17th ERES Conference 23-26 June, Milan, Italy

Measuring Adaptive Behaviour in a Retail Planning Context; A Multi-Stakeholder Conjoint Measurement Experiment

Ingrid Janssen
Assistant Professor
Real Estate Management and Development
P.O. Box 513
5600 MB Eindhoven
The Netherlands
Phone +31-402474896
E-mail: i.i.janssen@tue.nl

Aloys Borgers
Associate Professor
Urban Planning Group
Eindhoven University of Technology
PO Box 513, 5600 MB Eindhoven
The Netherlands
Phone: +31-040-2474625
Email: A.W.J. Borgers@tue.nl

Harry Timmermans
Professor
Urban Planning Group
Eindhoven University of Technology
PO Box 513, 5600 MB Eindhoven
The Netherlands
Phone: +31-040-2472274
Email: H.J.P.Timmermans@tue.nl

Keywords: retail planning, decision making, choice modelling, conjoint measurement, behaviour

ABSTRACT

In the Netherlands, new retail concepts regarding peripheral locations have recently been introduced. This is the result of changes in Dutch retail planning policies. Whereas in the past the national government had a strong hand in determining the program and location of new retail facilities, nowadays there are no restrictions for retail organizations to develop retail properties at peripheral locations. With this new legislation, the Dutch government tries to stimulate innovation in the retail landscape and anticipate the rapidly changing retail system. As a result, the interaction between public and private actors is an important determinant of local retail planning decisions. The purpose of this paper is to reveal behavioural aspects underlying these types of decisions. Three groups of stakeholders (real estate developers, retail organizations and local governments) were invited to take part in an online conjoint choice experiment. They were asked to choose different retail plans that help to enforce the retail structure of the imaginary city "Shop City". The results of this experiment uncover the viewpoints of the three groups of stakeholders towards different retail plan alternatives. Most importantly, however, it gives insight into the degree these viewpoints depend on the viewpoints of other stakeholders. Results suggest that compared to the two private stakeholder groups local governments are more hesitant to locate new retail facilities at peripheral locations. Retail organizations are the most persistent in their viewpoints while real estate developers are most sensitive to the viewpoints of others.

1. INTRODUCTION

Since 2004, retail planning decisions in the Netherlands have become liberalized. Where in the past the central government applied restrictive rules on the planning of new retail facilities, in recent years these rules have been relaxed. Moreover, the responsibility for decisions about the location of new retail facilities has been decentralized to local governments. Provinces are assigned to supervise and coordinate municipal plans. It is generally expected that this shift in planning philosophy will influence the Dutch retail structure, especially regarding new retail facilities at peripheral locations. As a consequence of the very strict retail planning policy in the past, the Netherlands traditionally has a very intricate retail structure compared with other European countries (see e.g. Davies, 1995; Guy, 1998). Peripheral shopping developments were only allowed for particular types of shops in selected cities (see also Gorter *et al.* 2003 and Evers, 2004). However, with the new planning philosophy introduced in the latest Document on Spatial Planning (VROM, 2006), retail planning has become more market-driven instead of plan-driven. This new legislation gives room to the real estate development industry to obtain a dominant position. Real estate developers actively search for ways to get (political) support for their plans. According to Van der Krabben (2009) the effect of the new planning policy is that private developers have developed much more plans for peripheral retail developments than in previous years. If all these plans would be implemented, the volume of peripheral retail facilities would increase by more than 50%. At the municipal level, different stakeholder groups interfere in the discussion whether to built competing retail locations in the periphery of urban areas. The viewpoints of the main stakeholder groups (local authorities, real estate developers and retail organizations) towards peripheral retail locations differ because of differences in goals, interests, experience and knowledge. During negotiations preceding local planning decisions, stakeholders share their viewpoints and try to influence each other. In this line of reasoning it may be expected that especially inexperienced, usually small, local governments will be influenced by experienced development companies searching for new development opportunities.

This paper focuses on the viewpoints of stakeholders involved in local retail planning decisions towards the expansion of local retail supply at peripheral locations. It is important to gain knowledge of the different attitudes among stakeholder groups to better understand local retail planning decisions nowadays. Insight into the influence structures between the stakeholders will improve this understanding. A second aim of this paper therefore is to measure the degree in which stakeholders are inclined to adapt their viewpoints to the viewpoints of other stakeholders. Because it is difficult to collect real data on retail planning decisions that are suitable for econometric modelling, an online conjoint measurement experiment is used to measure preferences and adaptive behaviour. Three different stakeholder groups are invited by means of a

web-based survey to respond to retail plans, which can be viewed as integral descriptions of retail plan alternatives for an imaginary city. Conjoint measurement (Louviere *et al.* 2000) has been applied many times in the context of retailing. Mostly this method is used to measure preferences underlying consumer choice behaviour. For example, Oppewal & Timmermans (1999) applied conjoint measurement to estimate the effect of physical aspects of shopping centres on consumer perceptions; Borgers *et al.* (2006) used this method to get insight into reactive behavior of Dutch customers to increasing supply at peripheral shopping locations; and Kim *et al.* (2009) used conjoint measurement to design a novel suburban luxury brand outlet mall in S. Korea.

