Monkey See, Monkey Do: Establishing New Real Estate Development Frameworks for the Land Optioning and Assembly Process in Singapore

By
Lawrence Bernard Harkless Jr.

Bachelor of Science in Architecture
University of Virginia
Charlottesville, VA

Submitted to the Department of Urban Studies and Planning and the Program in Real Estate Development in partial fulfillment of the requirements for the degrees of

Master in City Planning
and
Master in Real Estate Development

at the
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
February 2014

© 2014 Lawrence Bernard Harkless Jr. All Rights Reserved
The author here by grants to MIT the permission to reproduce and to distribute publicly paper and electronic copies of the thesis document in whole or in part in any medium now known or hereafter created.

Signature of Author: ........................................................................................................................................................................

Department of Urban Studies and Planning and Program in Real Estate Development

Certified By: ....................................................................................................................................................................................

Professor Brent Ryan, Department of Urban Studies and Planning, Thesis Supervisor

Accepted By: ....................................................................................................................................................................................

Professor Chris Zegras, Committee Chair, Department of Urban Studies and Planning

Accepted By: ....................................................................................................................................................................................

Professor David Geltner, Chairman Interdepartmental Degree, Program in Real Estate Development
Monkey See, Monkey Do:

Establishing New Real Estate Development Frameworks for the Land Optioning and Assembly Process
ABSTRACT

Monkey See, Monkey Do: Establishing New Real Estate Development Frameworks for the Land Optioning and Assembly Process in Singapore

by Lawrence Bernard Harkless Jr.

Submitted to the Department of Urban Studies and Planning and the Program in Real Estate Development on January 16, 2014 in partial fulfillment of the requirement for the degrees of Master in City Planning and Master in Real Estate Development

Development projects ultimately create places in the built environment. As such, the developer should be concerned with the quality of spaces they create for those in the community to interact within. For this reason, a structural framework should be established to allow developers to understand the needs of the various communities in which they develop.

The focus of this thesis is not upon traditional notions of community engagement, which is primarily focused on short-term decisions and development implications. Rather the structural framework proposed in this thesis takes a long-term approach to development and views community involvement as a win-win situation in which all parties involved are better off. In order for this framework to be implemented, a large-scale embrace of strategic planning that facilitates and guides development is needed. This requires that community engagement be addressed at the onset of the development process, more specifically, the land optioning and assembly process.

This thesis combines parametric design theory and community engagement in the ideal state of Singapore, with the goal of establishing a stakeholder framework that could be applied to the land optioning and assembly process for the Eco-Town development of Punggol. The intent of this thesis is to establish a stakeholder framework that provides an opportunity for the land optioning and assembly process to be more systematically understood. Using parametric design thinking theoretically allows each stakeholder to have control over various aspects of the land optioning process. Realistically, the developer could observe the impacts that occur when different stakeholders engage in this process. Ultimately, this framework provides the developer with a better methodology to understand stakeholder engagement as a component of their development projects.

The hope is to generate ideal development and planning process ideals that can allow individuals to have a greater impact in the communities in which they reside.

Thesis Advisor: Brent Ryan
Title: Associate Professor of Urban Design and Public Policy
ACKNOWLEDGEMENTS

To the Housing Development Board, the Urban Redevelopment Authority, Far East Development, and the Lee Kuan Yew Centre for Innovative Cities for making themselves available to answer questions and provide guidance to better understand the planning and development processes of Singapore. A HUGE thank you to Ms. Belinda Yuen, Mr. Chong Fook Long, and Mr. Chia Book Kuah for taking significant time out of their busy schedules to meet with me. I hope this thesis is as insightful as the information that you shared.

To the City Form Lab at the Singapore University of Technology and Design for providing me space to work during my research in Singapore. More specifically, many thanks to Andres Sevtsuk, Onur Ekmekci, and Martin Scoppa for their feedback and insights regarding my research questions.

To Brent Ryan for providing the opportunity to explore and conceive new ideals for how cities can be better designed and developed.

To the Punggol Tigers for contributing to the content of this thesis. Without your help, this thesis would not have been possible.

To my classmates in the MSRED Program and DUSP, for the great conversations and friendships that I will always remember and cherish.

To the developers, architects, planners, and citizens of our communities who took time to listen to my thesis topic, encouraged my thoughts, and challenged me to continue to find ways to mesh theoretical ideals with real world pragmatism.

And last but certainly not least,

To my parents who have been supportive, encouraging and taught me that to achieve much in life, much must be sacrificed.

To my beautiful wife, who put up with my long hours during my time at DUSP. Without her unconditional love and support, this journey would not have been possible.

To my soon to be first child, you really helped me get this thesis completed expeditiously.

Even more importantly,

To God, for blessing me with this great opportunity to learn and develop as a student and as a professional with such great people. May I be able to share this knowledge with others to positively transform how our cities are developed.
TABLE OF CONTENTS
Abstract
Acknowledgements
Preface

OBSERVE

Process
1.1 Real Estate Process Defined
1.2 Land Optioning and Assembly: How does this process work?
1.3 Real Estate Process Innovations
   1.3.1 The Design Structure Matrix
   1.3.2 The Design Structure Matrix Applied
   1.3.3 The Design Structure Matrix and Modular Construction Methods

Place
2.1 Singapore: History and Predisposition to Physical Planning
2.2 Singapore: Plans and Process
2.3 Punggol

Participation
3.1 Public Participation in Singapore Planning Efforts
3.2 Public Participation Example: Concept Plan 2001
3.3 Public Participation in an American Context

Philosophy
4.1 John Habraken and the Built Environment

Pages 4

APPLY

Pages 5

Pages 8-9
Philosophy and Process
5. John Habraken and the Land Optioning and Assembly Process

Pages 12-21
ANALYZE

Pages 13-21
Philosophy and Place
6.1 Punggol

Pages 22-65
Philosophy and Process
6.2 Habraken and Punggol(Built Environment)

Pages 66-73
Philosophy and Process
6.3 Habraken and Punggol(Land Optioning Process)

Pages 74-97
Place

Pages 98-111
Philosophy and Place
6.2 Habraken and Punggol(Built Environment)

Pages 112-115
Process
7.1 Recommendations for the Land Optioning Process in Punggol
7.2 Relevance and implementation in an American context
7.3 Future Research

Pages 116-121
Bibliography

Pages 122-125
Appendix 1

Pages 126-129
Appendix 2
Real estate is a dynamic form of investment that uses global financial capital to create physical products in the built environment. With an institutional approach to land and property development, an emphasis is placed on the production and consumption of space. More specifically, this emphasis is placed upon understanding the relational webs, which interlink landowners, developers, investors, purchasers, lesers, and renters in the development process, and how these interconnect.

