Examencommissie
Prof. dr. E. Carrionsa
Department of Statistics and Operations Research
Universidad de Sevilla
Prof. dr. S. Nickel
Department of Discrete Optimization and Logistics
Karlsruhe Institute of Technology
Prof. dr. M. Despontin
Department of Mathematics, OR, Statistics and IS for Management
Vrije Universiteit Brussel
Prof. dr. C. Macharis
Department of Mathematics, OR, Statistics and IS for Management
Vrije Universiteit Brussel
Prof. dr. P. Uyttendaele
Vrije Universiteit Brussel
Director of Maritime & Transport Business Solutions
Promotor
Prof. dr. F. Plastria
Department of Mathematics, OR, Statistics and IS for Management
Vrije Universiteit Brussel

Summary
Location, location, location. It is an often-heard saying when retailers are asked about the key success factors for their business. The way to decide for a retailer has a long-term impact and requires a substantial investment. Changing place is unlike changing product, price or promotion; a very drastic matter for a retailer in a competitive environment.

We propose an optimisation and a simulation approach to advice retailers on the most interesting location opportunities without losing sight of the "raison d’être" of competition in a retailer market, the consumers.

First we address the uncertain competitive environment in which location decisions have to be taken. We analytically formulate and solve three optimisation models that take anticipation on the future actions of new competitors into account. In line with well-known game theory strategies, we propose a worst case maximin location model, a minimum regret location model and a von Stackelberg location model for two players. Computational tests and an efficient procedure to deal with large consumer demand populations in location models demonstrate that these formulations provide interesting results for applications in practice.

Next we focus on the increasingly segmented and complex consumer markets that form the rapid evolving context in which retailers nowadays operate. The "fishing where the fish are" rule of thumb is put into perspective in a literature review. We discuss two streams of traditional modelling of consumer spatial behaviour and then apply a general framework for spatial models to the particular context of consumer behaviour. We move to more recent modelling approaches and elaborate on the recent evolutions in the modelling of consumer spatial behaviour. Particularly the aspect of increased mobility draws our attention and in our survey in the city of Ghent we zoom in on the shopping behaviour of consumers during commuting trips. Clearly, going where your customers are does not fully grasp the complex challenge that consumer spatial behaviour modelling presents.

So we infer that two important concepts are revealed in our literature study of consumer spatial behaviour: mobility and bounded rationality. Next we link these recent evolutions in consumer spatial behaviour to the changing retail location patterns with an agent-based approach for location modelling.

Therefore we first introduce the methodology of agent-based modelling and simulation and review related work in relevant domains. Next we develop a conceptual model that encompasses mobility and bounded rationality on the demand side and heterogeneity in the assortment of products on the supply side. We implement a prototype model in NetLogo. Our simulation results show the interplay between the consumer spatial behaviour and retail location decisions.

Finally, we extend the analytical and simulation approach with the simultaneous handling of location and price decisions to more accurately estimate future revenues. We successfully incorporate the mill price decision in the maximal covering location problem for revenue maximization in a competitive environment. The optimisation model seems computationally intractable, but we propose an intelligent enumeration technique that allows to solve the model to optimality in a very efficient way.

Finally we return to the agent-based approach. Similarly as in the optimisation model, we first introduce the price in the utility function of the consumer agents. Next we also incorporate the price as a decision element in the retailer agents.

We conclude that it is imperative to adopt a quantitative point of view for taking profitable business decisions in a competitive retail context, but we also recognise that another good location for a retailer is in the minds and hearts of its best consumers.

Curriculum Vitae
Lieselot Vanhaverbeke is Licentiate in Applied Economics and Advanced Master in Business Information Management. Since 2003 she works as a teaching and research assistant at the Department of Mathematics, OR, Statistics and IS for Management at the Faculty of Economic, Social and Political Sciences and Solvay Business School at the Vrije Universiteit Brussel. Her research interests next to applying quantitative methods to management problems in the fields of location and consumer behaviour also work with geographical information systems (GIS) for decision making. As a teaching assistant she was involved in coaching students for the courses Software for Management, Distribution and Location Problems, Statistics for Decision Making and Business Models and Strategies for the Digital Economy.

Concurrent Location Models and Consumer Spatial Behaviour
Promotor: Prof. dr. F. Plastria

Gelieve uw aanwezigheid te bevestigen voor 27 september 2010: lieselot.vanhaverbeke@vub.ac.be

Die zal plaatsvinden op: Woensdag 29 september 2010 om 17u00
In de promotie zaal gebouw D, 2de verdieping, lokaal 01
Campus Vrije Universiteit Brussel

Promotor: Prof. dr. F. Plastria

Gelieve uw aanwezigheid te bevestigen voor 27 september 2010: lieselot.vanhaverbeke@vub.ac.be

Hoe de VUB te bereiken, zie http://www.vub.ac.be/infoover/campussen/index.html
Pleinlaan 2 – 1050 Brussel
[T] 02 629 25 08
[F] 02 629 36 45
[E] faces@vub.ac.be

Lieselot Vanhaverbeke is Licentiate in Applied Economics and Advanced Master in Business Information Management. Since 2003 she works as a teaching and research assistant at the Department of Mathematics, OR, Statistics and IS for Management at the Faculty of Economic, Social and Political Sciences and Solvay Business School at the Vrije Universiteit Brussel. Her research interests next to applying quantitative methods to management problems in the fields of location and consumer behaviour also work with geographical information systems (GIS) for decision making. As a teaching assistant she was involved in coaching students for the courses Software for Management, Distribution and Location Problems, Statistics for Decision Making and Business Models and Strategies for the Digital Economy.