The application of conjoint analysis in group decisions to measure influence structures is relatively new. Recently, in the field of marketing and transportation the method is used for measuring influence structures within group decisions (see e.g. Dellaert *et al.*, 1998; Molin, 1999). Dosman and Adamovisz (2006) examined negotiation processes within households by combining data from a conjoint experiment with revealed information on the household's actual choices. In their research it is assumed that individual choices remain the same. In real bargaining processes this assumption does not hold. Therefore, Brewer and Hensher (2000) and later Hensher et al. (2007) developed interactive choice experiments. These experiments deliver a greater wealth of information on the related interaction processes between decision makers, rather than simply outcomes. This paper is inspired on this earlier research and uses conjoint measurement to measure adaptive behaviour within choice modelling techniques in a multi-stakeholder decision environment.

This paper is organized as follows. First, the research plan will be explained. In section 3, data collection and response will be discussed. In section 4, discrete choice models will be specified to estimate the effect of the attributes of the retail plans on the stakeholder's choices and to estimate the effect of adaptive behaviour. The results of the model estimation will be presented in section 5. Finally, conclusions will be drawn in section 6.

2 RESEARCH PLAN: ONLINE CONJOINT CHOICE EXPERIMENT

Expanding retail supply is an important decision because it can positively affect the economic position of a municipality. It contributes to the employment and consumer spending within the boundaries of the municipality. However, oversupply of retail space, especially at peripheral locations, may weaken the position of the inner city and probably will lead to vacancy. Since the introduction of the new planning document, many local governments in the Netherlands are challenged by the question weather or how to strengthen their own retail structure. Since the traditional hierarchical retail planning model has been rescinded, local governments are facing difficult planning decisions with market parties as their counterparts. Sometimes local

governments are triggered by real estate developers, searching for profitable development opportunities. In other cases retail firms initiate new retail plans, looking for new locations to expand their business that are good accessible and offer enough space for their large store formats (such as for example Media Markt and IKEA). Although there are more interest groups involved in retail planning decisions, like e.g. real estate investors and the regional government, representatives of the local government, retail firms and real estate developers are assumed to be the main stakeholder groups. Each stakeholder may have a different view as to the best way of expanding retail supply in a particular city because of their professional interest. The challenge is to define a retail planning problem that enables us to (i) measure differences in viewpoints among different stakeholders and (ii) measure the degree in which these viewpoints depend on the opinion of other stakeholders within the negotiation process.

Because real world retail planning decision processes do not provide sufficient information to draw general conclusions, an experimental setting it used to collect data in the short run. We decided to use a conjoint or stated choice experiment (see e.g. Louviere, Hensher and Swait, 2000), implying the following steps:

a. Decide on the decision context.
b. Decide on attributes and levels.
c. Create retail plans.
d. Select a representative fraction of the complete set of retail plans.
e. Create choice sets and add a “both retail plans are not acceptable” option.
f. Ask stakeholders to choose from each choice set the preferred option.

In addition to traditional conjoint choice experiments, assumed choices of other stakeholders will be added to be part of the choice tasks in order to measure adaptive behavior.

In the remainder of this section the above steps will be explained in detail. First, a context has to be decided on (a). In this study we developed an imaginary city called “Shop City”. The choice task is to decide on the most preferable retail plan to enlarge retail supply in this city. “Shop City” is a medium sized city (100.000 inhabitants) located in the centre of the Netherlands. The market position of “Shop City” in the non-daily retail supply is weak compared to other medium sized cities. Market research has shown that it is feasible to enlarge retail supply in this city.

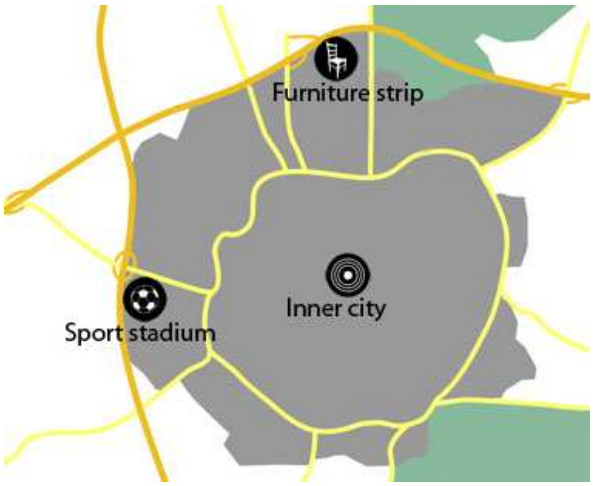

Figure 1 Map of imaginary city "Shop City"

There are three possible locations for the enlargement of retail facilities; 1) adjacent to a sport stadium, 2) an expansion of a furniture strip or 3) the inner city. The sport stadium as well as the furniture strip already exist. The furniture strip encloses momentarily 30.000 square meters of do-it-your-self and home/furniture retail facilities. Both peripheral locations are equal accessible. Figure 1 shows a map of "Shop City".