Land is arguably the most fundamental topic to address in real estate. For this reason, understanding land value is intrinsic to understanding how communities are developed. Land value is a function of two things. The first is how land is optioned/assembled, and when the developer decides to exercise their option to develop. The second is the market demand for specific localities. In the global race for financial capital, developers have focused more specifically on optimizing land value to achieve increased financial returns, and less on the quality of places that are being created in the city.

In the American context, developers are constantly (and secretly) transferring development rights and finding innovative ways to assemble land parcels to maximize their profits. This process is not transparent to all parties involved and does not allow for meaningful input from the various stakeholders that were mentioned above. The land optioning and assembly process as currently practiced needs to be re-imagined.

To begin, additional importance should be placed on the ex post analysis of the land optioning and assembly process in development projects. Ex post analysis represents the realization of what actually happened during one particular period in history, while ex ante analysis reflects what is expected to occur. Looking more closely at the land optioning and assembly process through
this ex post analysis, could provide insight into defining new methods of engaging with different stakeholders.

Land optioning and assembly is a necessary part of the real estate development process that needs to be studied. If cities continue to grow at the rate that many studies have projected, an increased importance must be placed on how developers acquire land parcels and assemble them to create value. To create more equitable communities, a more holistic approach to this process must be addressed.

Developers must make profits for the capital markets, but they also have a responsibility to participate in place-making in the city. Real estate development touches people in all areas of their lives, and buildings most certainly outlast their developers and may endure for centuries. As the Urban Land Institute credo states, “As responsible citizens/developers, let us leave this land enhanced…..thereby enriching the lives of all who live on it.” In order for this to happen, there needs to be a more integrated development approach, that allows for input from various stakeholders during the land optioning and assembly process.

By establishing a clear framework for this process, the most risky and uncertain components of the development process can be streamlined and more efficient. This would provide developers an opportunity to more directly address built form and the spatial environments in which we reside.

Establishing and defining planning and development ideals is necessary if we are concerned about creating great communities. Great communities should build community, encourage participation, and achieve desired levels of physical comfort. The intent of this study is to provide a theoretical framework for individuals to begin to explore new ways of thinking about development and planning ideals.

The real estate industry is well suited to establish and implement new development and planning ideals. Developers understand market trends that enable them to deliver physical products in the built environment. Successful projects become case studies for the development community, serving as examples and establishing industry trends that are then adopted in the marketplace. The adoption of new methods and processes demonstrates a willingness to implement new strategies. The hope is that new development paradigms and ideals can be explored by demonstrating the effectiveness that a revised form of community engagement could provide.

1 Peiser and Frej, Professional Real Estate Development, 367.
2 Ibid.
3 Jacobs, Great Streets / Allan B. Jacobs, 8-9. The criteria for great communities was adapted from Allan B. Jacobs seminal text Great Streets.
This diagram demonstrates the organization of this thesis, as well as the framework through which real estate process innovations might be conceived. More importantly, it demonstrates that innovation in real estate development is complex and multi-facted. This thesis utilized this process framework as a way to establish new ideals in combining parametric design thinking, community engagement, and the land optioning and assembly process. The reader is encouraged to establish their own process framework through which they might conceive their own real estate development ideals.
This section introduces the real estate development process. More importantly, it establishes the relevance of defining a new framework for community participation in the land optioning and assembly process. It also touches upon the major goals and questions this thesis hopes to address.
INTRODUCE

Real estate is a unique investment vehicle in that it serves both the financial and spatial markets. In the space market, real estate represents a physical product that is developed in order to meet market demand. These physical products, such as buildings are combined with financial and marketing resources to create an environment where people live, work, and play. The process of creating these environments is inherently complex and highly iterative, with feedback required from many different stakeholders. In its essence, the real estate development process is a complex, time intensive process that ideally ends with the completion of a physical product that serves a need in the community.

More importantly, real estate development is a risky business and investor returns must match the level of risk undertaken and managed in a project. This requirement places an emphasis on the ability of the developer to understand the multiple components of the development process, in order to most efficiently manage the many varying stakeholders. To achieve this, developers have focused on the elements of the development process where they can have direct control over the outcomes. More effort is spent on finding ways to expedite drawing completion, manage the construction schedule, and optimize building performance upon completion.

By focusing on these elements they have missed one of the most significant elements of this process: meaningful engagement of the community in the development process. The real estate development process can be organized and defined in many different ways, but this thesis will use the definition provided by David Geltner. He has broken this process down into the following phases:

Source: Bernard Harkless

---

Phase 1: Land optioning and assembly, permitting, development design
Phase 2: Construction
Phase 3: Lease-Up and Tenant Finishes
Phase 4: Stabilization and Operations

These various phases will be discussed in greater detail later in this thesis, but traditionally, developers approach their projects from this perspective. As one can see, community input is almost non-existent in this process. When community input is included in this process, it has been relegated to public hearings of design drawings during the permitting process in phase 1 of the development project. The impact of these reviews leaves much to be desired regarding the actual outcomes within the built environment. This is reinforced in the fact that current innovations within the development process, which will be touched upon later in this thesis have occurred downstream of actual policy or process improvements that could be implemented earlier in the development process, i.e. during the land optioning and assembly phase of development.

The Community As Stakeholder

Community engagement is a necessary aspect of development that should not be neglected. Sherry Arnstein, whose Ladder of Citizen Participation is used as a model for discussions on participation today says, “Participation of the governed in their government is, in theory, the cornerstone of democracy—a revered idea that is vigorously applauded by virtually everyone.”

