

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information		
Name	Luca Pieck	
Student number	4602323	

Studio		
Name / Theme	Tackling housing inequality	
Main mentor	Harry Boumeester	REM
Second mentor	Marja Elsinga	UDM
Argumentation of choice of the studio	I am interested in starting my own concept housing startup in the built environment. I believe concept housing is a promising method to solve the housing shortage the Netherlands is currently dealing with, and will contribute to tackling housing inequality.	

Graduation project	
Title of the graduation project	Competitiveness of start-ups in the Dutch concept housing market: How concept housing startups strategically manage to be(come) competitive in the Dutch housing construction industry
Goal	
Location:	Netherlands
The posed problem,	Modular construction concepts are needed to build modular buildings. Modular buildings are perceived to be an effective means to solve housing shortage, being more affordable, quicker to build, higher quality etc. Khan et al (2022) have found 111 drivers towards using modular integrated construction to realize affordable sustainable housing. Cost, time, productivity, quality, environment, social, policy and demand being the main 8 groups of drivers. As there are so many drivers to implement more modular construction, it would be beneficial to keep innovating in this specific branch, possibly to enhance quality, new processes, or lower costs for example. Start-ups are often linked with innovation (Colombo & Piva, 2008, De Groote & Backmann, 2020; Spender et al, 2017), , bringing new ideas to an industry and collaborating with the bigger incumbent firms or being acquired by them. However,

	<p>due to the competitiveness and barriers to entry associated with this industry (like high fixed costs and volatility), startups are expected to have a hard time to survive. To help startups bring innovation to the house building industry, it is important to find out how they can become competitive.</p>
research questions and	<p>RQ: How do concept housing startups strategically manage to be(come) competitive in the Dutch housing construction industry?</p> <p>This question will be answered by doing five qualitative interviews with strategic managers from startups currently active in the Dutch concept housing industry. Before these interviews can be done though, thorough knowledge is needed about the housing construction industry and the competitive forces it entails, as described by Porter (2008). This brings forward the following sub questions:</p> <p>SQ1: How do Porter's five forces of competition (2008) shape the housing construction industry in the Netherlands?</p> <p>Answering this question will help seeing the challenges of the Dutch housing construction industry, and thus explaining why some startups do not become competitive, if they are not able to cope with the industries dynamics.</p> <p>SQ2: What role does innovation play for startups to achieve competitive advantage?</p> <p>This question serves to test the hypothesis that innovation often is a core competency of concept housing startups, a capability that serves as a source of competitive advantage for a firm over its rivals. Testing this hypothesis is important as the need of innovation in the housing construction industry served as inspiration for this research.</p> <p>SQ3: What role do strategic alliances play for startups to achieve competitive advantage?</p> <p>This question is asked to find out what benefits come with strategic alliances between startups and incumbent</p>

	firms, but also to find out if they are crucial for startups to become competitive, thus making startups dependent on incumbent firms.
design assignment in which these result.	The goal of this research is to create a report which explains and explores the Dutch housing construction industry on the basis of Porter's five forces (2008) but more importantly, how a concept housing startup can become competitive in this challenging industry. The relations of innovation and strategic alliances with becoming competitive are also to be analyzed, as the initial literature review makes it seem likely to be significant towards answering the main research question. The report will conclude with a tool which can be used by top managers of concept housing startups to develop a strategy for gaining competitive advantages which can eventually lead to strategic competitiveness and company growth.

Process

Method description

To answer the research questions, a qualitative and descriptive research is necessary. The choice of doing a qualitative research is based on the complexity behind business growth, because startups are motivated and able to make more decisions about their development than theorists have ever thought of (Garnsey et al., 2006). Data will be gathered by doing an exploratory literature study, followed by doing expert interviews with top-managers of startups in the Dutch concept housing market. Both the data from the literature study and interviews will be analyzed and synthesized to formulate a conclusion to the primary question.

Expert interviews

The expert interviews will be done in a semi-structured way. These interviews will be the source of this research's primary data. Because of the literature studies, which gave an understanding of the context, questions can be formulated on how the managers dealt with certain challenges associated with the industry. The findings on the influence of innovations and strategic alliances can be used to formulate questions about those topics, which will be asked during each interview. However, due to the complexity of strategic management, the answers to these fixed questions can be quite varied. To be able to ask follow up questions to gather a viable amount of data, it is necessary for the interviewer to be able to differ from only asking the fixed questions, thus choosing for a semi-structured approach.

Interviewee/case selection

First, by using internet and the NCB (Network of Conceptual Construction), an

inventory will be made of every Dutch concept housing startup. An exploratory interview with the director of NCB might help realizing this inventory. When this inventory is complete, a division will be made between firms who do work in a partnership-network and firms who don't, as this might have influence on the gathered data which will be used to answer the main research question. This division is also necessary to compare both groups to be able to answer sub question 3: "*What role do strategic alliances play for startups to achieve competitive advantage?*". Following this division, stratified sampling will be used proportionally to select the companies. The interviewees will be the top managers of those selected startups, or someone who is closely involved with the strategic management of the firm.