In the next step (b) is decided on the attributes and levels of the alternative retail plans for "Shop City". The attributes are three different branches for expansion of retail supply:

- Toys and sporting goods (2.500 sq. m.)
- Home electronics and media (5.000 sq. m)
- Fashion (7.500 sq. m.)

The levels are the locations on which retail supply in "Shop City" can be expanded. The choice for these branches as well as their floorspace reflect typical current retail development, in nature and size, in the Netherlands. As a restriction, at least one large-scale store should fit the total volume of each branch. Moreover, the total volume (the volumes of all branches summarized) for a particular location should represent a realistic, autonomous expansion of the retail supply. To meet these restrictions the choice context is tailored according to similar retail expansions in Dutch cities. The three branches are the first three attributes of the experimental design used to generate alternative retail developments. The fourth attribute is the presence of a restaurant. Respondents are told that this restaurant is part of a new national chain of self-service restaurants with a surface of 1.000 sq. meters. The restaurant offers a high quality of fresh food. It has got extended opening hours: from 8 am till midnight. A playground for children is included in the restaurant. The idea is that adding a restaurant will strengthen the position of a (new) peripheral retail location. The retail location will become more attractive for consumers since they can combine shopping with having lunch, dinner or a coffee break. This will directly contribute to the length of stay of consumers and

indirectly to the amount spent. It is only possible to add a restaurant at the two peripheral locations (sport stadium and furniture strip) because it is assumed that the supply of restaurants in inner cities is already sufficient. Table 1 shows the attributes and their levels that are systematically varied in the experiment to create retail plans (step c).

Table 1: Selected attributes and levels

Attributes		Levels
1	Toys and sporting goods (2.500 sq. m.)	- peripheral location sport stadium - peripheral location furniture strip - inner city
2	Home electronics and media (5.000 sq. m.)	- peripheral location sport stadium - peripheral location furniture strip - inner city
3	Fashion (7.500 sq. m.)	- peripheral location sport stadium - peripheral location furniture strip - inner city
4	Restaurant (1.000 sq. m.)	- peripheral location sport stadium - peripheral location furniture strip - no restaurant

Given the set of attributes and levels, the total number of different retail plans would be 3^4=81. Since this is too many to handle, an experimental design is used to select a representative fraction from the complete set of alternatives (step d). This resulted in 27 different retail plans.

Next, choice sets were composed by combining two randomly selected retail plans plus a "both retail plans are not acceptable" option (step e). These choice sets were presented to the stakeholders by means of a web-based survey. Members of the three stakeholder groups were invited to complete the questionnaire and make 15 choices. Next, the stakeholders were asked to make an additional 15 choices, however in this second part the preferences of the other stakeholders were varied as part of the experiment as well. These other stakeholders' preferences were generated randomly. The lay-out of the choice task in the web-based survey is shown in Figure 2. In total, each respondent had to make 30 choices, the first 15 choice tasks represent conventional conjoint choice tasks, while the second set of 15 choice tasks enable the measurement of adaptive behavior. Altogether, these data support the estimation of the parameters representing the part-worth utilities of the attributes and the effects of adaptive behavior on these part-worth utilities.