The difficulty in implementing participation processes comes from the inherent problems that arise. Who is able to participate and how are they going to be included in the participatory process? When discussing real estate development, these questions become tenuous, as many developers try to find the most efficient way to circumvent the community engagement process.

This observation requires that participation be divided into two different categories: the haves and the have-nots. In many cases, the have-nots are at the mercy of the haves in determining the future of their day-to-day environments. In the context of real estate development, the developer is traditionally in the role of the have and has the power to determine what type of community engagement they feel is necessary in the development process. The goal, as stated by Arnstein is to provide the have-nots with the real power needed to affect the outcome of the process. There has to be a way for the have-nots and the haves to work together to achieve common goals of creating great places.

Similarly, the goal of this thesis is to look at ways that community participation can be understood and to provide opportunities for the community to engage in the development of their communities in a more meaningful way. More importantly, this thesis looks to encourage developers to take a more active role in defining the community engagement process and provides a potential solution to a typically adversarial process.

It is the belief of this author that for larger-scale innovation to take place in the real estate development field, an analysis of the relationship between the community and the land optioning and assembly process needs to be addressed. There is extensive literature and research on this process that has primarily addressed

---

5 Geltner, Commercial Real Estate Analysis & Investments / David M. Geltner ... [et Al.].
6 Arnstein, “A Ladder Of Citizen Participation.”
7 Ibid., 217.
land development from an optimization standpoint. The focus of this analysis is spent upon achieving the optimal assemblage of parcels, ensuring efficient development of land. Thinking about land optioning in this way reduces the value of understanding the various agents that participate in this process. More importantly, these existing models do not address the quality of place that is provided and the relationship of urban form to various optioning and assembly of parcels. For the majority of those in the development field, a project is considered successful if it maximizes the land value.

Development projects ultimately create places in the built environment. As such, the developer should be concerned with the quality of spaces they create for those in the community. For this reason, a structural framework should be established to allow developers to understand the needs of the various communities in which they develop. The focus of this thesis is not upon traditional notions of community engagement, where the interaction and outcome is inherently adversarial and zero-sum due to a highly political process, in which short-term considerations predominate. The structural framework proposed in this thesis takes a long-term approach to development and views community involvement as a win-win situation in which all parties involved are better off. The basis of this framework is in locational value and the ability to generate positive externalities. In order for this framework to be implemented, a large-scale embrace of strategic planning that facilitates and guides development is required. This requires that community engagement be addressed at the onset of the development process, more specifically, the land optioning and assembly process.

Origins of this Thesis

The inspiration of this research came from an interest regarding parametric design and the way that this design methodology might impact built form in the urban setting. The essence of parametric design in an urban context is based upon understanding that the city is a complex, dynamic system composed of different forces that act upon each other within this system. By establishing parameters, one is able to more clearly see and interpret the relationships between complex data, and urban form. More specifically, looking at the city through the lens of parameters provides the opportunity to establish certain urban design principles or ideas and interpret outcomes based upon the outputs of this study.

Additionally, parametric design uses computational technology to quickly generate urban form and how these forms might change when one of these parameters is adjusted. In this regard, parametric design uses new technological tools and new theories to better understand cities. It is the belief of this author that parametric design thinking has the potential to positively impact how cities are designed and developed from more than just a formal city-design approach.

This new theoretical and technological approach provides significant opportunity to re-imagine how cities are designed, it is still primarily a tool used by designers to generate new, complex urban forms. If parametric thinking is applied to the land optioning and assembly process, there is an opportunity for the complex web of stakeholders to more holistically design and develop communities.

8 Poorvu and Cruikshank, The Real Estate Game, 163.
Parametric Design Thinking, Community Engagement and the Land Optioning and Assembly Process

How might parametric design thinking and community engagement be combined to change the real estate development process? My interest in this topic arose from site observations and research of a housing development project in the new town community of Punggol located on the northeastern edge of Singapore.

During this visit, it was observed that residents used public space for different types of uses from religious shrines, to plants and flowers, to simply storage space, just to name a few. The question then arose regarding why were these spaces being utilized in this manner. Was it simply a cultural idea, or was there something greater that the individual was seeking? The analysis of this data, which can be found in Appendix 1, serves as the basis for this thesis and will be discussed later, but the simple answer is that these observations were not cultural. These observations reflect a desire by those individuals to be more actively engaged in the creation of their home.

This conclusion caused me to analyze what urban design parameters caused this observed phenomena in the built environment. Upon further research, the writings of the architectural theorist John Habraken provided clarity in understanding the site observations. John Habraken established a framework for various agents in the built environment to control different components of the design and construction of the dwelling. In its essence, this theory observes the built environment in a parametric manner, as Habraken is interested in understanding the impacts of different actors in the built environment. Habraken’s theory is simple to understand and easy to apply, providing an opportunity to explore the relevance of parametric thinking to the real estate development process.

More importantly, Habraken’s framework rethinks the role that the individual plays in the development of their home. He addresses larger issues of how the word ‘dwelling’ is defined and how various agents impact the design process. Additionally, Habraken’s framework provides a unique opportunity to establish a model that can help define the role of agents in the development process, an area of research that is significantly lacking in the development field. There was much insight to be learned from the application of Habraken’s framework to the land optioning and assembly process, as it could provide developers a useful tool to think about how they might be better able to engage the community in this process, while still achieving desired levels of efficiency.

To demonstrate the applicability of Habraken’s framework to the real estate development process, this thesis looks to the ideal state of Singapore. Singapore is unique in its dedication to planning and development. They have a standardized planning and development process that allows for the relationships between various stakeholders to be more closely examined. Additionally, as a nation-state, Singapore has a unique and highly structured planning and development process, with admirable ideals. These ideals encompass everything from providing housing for the majority of Singaporeans, or providing ample access to gardens and public spaces. These ideals are best demonstrated in Punggol, the new Eco-Town development located in northeastern Singapore. Punggol also offers the opportunity to study the relationship between masterplans and development through the Housing Development Board(HDB). HDB is the master-planner and developer of Punggol and can provide us insights into how deliberate planning and development strategies can be employed by a developer.
The goal is to establish a stakeholder framework that could be applied to the land optioning and assembly process. This stakeholder framework provided an opportunity for the land optioning and assembly process to be more systematically understood. Theoretically, it begins to parametricize the process by allowing each stakeholder to have control over various aspects of the land optioning process. The developer can then observe the impacts that occur depending on how and when stakeholders engage in this process. Ultimately, this framework provides the developer with a better methodology to understand stakeholder engagement at this part of the process. This methodology could be used in addition to other established frameworks to provide a clearer understanding of the development process.

