store design students to address relevant constraint generators.

The constraint generator classification provided in the paper may constitute the basis for organising future store design studies. Given the lack of existing literature, the paper had an explorative focus with the purpose of revealing some basic characteristics of store design

projects; hence, it may be beneficial for future research to employ a broader focus, for example, in the form of a questionnaire study. Furthermore, future research may also investigate the usefulness of the contributions of this paper in other retail contexts beside fashion stores. More specifically, although many other types of retails stores may not face as tough demands in relation to store style, novelty, and atmosphere, in some cases, such stores may draw inspiration from fashion stores in relation to choosing more special designs and standing out more. In fact, it may be argued that this tendency is already taking place, albeit to a smaller extent, in, for example, the design of supermarkets, drug stores, and food markets.

The focus has been on the retail designer's process in creating a store design. A retailer's marketing strategy does not necessarily include an in-depth understanding of the store design process. The findings presented here suggest a solid basis for including a deeper understanding of constraints and constraint generators in the store design process as a component in the retailer's marketing strategy. This is an area which future research should continue to explore. We have also shown that involving store designers in this process can yield benefits to the final result. In short, this paper has identified an area of marketing strategy that has received little attention, but which deserves further exploration.

In relation to a general retail perspective, the insights into constraint generators that store designers deal with may allow retailers to become more involved in what from certain perspectives could appear to be a black box in which the store designer operates. For example, rather than merely making certain demands and expecting store design bureaus to provide design proposals that satisfy these, retailers may in some cases profit from being more involved in making supplier agreements, ensuring that their demands meet legislative rules, understanding competitor designs better before making demands, and so on. In this manner, the communication between retailer and retail designers may become more efficient, the duration of the project may be shortened, and fewer financial resources may be needed.

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