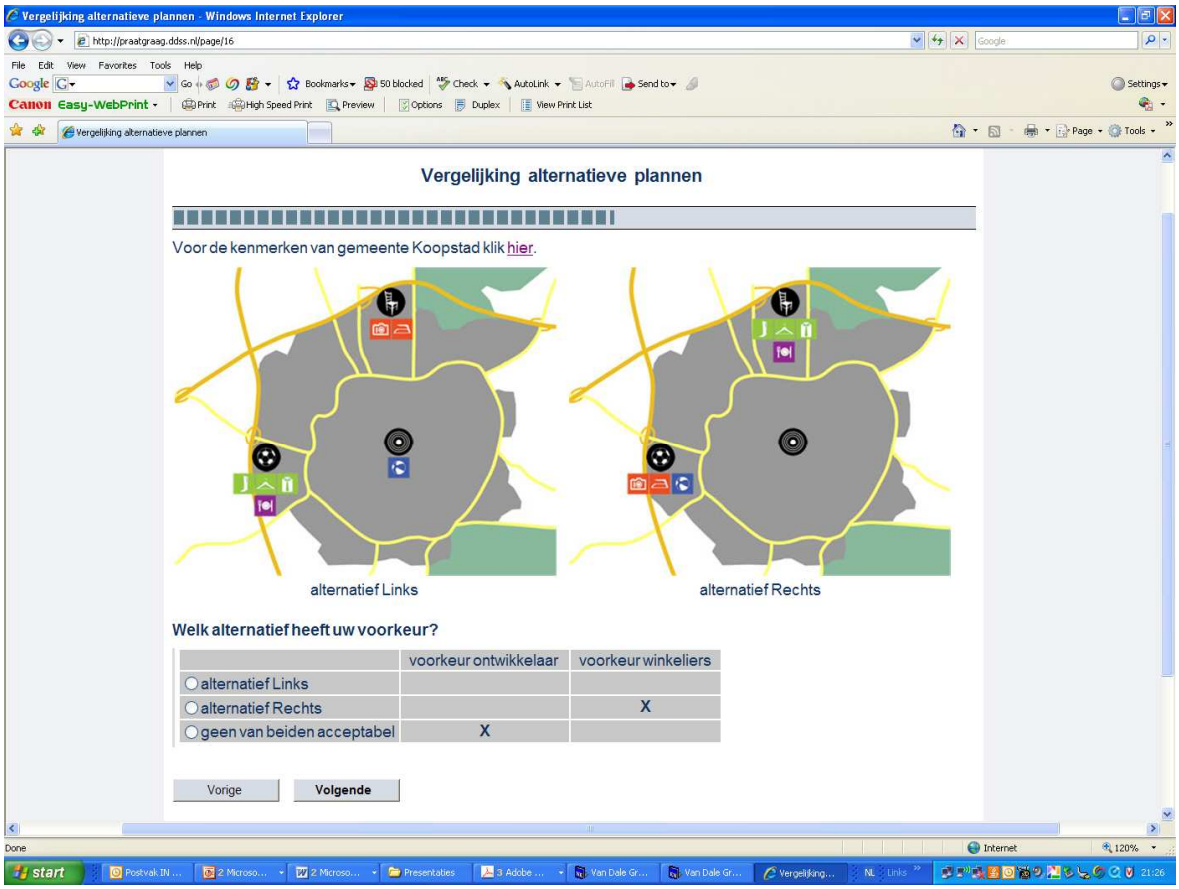

Figure 2 Example of a Choice Task (note that the including viewpoints other stakeholders' preferences may be absent)

3. DATA COLLECTION AND RESPONSE

Different sources were used to recruit potential respondents. First, a membership list of the Dutch Council of Shopping Centres, including members of all three kinds of stakeholders (retailers, developers and local governments) was used. Especially developers were well represented in this list (163 names), which includes both postal and e-mail addresses. These developers were contacted by mailing a personal letter that explained the purpose of the experiment. The link to the website was mentioned in the letter. The letter also contained a separate colour-printed sheet with an explanation of the characteristics of "Shop City". This sheet served two purposes: (1) a teaser to visit the website and (2) a reminder to the characteristics of "Shop City" for the respondents participating in the experiment. Some addresses appeared to be out of date and some addressees indicated not to be willing to participate. The remaining 147 respondents were sent a personal e-mail a week after the invitation letter was sent. This strategy worked well. Out of these 147 developers, 67 (46%) visited the website and completed the entire questionnaire.

Because the membership list contained less retailers and local planners (resp. 44 and 24), other strategies were applied to recruit additional respondents from these groups of stakeholders. Regarding the retailers, with the help of our personal network, the amount of respondents that is personally invited by letter could be increased from 44 to 88. Besides, 185 letters were sent to the headquarters of retail organizations. As far as e-mail addresses were available, these letters were followed by a personal invitation by e-mail (68) or by an e-mail to the general e-mail address of retail organizations (160). The number of completed questionnaires is equal to 36.

To collect data from local governments, another strategy was used. We contacted local governments by phone, explained the purpose of the experiment and asked for the responsible public servant. Depending on this conversation, personal letters or e-mails were sent directly to the representatives with a link to the online questionnaire. In total 132 representatives of local governments received a personal letter and up to 216 representatives received an invitation by e-mail. In addition, 62 letters were sent to local governments, inviting them to pass the letter to the servant responsible for local spatial planning. Eventually 67 representatives of local governments charged with retail planning completed the questionnaire. Table 2 shows the details regarding the response. The total number of completed questionnaires is 170. The website was visited by 266 respondents from which 170 (63%) completed the entire questionnaire. This high percentage suggests that respondents, once they entered the website, felt encouraged to complete the experiment. We do not know the distribution of the 96 respondents who did not complete the questionnaire across the stakeholder groups.

Table 2: Response pattern

	Invitation by personal letter	Invitation by personal e-mail	Invitation by letter to organization	Invitation by e-mail to organization	Visited website	Completed questionnaires
Developers	163	147	0	0	unknown	67
Retailers	88	68	185	160	unknown	36
Local governments	132	216	62	0	unknown	67
Total	383	431	247	160	266	170

In addition to choosing the most preferred retail plan from choice sets, respondents were asked to provide some additional personal information regarding gender, age, experience and job position and information regarding their company. The average experience in the retail sector among the group of developers was 11 years. The positions of the developers within their organizations varied from "member of the board of directors", "retail developer" to "concept developer". The respondents representing retail firms were even more experienced. Their average experience in the retail sector was 18.5 years (including two respondents with 40+ years of experience). Fifteen out of 36 retail-representatives were director or owner of the retail company. The remaining respondents hold a position within the organization affiliated to "real estate", "facilities" or "acquisition". The group of retailers represented a broad variety of branches. No single branch was over-represented. Almost half of the respondents representing local governments have been personally involved in out-of-town retail decision making processes. The positions of the respondents within the local government were mainly policy advisors for economic or spatial affairs.