This thesis primarily aims to establish a land development framework that can more actively engage the various stakeholders that are affected by this process. With various stakeholders and motives at stake in this process, community benefit, economic growth etc, this framework hopes to clearly establish how each of these stakeholders might take ownership in the land optioning and assembly process and intervene to assist in the creation of place in the city.

The major goals that this thesis has:

1. To understand the impact that deliberate planning policies and processes have in creating better opportunities for developers to place a greater emphasis on creating better places in the built environment.
2. To demonstrate to developers, government officials, and community members that there is a clear way to define how the land optioning and assembly process might be more integrated and more efficient.
3. To understand the extent to which an integrated, intentional land optioning and assembly process can facilitate place-making opportunities.
4. To argue that if established, this framework (in the context of Singapore) has the potential to be quantified and evaluated ex post to determine its effectiveness on development projects.
5. To initiate a conversation with the development community to establish ways that the public can more actively participate in the development of their communities.

Through the lens of Habraken’s framework, the major questions that this thesis hopes to answer:

1. How should the land optioning and assembly process be overseen? Are there institutions or individuals that could provide better oversight of the land optioning and assembly process than is currently observed?
2. How can ownership of the land optioning and assembly process be more inclusive and still clearly defined?
3. How can shared values be communicated and implemented in the land development process?
As this thesis is about the formation of a new process framework, it is organized in a manner that demonstrates the process through which these issues were conceived and addressed.

Introduce: This section introduces the real estate development process. More importantly, it establishes the relevance of defining a new framework for community participation in the land optioning and assembly process. It also touches upon the major goals and questions this thesis hopes to address.

Observe(Chapters 1-4): This section will define the current development process, as well as new innovations in the real estate development field that have allowed developers to better understand the development process and more effectively manage their risk. This section will also introduce the case study of Singapore and an analysis of its current planning and development processes. Finally, it will introduce and integrate John Habraken’s theory and its applicability to the built environment.

Apply(Chapter 5): This section will explain Habraken’s framework as it relates to the real estate development process. It serves as the theoretical underpinning of this thesis and demonstrates the applicability of Habraken’s theory to the increased scale of the neighborhood or master planned development.

Analyze(Chapter 6): This will introduce the data that was collected through the initial site observations and interviews. It will more specifically demonstrate how Habraken’s theory is manifested in the built environment of Punggol. Most importantly, this section will apply my proposed theoretical framework to the development process in Punggol.
Project(Chapter 7): This section will provide process and policy recommendations for Punggol. More specifically, it will demonstrate how the Housing Development Board can implement a new framework and study its affect on the built environment through urban form and development process ex post analysis.

CONCLUDE

Conclude: This section briefly revisits the intent of the thesis and also encourages the reader to adopt this framework for re-imagining how community engagement can positively impact the land optioning and assembly process. Additionally, it challenges the reader to establish their own planning and development ideals regarding this
This section is comprised of Chapters 1-4 and will define the current development process, as well as new innovations in the real estate development field that have allowed developers to better understand the development process and more effectively manage their risk. This section will also introduce the case study of Singapore and an analysis of its current planning and development processes. Finally, it will introduce and integrate John Habraken’s theory and its applicability to the built environment.
1.1 Real Estate Process Defined

1.2 Land Optioning and Assembly: How does this process traditionally work?

1.3 Real Estate Process Innovations
   - The Design Structure Matrix
   - The Design Structure Matrix Applied
   - The Design Structure Matrix and Modular Construction Methods Development Stage Task Matrix

2.1 Singapore: History and Predisposition to Physical Planning

2.2 Punggol

2.3 Singapore: Plans and Process

3.1 Public Participation in Singapore Planning Efforts

3.2 Public Participation Example: Concept Plan 2001

3.3 Public Participation in an American Context

4.1 John Habraken and the Built Environment
1.1 Real Estate Process Defined

The real estate development process depends upon many different disciplines to create successful development projects. This interaction is highly iterative and touches upon financial analysis, market and competitive analysis, political and legal analysis, and physical and design analysis. To better understand how development projects are managed, one must have a good understanding of the various phases within the development process and the effect that each of these phases has upon the investment risk/return profile.

Phase 1: Land optioning and assembly, permitting, development design

During this phase, the developer conducts a highest and best use analysis for the site. Once this is determined, they will begin to option and assemble different land parcels, obtain permits, as well as further develop the site plan and design of the project. There is no set time frame for this phase of the development project to be completed. It can take anywhere from a couple of months to a couple of years. Because of this lack of certainty and predictability, this is the riskiest phase of the development process. The opportunity cost of capital (OCC) can be as high as 40%.

---

9 Geltner, Commercial Real Estate Analysis & Investments / David M. Geltner ... [et Al.], 759.
Phase 2: Construction

During this phase, the development project is built. At this point, the land is irreversibly committed to the construction project, and it ceases to be a “land speculation” with real options characteristics.\textsuperscript{10} The opportunity cost of capital (OCC) is usually around 20\%.\textsuperscript{11}

Phase 3: Lease-Up and Tenant Finishes

This phase reflects the completion of the major core and shell of the development project. The space is now leased and occupied by its tenants. This phase of the development process involves less capital and less risk than the other components, therefore the opportunity cost of capital falls around 10\%.