Literature and general practical preference

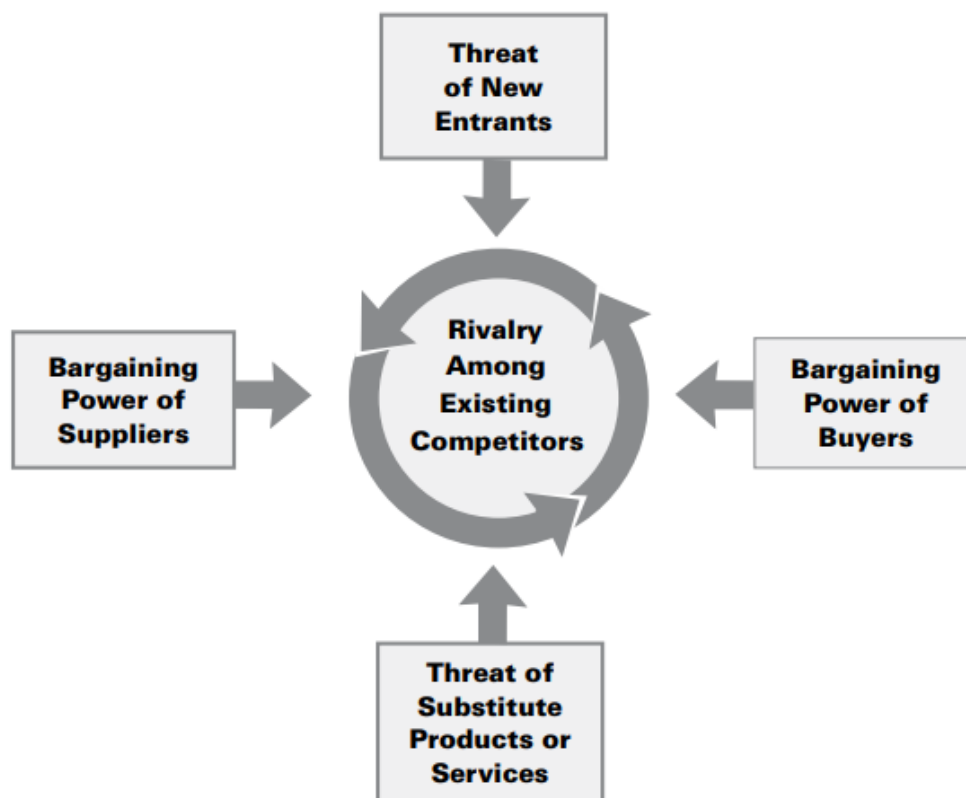


Figure 1: Porter's five forces (2008)

The most referenced literature is from Porter (2008). His model of five forces which shape the competition in any industry was used as a framework to analyze the competitiveness of the Dutch house building industry. Khan et al (2022) is an important source as they clarify the relevancy of the research (the need to more modular integrated housing, which is open for innovation; startups can bring innovation to this industry)

Relationship with Module Manufacturer	Strategic	<ul style="list-style-type: none"> • Some understanding of modularity • Provides important inputs for modular products • Need to enhance process integration 	<ul style="list-style-type: none"> • Clear understanding of modularity • Involvement in decision-making process • Evidence of modular product architecture • Process integration • Modular operations • Mission alignment between buyers and suppliers
	Operational	<ul style="list-style-type: none"> • Poor understanding of modularity • Little or no involvement in the decision-making process • Lack of process integration • Non-modular operations 	<ul style="list-style-type: none"> • Investing in modular solutions • Limited involvement in the decision-making process • Developing supplier relationships
		Low	High
		Degree of Supplier Integration	

Figure 2: Relationship/supplier integration matrix (Dorian & Giannakis, 2011)

Dorian & Giannakis' model of supplier integration (2011) will be used to develop an understanding of the power of the suppliers in the Dutch concept housing market. Topics of the literature (keywords) used are summarized in the following concepts: Concept housing (industrial housing, modular housing), startups, innovation, strategic management, competitiveness, strategic alliance, business strategy. See below for a conceptual framework of the study.