4. MODEL SPECIFICATION

The collected data were used to estimate a random utility choice model. Each choice set consisted of two retail plans and a "both retail plans are not acceptable" option. Thus, one of three choice alternatives has been chosen from each set. According to random utility theory (e.g. Train, 2003), each alternative *i* has a utility (U_i). This utility consists of a structural (V_i) and a random (ε_i) component:

$$U_i = V_i + \varepsilon_i \tag{1}$$

The structural component is assumed to be an additive function of the characteristics of the alternative:

$$V_i = \beta_0 + \sum_k \beta_k X_{ik} \tag{2}$$

where X_{ik} represents characteristic *k* of alternative *i* and β_k is the parameter for characteristic *k*. Note that each retail plan is characterized by 4 attributes. However, as each attribute consists of three levels, dummy coding (see Table 3) was used to estimate the part-worth utility of each characteristic. This means that 8 variables are needed to estimate all part-worth utilities. The part-

worth utility of the first level of the first attribute is equal to β_1, of the second level to β_2, and of the third level to zero, and so on. The part-worth utilities of the fourth attribute are represented by β_7 and β_8. The utility of the 'both retail plans are not acceptable' option is measured by the constant β_0.

Table 3: Dummy coding

Attribute level	Coding	
1	1	0
2	0	1
3	0	0

If it is assumed that the random utility components are identically and independently double exponentially distributed, the multinomial logit model can be used to estimate the probability p_i that retail plan *i* will be chosen. This model is defined as:

$$p_i = \exp(V_i) / \sum_j \exp(V_j) \qquad (3)$$

The parameters are estimated by maximum likelihood estimation, which maximizes the predicted probabilities of the chosen retail plans. Using the null-model (all parameters are equal to 0.0) as a reference model, a goodness-of-fit measure Rho^2 can be computed. This measure ranges between 0.0 (no improvement compared with the null-model) to 1.0 (a perfect prediction of each observed choice). According to Hensher et al. (2005), a Rho^2 of 0.3 or higher represents a decent fit for a discrete choice model. However according to Louviere *et al*. (2000) values between 0.2 and 0.4 can be considered to be indicative of extremely good model fits.

The parameters $\beta_1 \ldots \beta_8$ represent the main effects of the attributes. In fact, they represent the preferences for the attribute levels. The experimental design that was used to generate the retail plans allows for the estimation of interaction effects between the first attribute (toys and sporting goods), the second attribute (home electronics and media) and the fourth attribute (restaurant). An interaction between two attributes will occur if respondents' preferences for levels of one attribute depend on the levels of another. For example, it is imaginable that the preference for a retail plan will increase if both toys & sporting goods and home electronics & media are on the same location.

In total, 12 interaction variables (I_{i1}…I_{i12}; e.g. $I_{i1}=X_{i1}\times X_{i3}$, $I_{i12}=X_{i4}\times X_{i8}$) can be specified to measure all possible first order interaction effects. Now, equation 2 can be extended to:

$$V_i = \beta_0 + \sum_{k=1,8} \beta_k X_{ik} + \sum_{l=1,12} \theta_l I_{il} \qquad (4)$$

In this equation, β_0 represents the utility of the 'both retail plans are not acceptable' option, the β_k-parameters measure the main effect of the attributes, and the θ_l-parameters measure the interaction effects between attributes.

So far, we did not deal with the effects of additional information regarding the viewpoints of other stakeholders. To be able to estimate the influence other stakeholders have on the third stakeholders' utilities, additional variables have to be specified. It is assumed that knowledge of other stakeholders' preferences only will affect the main effects (β_0…β_8). Assume for a moment that only one other stakeholder (s) is involved in the decision making process and that the decision maker wants to adhere to the preferences of stakeholder s. If a decision maker is presented a choice set and if, in addition, the decision maker is told that stakeholder s would choose alternative i_s (i_s=1,2,3) from this choice set, the decision maker may add some extra utility to the part-worth utilities of this alternative and decrease the part-worth utilities of the other alternatives. This mechanism is illustrated in Table 4. The upward pointing arrow indicate that the decision maker wants to increase the part-worth utilities of the first alternative (i_s is assumed to be 1) while the downward pointing arrows indicate that the decision maker wants to decrease the part-worth utilities of the other two alternatives. However, the adjustments may be conflicting, e.g. in the case of variables X_3 and X_7. In these cases, it is assumed that the conflicting effects will be ignored by the decision maker.

Table 4: Adaptation of part-worth utilities

	X_0	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	Pref S
Plan 1	0	1 ↑	0	1 ↑	0	1 ↑	0	1 ↑	0	yes
Plan 2	0	0	1 ↓	1 ↓	0	0	1 ↓	1 ↓	0	no
None (3)	1 ↓	0	0	0	0	0	0	0	0	no