Phase 4: Stabilization and Operations

During this phase, the project is completely or nearly leased up, and operating at its long-run steady state level of profitability.\textsuperscript{12}

As one can see from the risk and investment that occurs at each stage of the development process, ideally only the best development ideas and opportunities proceed forward from phase 1. The entitlement aspect of this process has increased the cost and risk associated with this phase that is mostly out of the control of the investor. This phase of development is often controlled local municipalities or local communities that can make decisions to

\textsuperscript{10} Ibid., 761.
\textsuperscript{11} Ibid., 762.
\textsuperscript{12} Ibid.
constrain development in various ways. If conditions become unfavorable for the developer, additional costs to continue with the process are incurred, potentially missing the optimal market timing to complete the exercise of their option. This entire process has significant implications for not only investors in the capital markets, but also to those in the community that wait for development projects to be delivered to meet their needs and demands. There must be a better way for the developer to manage and understand this component of the process.

For this reason, an emphasis should be placed on phase 1 of the development process, more specifically the land optioning and assembly component of this phase. In its essence, the land optioning and assembly component of the process is the first step that a developer must take in the previously mentioned entitlement process. Therefore, the value of real estate development is found in the option to develop. If more emphasis is placed upon understanding this process and ways that landowners, planners, developers, and the community can more effectively communicate needs and desires earlier in the process, then developers can introduce an element of predictability to the development process.

Additionally, this risk and complexity demonstrates that there is a benefit to finding new methods to better understand and manage the development process. In Phase 1 of the development process, the developer’s objective is to efficiently gather information from the necessary entities so the process can be more quickly completed and less capital can be spent before the land acquisition and construction occur. For this reason, it is worth establishing a framework that can allow you to gather information in a meaningful way, while still keeping an efficient development schedule that allows for the proper management of financial risks and returns.

1.2 Land Optioning and Assembly: How does this process traditionally work?

Land is arguably the most fundamental topic to address in real estate. For this reason, understanding land value is intrinsic to understanding how communities are developed. Land value is a function of how it is optioned and assembled and when the developer decides to exercise their option to develop. Most importantly, land value is a function of market demand; land in New York City is worth much more than land in Des Moines, Iowa.

An option is defined as: The right without obligation to develop land at any time. When development is undertaken, this option is surrendered, the cost of construction incurred, and in return the value of the developed property is obtained. This option-like characteristic allows the owner/developer to profit from uncertainty during an upswing the market.

Traditionally, there are two ways that the development process begins: a site-looking-for-a-use or a use-looking-for-a-site. In the former case, the site is already under the control of the developer and a highest and best use study takes place. With the use-looking-looking-for-a-site scenario, the developer already

15 Geltner, Commercial Real Estate Analysis & Investments / David M. Geltner … [et Al.], 82.
has a use in mind and must determine the cost and the level of usage demand and competition at any given location.\textsuperscript{16} For purposes of this analysis, the use-looking-for-a-site methodology will be used. In this process, a developer conducts market analysis to determine the best site for their development expertise. These land parcel(s) may be owned by an individual or an entity, so the developer must begin to negotiate the option to develop their land. Developers traditionally will offer pre-existing landowners a conditional price for the land, contingent on the outcome of the assembly and permitting process.\textsuperscript{17}

With so much at risk during this phase of the development process, developers must have a plan for how they hope to obtain the highest and best use for the land. As Hoch describes in the seminal reference book on land use,

“Landowners and developers who bring their petitions before local government planners, planning commissions, and councils have their own plans. With the exception of very experienced development firms, few people seeking approval understand that an urban plan must be the foundation for their actions. But when their petitions are rejected because of inconsistency with the local official plan, their allegiance to planning policies may be undermined. Most people resist enforcement when they do not understand how the local plan and regulations might affect the plans for their own property”\textsuperscript{18}

This excerpt demonstrates the importance of placing an emphasis on the planning process component of the development process. More importantly, it places an emphasis on the specific stakeholders that play key components in how land is developed in the city. Development has implications for the different communities in which they are developed; therefore, it is important for the development process to address more than just internal process improvements.

\textsuperscript{16} Ibid., 758.
\textsuperscript{17} Ibid., 760.
1.3 Real Estate Process Innovations

To understand the innovations in the real estate development process, one must first understand that real estate is ultimately a product, and this product must be sold in a marketplace that competes with other types of investments. The real estate development process is a complex, time intensive process that ideally ends with the completion of a physical product that serves a need in the community. There are many different stakeholders and trade-offs that are required throughout the development process, making the real estate development process highly complex and iterative. Each of these stakeholders has different objectives and roles that must be fulfilled sequentially or simultaneously in order for a development project to be realized. As one can imagine, this complexity makes it difficult to find models or methods that allow the real estate development process to be better managed and understood.

Decades ago, developers of complex products such as aircrafts and microchips faced problems with understanding how these products were developed and the relationships between various stakeholders within the development process. They discovered that information generated during the development process was unique and specific for each product; however the method they went about developing products was similar each time.\(^{19}\) Furthermore, intense competition required firms to develop new products at an increasingly rapid pace, which placed significant pressure on engineering firms to develop better products while

---

also developing these same products faster. This competition in the product development field required firms to find ways to reduce cost, shorten schedules, and most importantly reduce uncertainty.

This philosophy translated well with the real estate industry, as the real estate industry was charged with creating physical products (buildings) in the built environment. Developers are constantly competing for land and the ability to develop real estate products for people to live, work, and play. More importantly, developers are always looking for ways to build and manage their products more efficiently, in order to deliver a differentiated product to the market.

As mentioned previously, there are many different stakeholders and trade-offs that are made throughout the real estate development process. This dilemma makes it difficult to comprehensively model and understand how each of these parts contributes to the whole of the development process. To date, much of the literature has either focused on a broad understanding of the development process or a specific component of the development process such as design development or construction management, but a more specific analysis of the various stakeholders and their responsibilities in different stages of the development process needs to be studied. By identifying each stakeholder and the role they play in this process, one can begin to understand the impacts and trade-offs that various stakeholders place upon the process.