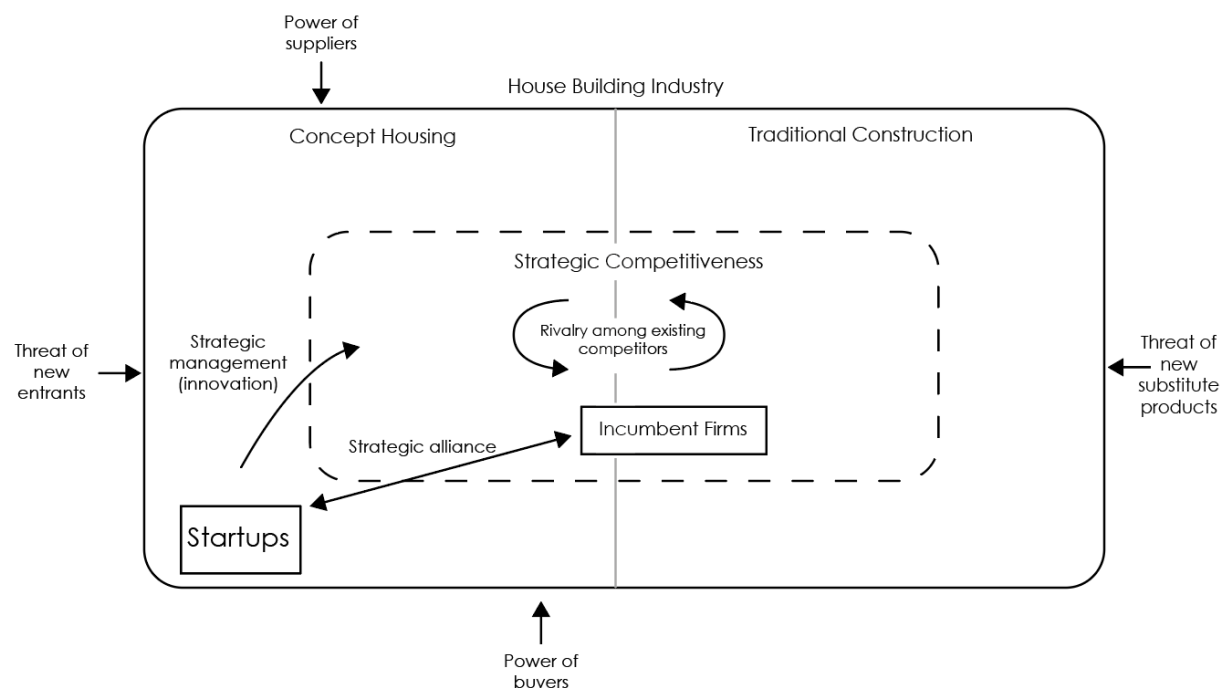


Figure 3: Conceptual model of research (Own image, 2023)

Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

This graduation topic is about finding solutions to the housing shortage AND about entrepreneurship in the built environment (strategic management). Both of these topics are linked with the master track MBE.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

Scientific relevance

There is a lot of literature on innovation in the built environment, however they often mention that it is a project-specific industry, which is true when looking at traditional construction. However, with the rise of industrial housing, the housing construction industry is becoming more product-based like other manufacturing industries (Hall et al, 2022). With this in mind, analyzing the influence of Porter's five forces (2008) on the Dutch house building industry through the lens of a concept housing startup might give new insights on the industry, as no research has done this yet. Furthermore, there is not much literature to be found where the concepts of innovative startups, conceptual housing and strategic management come together. Hall et al (2022) researched new business models associated with industry 4.0 in construction, of which one was concept housing. However, their case study was based around BoKlok, a residential housing concept developed jointly by Skanska and IKEA, which are two global companies. As this can not be defined as a startup, it still leaves the question on how a young, small company can achieve a competitive position in the housing construction industry. Furthermore, there are contradictions found about the willingness to innovate in the construction industry. This research will add knowledge and give a modern perspective on this aspect in the Dutch context.

Social relevance

As social drivers are observed to be the most significant and the Dutch government promotes innovation in construction, it is beneficial for society that these startups can exist and new companies can keep entering the industry of modular construction. Some social drivers for modular integrated construction stated by Khan et al (2022) include: substitute for rising housing demands, enhanced urban regeneration, better employment opportunities, and a high acceptance towards innovation.

Colombo, M. G., & Piva, E. (2008). Strengths and weaknesses of academic startups: a conceptual model. *IEEE Transactions on Engineering Management*, 55(1), 37-49.

De Groote, J. K., & Backmann, J. (2020). Initiating open innovation collaborations between incumbents and startups: How can David and Goliath get along?. *International Journal of Innovation Management*, 24(02), 2050011.

Doran, D., & Giannakis, M. (2011). An examination of a modular supply chain: a construction sector perspective. *Supply Chain Management: An International Journal*, 16(4), 260-270.

Garnsey, E., Stam, E., & Heffernan, P. (2006). New firm growth: Exploring processes and paths. *Industry and Innovation*, 13(1), 1-20.

Hall, D. M., Lessing, J., & Whyte, J. (2022). New Business Models for Industrialized Construction. In *Industry 4.0 for the Built Environment* (pp. 297-314). Springer, Cham.

Khan, A., Yu, R., Liu, T., Guan, H., & Oh, E. (2022). Drivers towards Adopting Modular Integrated Construction for Affordable Sustainable Housing: A Total Interpretive Structural Modelling (TISM) Method. *Buildings*, 12(5), 637.

Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard business review*, 86(1), 25-40.

Spender, J.C., Corvello, V., Grimaldi, M., & Rippa, P. (2017). Startups and open innovation: A review of the literature. *European Journal of Innovation Management*, 20, 4–30.