To measure these adaptation effects, an additional set of variables has to be defined:

$$A_{ik}^{S} = f_{ik}^{S} X_{ik}^{S} \qquad (5)$$

Where f_{ik}^{S} is defined by the following sequence of rules:

f_{ik}^{S} = +1 if $i = i_s$; i=1,…,3; k=0,…,8

f_{ik}^{S} = -1 if $i \neq i_s$; i=1,…,3; k=0,…,8

f_{ik}^{S} = 0 if X_{1k}=X_{2k} $\vee$ $i_s \neq 3$; i=1,2; k=0,…,8

Similarly, additional variables have to be defined for the second stakeholder. If both stakeholder 1 and stakeholder 2 prefer the same alternative, the decision maker may want to adhere even more to their preference. This can be measured by a third set of additional variables. To sum up, the equation for the structural utility now becomes:

$$V_i = \beta_0 + \sum_{k=1,8} \beta_k X_{ik} + \sum_{l=1,12} \theta_l I_{il} + \sum_{k=0,8} \alpha_k^1 A_{ik}^1 + \sum_{k=0,8} \alpha_k^2 A_{ik}^2 + \sum_{k=0,8} \alpha_k^{1,2} A_{ik}^{1,2} \qquad (6)$$

where the α_k–parameters measure the adaptation effects. The last right-hand side component measures the additional adaptation effect if both stakeholders prefer the same alternative in the choice set. Then, $A^1_{ik} = A^2_{ik}$ (i=1,…,3; k=0,…,8) by definition and $a^{1,2}$ indicates whether both stakeholders prefer the same alternative ($a^{1,2}$ = 1 if $i_1 = i_2$; 0 otherwise). Note that positive α–parameters indicate that the decision maker is willing to adhere to the other stakeholders. Negative α–parameters suggest that the decision maker does not want to adhere to the other stakeholders. Also, a decision maker may want to adhere to one stakeholder (positive α–parameters for that stakeholder), but not to the other stakeholder (negative α–parameters).

5. ESTIMATION OF THE PARAMETERS

The parameters of the multinomial logit model were estimated using Nlogit 4.0 (Green, 2007) in a stepwise manner. After the first run, all variables with a significance P[|Z|>z]>0.50 were removed from the model. This criterion was gradually decreased until 0.05. Thus only parameters that are significant at the 5% significance level are included in the models. The estimated

parameters are presented in Table 5. For each stakeholder group separate models were estimated. The models for developers and local governments perform quite well, resulting in Rho^2-values of respectively 0.29 and 0.34. The performance of the retailer's model is a little disappointing (Rho^2-value of 0.16). Reasons might be the smaller number of respondents and a high degree of heterogeneity among the retailer-respondents. In the remainder of this section, we will interpret the estimated parameters for each type of effects (main, interaction and adaptation).

Main effects

When analyzing the results it is immediately obvious that all three stakeholder groups are strongly against the location of *Fashion* at a peripheral location. The values of the parameters for the variables X5 (Fashion at Sport stadium) and X6 (Fashion at Furniture strip) are extremely negative. Also none of the stakeholder groups prefers to locate *Home Electronics & Media* near the sport stadium. Although, developers attach some utility to this branch if it is located at the other peripheral location: the furniture strip (0.333). It would be expected that adding *Toys & Sporting Goods* near a sport stadium is preferable, because the similarity between branch and target group may generate some synergy effect. However, this variable is not significant for all stakeholder groups. Finally, only the developers think that adding a *Restaurant* enforces the position of the furniture strip (0.293). The utility of the "both alternatives not acceptable" option was negative and significant for all three stakeholder groups (resp. -0,658, -0.630 and -1.007). This implies that in most cases, respondents made a choice between one of the retail plans.

Interaction effects

Out of twelve possible interaction effects, for each stakeholder group, a different set of interaction effects appeared to be significant. For example, for developers three interaction effects play a role: X1xX3 (both Toys & Sporting goods and Home Electronics & Media near the Sport stadium), X1xX7 (both Toys & Sporting goods and Restaurant near the sport stadium) and X3xX7 (both Home Electronics & Media and Restaurant near the sport stadium). All three interaction effects are positive, implying that if the corresponding variables are equal to unity, the utility of the retail plan will increase. Although the main effects of the variables X1 (*Toys & Sporting Goods Sport Stadium*) and X7 (*Restaurant Sport Stadium*) are not significantly different from zero, both variables affect the utility of an alternative retail plan by means of their interaction with other variables. According to the main effect, developers do not prefer *Home Electronics & Media* to be located near the sport stadium (X3=-0.783), but if *Toys & Sporting Goods* (X1) and a *Restaurant* (X7) are realized at this location as well, the utility of this retail plan will increase with resp. 0.640+0.595+0.385. Thus, locating *Toys & Sporting Goods, Home Electronics & Media, and a Restaurant* near the sport stadium will yield a positive utility for

developers. This principle also holds for the retailers. Also retailers do not prefer *Home Electronics & Media* to be located near the sport stadium (X3=-1.213). If again *Toys & Sporting Goods* (X1) and a *Restaurant* (X7) are added to this location as well, the utility will increase by 0.893 (X1xX3) + 0.580 (X3xX7).

Retailers appear to be indifferent regarding the location of *Toys & Sporting Goods* and the *Restaurant* as the corresponding main effects (X1, X2, X7, X8) are not significantly different from zero. However, when these branches are allocated to different peripheral locations, the utility increases as indicated by the interaction effects (X1xX8 and X2xX7). Something similar holds for the local governments: they do not prefer *Toys & Sporting Goods* at the Furniture strip (X2 =-0.570), but if these *Toys & Sporting Goods* are located near the sport stadium and the *Restaurant* at the Furniture strip, the resulting utility will be positive (0.739). For local governments the main effects *Toys & Sporting Goods* on the furniture strip (X2) and *Home Electronics & Media* near the sport stadium (X3) are negative (resp. -0.570 and -1.091) meaning that local government do not prefer these retail facilities to be located at these peripheral locations. But, when both facilities on these locations are combined in one retail plan, the aversion for that particular retail plan will decrease with 0.570.