Source: Bulloch and Sullivan

---

20 Eppinger, A Model-Based Method for Organizing Tasks in Product Development / Steven D. Eppinger … [et Al.], 1.
The most recent literature on real estate development process improvements has focused upon identifying the specific stages and tasks within the entire development process with the hopes that a better understanding could be obtained throughout the entire development process. The assumption was that by better understanding the development process, one could more effectively optimize various components of the process, ultimately better managing their risk profile. The tool that was used was the Design Structure Matrix (DSM), which was a tool for process management utilized by the previously mentioned product development sector.

The Design Structure Matrix

The Design Structure Matrix (DSM) was designed to understand the informational relationships between tasks. The DSM also provides a simple, compact, and visual representation of a complex system that supports innovative solutions to decomposition and integration problems. A DSM is a square matrix with identical row and column labels.

There are generally three types of relationships that tasks can have with each other: dependent, independent, and interdependent. The last of these, interdependency, is what the Design Structure Matrix tries to solve. Modeling and managing coupled tasks, which describes much of the real estate development process, is what the DSM is designed to address.

Source: Bonelli and Gonzales

Source: Bulloch and Sullivan

---

process and product development industries, is much more challenging because this arrangement implies iteration and feedback loops.\textsuperscript{22}

The goal of the matrix is to optimize the process. In order for this to occur, tasks must be organized in a way in which the most number of X’s as possible are below the diagonal, minimizing feedback.\textsuperscript{23} If tasks cannot be moved below the diagonal, it is ideal to move them as close to diagonal as possible. This allows players in the process to see what tasks are required for them to complete their work, as well as how their work might impact other participants. Modeling the process in this manner allows managers to better understand how relationships are iterated in the process and ways that the number of interactions between players can be minimized.

\textit{The Design Structure Matrix Applied}

The work of Bulloch and Sullivan in an MSRED 2009 thesis used the DSM to establish a baseline model of a real estate development project. They first provided historical and contemporary frameworks that help in defining the real estate development process and the many different actors and tasks involved in this process. More specifically, they categorized and provided a brief analysis of the different models, frameworks, and approaches that existed in current literature into the following categories:

- Agency Models – deal with the actors in the development process and their relationships. These models attempt to describe the development process by focusing on sociological or behaviorist perspectives.
- Structure Models – focus on the forces, institutions, and conventions that organize and constrain relationships in the development process. These models are generally informed by political economics.
- Economic Models – primarily econometric in nature and deal with supply and demand as a driver for the development process as reflected in rents, costs, occupancy, investment yields, etc.
- Event Sequence Models – focus on the management and sequencing of the stages and processes of real estate development. These models are practical and industry focused historically the least theoretical in nature.
- Systems Models – view the real estate development process holistically and attempt to synthesize and reconcile the practicality of event sequence models, the actor focus of agency models, and the impact of institutions and power relations of structural models.\textsuperscript{24}

Bulloch and Sullivan believed that each of these models contributed to one’s understanding of the real estate development process, but none of these models provided the level of detail that they felt was required to develop real estate products and better understand the relationships between the agents and tasks. They believed that tools of analysis established in the field of systems

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{22} Bulloch and Sullivan, \textit{Application of the Design Structure Matrix (DSM) to the Real Estate Development Process}, 46.
\item \textsuperscript{23} \textit{Ibid.}, 48.
\item \textsuperscript{24} \textit{Ibid.}, 20.
\end{itemize}
\end{footnotesize}
engineering provided the best opportunity to understand the real estate development process and create a tool that could be used to assist in the decision-making process of real estate. For this reason, they used the design structure matrix as a tool that could provide professionals as well as academics with insightful information through which they could better understand the development process.

With the help of their partner, Jones Lang LaSalle, the world’s largest real estate services company, they identified 91 individual tasks necessary for successful completion of a RED project. They then took these 91 tasks and created a 91x91 matrix to identify the 1,148 planned informational inter-task interactions. They also identified the stages of development in the following manner:

1. Idea Inception
2. Feasibility
3. Preconstruction
4. Construction
5. Stabilization
6. Asset Management/Sale

The DSM as they have used it in their analysis, provides a general analysis of the real estate development process without going into much specificity of each of the stages mentioned above. This analysis is significant and provides a useful method to begin to better understand the development process, but they have also made an assumption regarding the complexity of the real estate development process. In their application of the DSM, they have assumed that this method is the best way to model the entire development process. They have also accepted the development process as is currently practiced. Bulloch and Sullivan have not entertained the option that there might be different methods of analysis that could be used to provide a better approach to various stages of the development process. More specifically, is there a way to model the relationship between various agents of the development process that is not so technocratic?

Bulloch and Sullivan discussed agency models in their analysis of the DSM, but they dismissed these models as insufficient to understand the complexity of the real estate development process. They believed a shortcoming of agency models to be the difficulty they have in clearly and concisely conveying exactly who is interacting with whom and why that interaction is important. They also believe that the current diagrams provided limited opportunities for analysis and cannot dynamically adjust to changing conditions. Is there a way to begin to analyze and diagram these relationships in a more dynamic way?

Design Structure Matrix (DSM) and Modular Construction Methods

The DSM has also been used to understand the impacts that modular construction methods have upon the real estate development process. In 2012, the CRE thesis Bonnelli and Gonzales used the DSM to identify unplanned iterations in the RED process when projects used MCM. The major goal of this thesis was to understand whether re-sequencing, elimination, or cre-

25 Ibid., 51.
Stage 1: Land Banking Stage
Stage 2: Land Packaging Stage
Stage 3: Land Development Stage
Stage 4: Building Development Stage
Stage 5: Operating Stage
Stage 6: Renovation Stage
Stage 7: Redevelopment Stage

The main take away from this model is that there are discrete stages in the development process, and that in each stage the real estate developer must complete different tasks using specialized skills and accepting certain risks and employ various capital structures with different risk-return characteristics to create or capture the value increase in that stage.

Kohlhepp also believes that this matrix enables citizens, neighbors, and government officials to understand that a land packager selling to a land developer or a land developer selling a building pad to a building developer are not simply “flipping” the property to make quick profits at the community’s expense. Rather they are creating value by first, spending money to accomplish certain tasks and, second, incurring the corresponding risks that move the property to the next stage of the development process.