Adaptation effects

The parameters for the adaptation variables measure the effect whether a stakeholder is willing to adapt his/her opinion for that particular attribute to the opinion of other stakeholders. Obvious is that the number of significant adaptation variables is largest for the developers and smallest for the retailers. It may be concluded that the retailers appear to be the most persistent decision makers. However, another reason may be the relative small number of respondents in this group. All adaption effects are positive, implying that for all significant adaptation effects the stakeholders will tag on the opinion of the other stakeholder. Overall, none of the decision makers wants to dissociate him-/herself from the other stakeholders. For example, the part-worth utility of the developer for adding *Home Electronics & Media* (X4) to the furniture strip amounts to 0.333. According to the corresponding adaptation parameter for the preference of the retailers ($A4^{RETAILER}$=0.382), the developer is willing to (temporarily) adjust his/her part-worth utility to the opinion of the retailers. Thus, if the developer knows that the retailer prefers a retail plan with *Home Electronics & Media* at the furniture strip, the developer will become more in favor of locating *Home Electronics & Media* at the furniture strip (0.333+0.382=0.715).

Another interesting result is the adaptive behavior of the local governments for locating *Toys & Sporting Goods* at the furniture strip. The main effects show that the part worth utility for this variable (X2) is negative (-0.570) implying that planners do not prefer this branch to be located at the furniture strip. However, since the adaptation variable $A2^{DEV.xRETAILER}$ has a high

positive value (0.851) the preference of local governments turns positive (-0.570+0.851=0.281) if the civil servant knows that both the developer and the retailer are in favor of placing *Toys & Sporting Goods* at the furniture strip.

Table 6: Estimated parameters multinomial logit model

			developers		retailers		local governments	
	variabele	attribute level	β	P(|Z|>z)	β	P(|Z|>z)	β	P(|Z|>z)
preference variables	X0	Both alternatives not acceptable	-0.658	0.000	-0.630	0.000	-1.007	0.000
	X2	Toys&Sports Furniture strip	-	-	-	-	-0.570	0.000
	X3	Elect&Media Sport stadium	-0.783	0.000	-1.213	0.000	-1.091	0.000
	X4	Elect&Media Furniture strip	0.333	0.002	-	-	-	-
	X5	Fashion Sport stadium	-2.793	0.000	-1.724	0.000	-2.950	0.000
	X6	Fashion Furniture strip	-2.369	0.000	-1.569	0.000	-2.491	0.000
	X8	Restaurant Furniture strip	0.293	0.003	-	-	-	-
interaction variables	X1xX3		0.640	0.000	0.893	0.000	-	-
	X2xX3		-	-	-	-	0.570	0.009
	X1xX7		0.595	0.000	-	-	-	-
	X1xX8		-	-	0.585	0.000	0.739	0.000
	X2xX7		-	-	0.364	0.044	-	-
	X3xX7		0.385	0.031	0.580	0.011	-	-
adaptation variables	$A3^{DEVELOPER}$		XXX	XXX	-	-	0.333	0.023
	$A8^{DEVELOPER}$		XXX	XXX	0.575	0,000	-	-
	$A0^{RETAILER}$		0.335	0.000	XXX	XXX	-	-
	$A2^{RETAILER}$		0.286	0.044	XXX	XXX	-	-
	$A3^{RETAILER}$		0.322	0.017	XXX	XXX	-	-
	$A4^{RETAILER}$		0.382	0.004	XXX	XXX	-	-
	$A5^{RETAILER}$		-	-	XXX	XXX	0.596	0.003
	$A6^{RETAILER}$		0.459	0.002	XXX	XXX	-	-
	$A8^{RETAILER}$		-	-	XXX	XXX	0.551	0.000
	$A0^{PLANNER}$		0.305	0.000	-	-	XXX	XXX
	$A3^{PLANNER}$		0.292	0.027	0.442	0.016	XXX	XXX
	$A4^{PLANNER}$		0.301	0.016	-	-	XXX	XXX
	$A0^{DEV.xRETAILER}$		XXX	XXX	-	-	0.459	0.001
	$A2^{DEV.xRETAILER}$		XXX	XXX	-	-	0.851	0.002
		LL(B)	-1554.6		-996.0		-1453.0	
		LL(0)	-2208.4		-1186.6		-2208.4	
		Rho^2	0.30		0.16		0.34	
		Rho^2 Adjusted	0.29		0.16		0.34	

6. DISCUSSION AND CONCLUSIONS

In this paper, a stated choice model was applied to measure preferences of three groups of stakeholders (developers, retailers, and planners) for retail development (Toys & Sporting Goods, Home Electronics & Media, Fashion, and a Restaurant) at peripheral locations (a furniture strip or near a sport stadium. In addition to standard stated choice models, the model was specified to measure adaptation effects as well. Data was collected by means of an online choice experiment. A multinomial logit model was used to estimate the preferences for the retail development options and adaptation effects

The experiment shows interesting results that are typical for the Dutch retail market. All stakeholder groups believe that fashion should not be located on a peripheral retail location. This suits with the general opinion in the Netherlands at the moment. Peripheral, well-accessible locations should attract customers aiming at efficiently buying products while down town shopping areas should attract funshoppers (Evers, et al., 2005). Buying clothes is considered to be a recreational shopping activity and for that reason, fashion should be located in the inner cities. Regarding the location of other branches, the stakeholders appear to be rather indifferent, except for locating Home Electronics & Media outlets. All stakeholders unanimously reject the option of location this branch near a sports stadium.

As for the adaptive behavior of the decision makers, results reflect the background of the stakeholders. Developers facilitate with their development plans market demand and are willing to adapt their viewpoint to the opinion of the other stakeholders. On the other hand, retailers rent retail space from the developers and as such are less dependent on other stakeholders. Finaly, local governments behave somewhere in between. They used to hold strong positions regarding allocating space to retail functions.

It goes without saying that all these results and interpretations are contingent on the model that has been applied. One limitation of the multinomial logit model is that it does not account for any taste variation among respondents. To test for heterogeneity among the respondents, a mixed (or random parameter) logit model (see. e.g. Train, 2003) could be estimated instead. This model assumes that respondents share the same kind of utility function, but vary in terms of the weights they attach to the attributes. Such taste differentiation is captured by estimating a distribution for each of the parameters of the utility function. A more straightforward way to account for heterogeneity is estimating interaction effects between respondent characteristics and variables describing the choice alternatives. The authors hope to report these extensions in the near future.

REFERENCES

Brewer, A. N. and D. A. Hensher (2000), Distributed work and travel behaviour: The dynamics of interactive agency choices between employers and employees, *Transportation*, 27, 117-148.

Borgers, A., S. van Swaaij and I. Janssen (2006), Assessing the impact of peripheral mega retail centres on traditional urban shopping centres, *Belgeo*,1 (2), 53-66.

Davies, R.L. (Ed.) (1995) *Retail Planning Policies in Western Europe.* London / New York: Routledge.

Dellaert, B.G.C., M. Prodigalidad and J.J. Louviere (1998), Family members' projections of each other's preference and influence: a two-stage conjoint approach, *Marketing Lett*., 9 (2), 135-145.

Dosman, D. and W. Adamowicz (2006), Combining stated and revealed preference data to construct an empirical examination of intrahousehold bargaining, *Rev. Econ. Household*, 4, 15-34.

Evers, D. (2004) *Building for Consumption, An institutional analysis of Peripheral Shopping Center Development in Northwest Europe*, PhD dissertation, University of Amsterdam, Amsterdam.

Evers, D., A. van Hoorn and F. van Oort (2005), *Winkelen in Megaland*, Nai Uitgevers, Rotterdam, Ruimtelijk Planbureau, Den Haag.

Hensher, D., Rose, J., and Greene, W (2005), *Applied choice analysis: a primer*, Cambridge University Press, Cambridge.

Hensher, D.A., Puckett, S.M. and Rose, J.M. (2007), Extending stated choice analysis to recognise agent-specific attribute endogeneity in bilateral group negotiation and choice: a think piece, *Transportation*, 34, 667-679.

Gorter, C., P. Nijkamp, P. Klamer (2003), The attraction force of out-of-town shopping malls: a case study on run-fun shopping in the Netherlands. *Tijdschrift voor Economische en Sociale Geografie* 94, 219-229.

Green, W.H. (2007), *NLOGIT Version 4.0: Reference guide*, Econometric Software, Inc., Plainview USA and Castle Hill, Australia.

Guy, C.M. (1998) Controlling New Retail Spaces: The Impress of Planning Policies in Western Europe, *Urban Studies*, 35, 953-979.

Krabben, E. van der (in press a) Retail planning in the Netherlands: evaluating the effects of radical changes in spatial planning ideology. *European Planning Studies* (forthcoming).

Kim, G., A. Kim, S.Y. Sohn (2009), Conjoint Analysis for luxury brand outlet in Korea with consideration of customer lifetime value. *Expert Systems with Applications*, 36, 922-932.

Louviere, J., D. Hensher and J. Swait (2000), *Stated Choice Methods, Analysis and Application*, Cambridge University Press, UK.

Molin, E.J.E. (1999), Conjoint modelling approaches for residential group preferences, Ph. D. thesis, Eindhoven University of Technology, Eindhoven.

Oppewal. H, and H. Timmermans (1999), Modeling consumer perception of public space in shopping centres. *Environment and Behavior*, 31, 45-65.

Train K. (2003), *Discrete Choice Methods with Simulation*, Cambridge University Press, UK.

VROM (Ministerie van Volkshuisvesting, Ruimtelijke ordening and Milieubeheer) (2006) *Nota Ruimte: Ruimte voor Ontwikkeling.* The Hague: VROM