Although the DSM has contributed significantly in providing new tools and metrics through which to evaluate the development process, they are still highly technocratic. Furthermore, none of them touches upon the most important component of this process in much detail: the land optioning and assembly process. The land optioning and assembly process is the place-making device that facilitates the type of environments that we are creating in our communities.

29 Ibid., 21.
Source: Bonelli and Gonzales

### Factors

<table>
<thead>
<tr>
<th>Potential Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Client - related</strong></td>
</tr>
<tr>
<td>- Finance/Payments of completed work</td>
</tr>
<tr>
<td>- Owner interference</td>
</tr>
<tr>
<td>- Slow decision making</td>
</tr>
<tr>
<td>- Unrealistic contract duration imposed by owners</td>
</tr>
</tbody>
</table>

| **Contractor - related** |
| - Site management |
| - Improper planning |
| - Inadequate contractor experience |
| - Mistakes during construction |
| - Improper construction methods |
| - Delays caused by subcontractors |

| **Consultant - related** |
| - Contract management |
| - Preparation and approval of drawings |
| - Quality assurance/control |
| - Long waiting time for approval of tests & inspections |

| **Material - related** |
| - Quality of materials |
| - Material shortage |

| **Labor & Equipment - related** |
| - Labor supply |
| - Labor productivity |
| - Equipment availability |
| - Equipment failure |

| **Contract - related** |
| - Change orders |
| - Mistakes and discrepancies in contract documents |

| **Contractual relationships - related** |
| - Major disputes and negotiations during construction |
| - Inappropriate organizational structure linking all parties involved in the project |
| - Lack of communication between parties |

| **External factor - related** |
| - Weather conditions |
| - Changes in regulations |
| - Problems with neighbors |
| - Site conditions |

Source: Kohlhepp, *The Design Structure Task Matrix*
Real estate would be no different than stocks and bonds in the capital markets without land, therefore, understanding the various stakeholders and their interactions is required to better make structural improvements on how this process might be more efficiently carried out while providing the opportunity for developers to more actively shape the built environment through the products they bring to market.

This is the development framework that will be used for this thesis. It is based upon the Daniel Kohlhepp development framework model. The objective of this framework is to establish that there is a value associated with each stage of the development process. This value can either be held or sold depending on the developers strategy for project development.

Figure 1
2.1 Singapore: History and Predisposition to Physical Planning

Singapore was founded as a British trading post in 1819. Since its birth, Singapore has demonstrated a unique ability to deal with rapid growth, placing an emphasis on physical planning and development with strict controls on urban growth. Land use planning in Singapore started with the city's founding by Sir Stamford Raffles in 1819. The Raffles Plan of Singapore utilized a town committee to establish distinct residential districts for different ethnic groups of settlers became the basis of growth in built-up areas of Singapore. Although this plan was implemented for nearly a century, order and regularity characteristic of British planning methods soon became a significant component of how Singapore was developed.

30 Yuen, Planning Singapore, 2.2
In 1927, the Singapore Improvement Trust was established with the goal of housing the homeless in Singapore. It was given the power to plan roads, regulate sanitary conditions of buildings and draw up schemes for land acquisition. Most importantly, the SIT was not given the authority to carry out large-scale housing construction. This meant that there was not significant capability of this organization to provide the rapid housing needs of a growing population. Because of this, the Land Acquisition Ordinance was amended in 1946 and 1955 to give the government more powers to acquire more private land for comprehensive new-town development and to seek price stabilization.

In 1959, the People’s Action Party (PAP), came into power, led by Lee Kuan Yew. During this time, there was much political struggle between Malaysia and Singapore’s Chinese majority. This caused social tension and strife and forced Malaysia to expel Singapore by an act of Malaysian parliament on August 9, 1965. On the same day, Lee Kuan Yew declared Singapore an independent and sovereign state.

After being expelled, Singapore initiated many policies that reinforced its commitment to physical planning as a means to achieve economic and social prosperity. This began with the Land Acquisition Act of 1966, which repealed the 1920 ordinance. It gave the government increased powers regarding compulsory land acquisition. The process of taking possession of land was expedited and compensation for land-owners who had

32 Ibid.
their properties taken over was regulated. In 1973, another Land Acquisition Act Amendment was enacted to curb speculation on land and to limit the cost of land acquisition. This was to ensure that the cost of compensation did not fluctuate too drastically with market conditions.\textsuperscript{34} This allowed the government to purchase land at a discount, enabling the ability to establish a state-owned land bank that provided the unique ability to shape how and when planned developments could come to market.

Although the government had amended the land acquisition policy, they still faced population issues in the city centre. Many people still lived squatter settlements and deteriorating housing conditions. The government was faced with a lack of professional manpower, an inadequate building industry and limited financial resources. To meet this need, the Housing and Development Board was established in February 1960.\textsuperscript{35}

The Housing Development Board is a unique organization that embodies socialist tendencies, while still maintaining free market ideologies. The Housing Development Board is a private developer that is supported by public funds from the State. As an entity it has been given extensive powers with respect to land acquisition, resettlement, town planning, architectural design, engineering work, and building material production.\textsuperscript{36} These powers have been vital in the creation of new housing developments, as well as in the redevelopment of older housing estates.

As a framework for understanding the progression of HDB planning and development history, one must understand the creation

\textsuperscript{34} Third World Network, Provision of Public Housing in Singapore, 15.
\textsuperscript{35} Ibid., 13.
\textsuperscript{36} Ibid., 14.
and development of new towns to deal with population growth. A New Town was a fully planned and programmed development that had a town centre and a range of complementary facilities. Pedestrian and vehicle circulation were separated, and industrial land was allocated for light industrial use to reduce the need for commuting to other employment centres. Most importantly, these communities were filled with amenities such as schools, parks and sports facilities. As with many things related to physical planning and development in Singapore, new information and thoughts on how to improve the new town concept were developed. These new improvements were implemented in the Ang Mo Kio New Town, which was developed in 1970.

In this New Town model, there was a three-tier hierarchy of organization that was used in the planning methodology. The organization was centered upon a town centre, neighborhood centre, and sub centre. Town centres were intended to serve the residents of the entire town by providing more comprehensive goods and services. On the other hand, the neighborhood was intended to serve as the basic planning unit in new towns. Neighborhood centers were intended to provide the majority of goods that those in the community might need on a frequent basis, while sub centres provided more specialized and localized shops.

This progression of planning and development methodology is important in understanding the intention behind the New Town development of Punggol. More specifically, it demonstrates how HDB has continued to refine their masterplanning and development concepts to provide the best living environment to the residents of Singapore.

---

37 Han, “Global City Making in Singapore,” 158.
38 Ibid.
2.2 Punggol

“(New HDB Towns) enable us to try out new planning concepts and ideas. Proven ideas can then be replicated in other new towns, as well as in old towns when we redevelop them.”

Punggol is a truly unique case study for physical planning and development ideas. It is a new town housing development started in 1998 that is expected to house nearly 100,000 people in a combination of public and private housing. As one can imagine, dealing with a growing population and scarce land resources, it becomes imperative to find ways to optimize development to address a multitude of issues.

To accomplish this task, Punggol has sought to maintain some of its history. Originally, Punggol served as a Malay community comprised mainly of fishermen who made a living off the waters surrounding the marshland, while the Chinese immigrants were mostly rubber tappers and poultry and pig farmers. This relationship with nature and the environment is something that the Urban Redevelopment Authority sought to maintain when it coined Punggol as the “waterfront town of the 21st century.” As these housing developments are constructed along the waterfront, they are finding new ways to increase the density, while still providing a significant amount of public green space.

Source: Parametric Urbanism Workshop, MIT

39 “Punggol to Have 7 New Waterfront Districts.”
40 “A Brief History of Punggol - From Marshland to Modern Heartland | Five Stars And a Moon.”
From the beginning, Punggol was intended to be a model for the future of public housing development in Singapore. Punggol 21, the first community in this new town development was planned to be an icon for the new century to serve the need of the globally connected, sophisticated Singaporeans. The major ideas that led Punggol 21 were:

1. More executive condominiums and private housing in the estate.
2. More high quality HDB flats in the form of 'Design Build' and 'Design Plus' flats
3. A town planned with LRT from the start
4. Walking distance to the LRT stations not more than 300m for most residents
5. Clusters of community facilities
6. Clubs run by SAFRA or NTUC\(^1\)

Now, Punggol has been positioned by the Housing Development Board as Singapore’s first eco-town. It is intended to serve as a testing ground for new green features, such as energy, water, and waste management. Some of these features have been promoted through more intimate estates with common greenery, a wide range of housing with supporting facilities, and an integrated public transport network with enhanced accessibility for residents.\(^{41}\)

\(^{41}\) Han, “Global City Making in Singapore,” 160.
Source: Bernard Harkless
More importantly, Punggol serves as an example of HDB’s move towards concept living. When HDB was first started, its primary goal was to meet the housing needs of a growing state. As HDB gained expertise, they began developing self-sufficient satellite towns like Tampines and Woodlands. These communities had their own governments that were elected by the public. They also were intended to serve as places where Singaporeans could live, work, and play.

**Community Organizations in Singapore**

With the progression of development typologies undertaken by HDB, the role of community groups has to evolve as well. Historically, Singapore utilized Grassroots Organizations (GRO’s), as a bridge between the government and the people. Over the last 40 years, the roles of the GRO’s have evolved to focus on organizing and providing a wide range of community projects and activities to meet the social, recreational, educational, cultural, and welfare needs of the residents. The GRO’s were organized under the umbrella of the People’s Association, which allowed each electoral constituency to have its own Citizens’ Consultative Committee (CCC) and several Residents’ Committees that were comprised of a number of housing blocks. It is important to note here that the RC’s aligned themselves more to the local Member of Parliament and the ruling party leaving them less responsive to the residents or constituents they serve.

Most recently, Town Councils were established to encourage participatory democracy in Singapore, as well as government decentralization. These things demonstrate that Singapore is open to finding new ways to engage the public.

Most important to note is that HDB serves as the master planner and developer for Punggol and are leading the vision for this community. This is significant to note because the Housing Development Board has an integrated capacity to think about planning and urban design in addition to the development of housing. With an integrated process such as this, they are presented with a unique opportunity to experiment with new ways of engaging the public in their development process.

---

42 Concept living is not a buzzword. HDB defines concept living as housing communities that become places where people can live, work, and play. In the case of Punggol, the concept driving the living standards for the community is environmental sustainability.

43 Tampines was one of the first towns planned using the strategy of hierarchical distribution of population, land uses, open spaces, and infrastructure. Seik, “Planning and Design of Tampines, an Award-Winning High-Rise, High-Density Township in Singapore.”

44 Ibid., 163.

45 Ibid., 165.

46 Ibid.
2.3 Singapore: Plans and Processes

Key Players in Physical Planning Process of Singapore

Ministry of National Development – the main government entity responsible for national planning and land use in Singapore

Urban Redevelopment Authority – the land use planning and conservation authority in Singapore. They are responsible for ensuring that development in Singapore follows the development control guidelines that were part of the concept planning and master planning processes.

Housing Development Board – the public housing authority of Singapore

Singapore Land Authority – charged with optimizing land resources for the economic and social growth of Singapore. They are also the agency responsible for coordinating government land sales, which is the primary method of how land is developed in Singapore.

As mentioned in Chapter 2.1, Singapore has a unique history in regards to physical planning and development. Each of these entities mentioned above plays a significant role in the development process. Each of these organizations is a governmental entity that is charged with managing various aspects of the development process in Singapore. The Ministry of National Development is one of 16 ministries within the larger government context of Singapore. They oversee the Urban Redevelopment Authority and the Housing Development Board. This is important because it has established a systematic way for development in Singapore to be understood and executed.
As one can imagine, the intricate planning history mentioned above has to have current implications on how the planning and development process is conducted in current-day Singapore. As was demonstrated through the various amendments and laws passed regarding land acquisition, it is clear that the intensive involvement of the government in development is heightened do to the fact that the State owns the majority of land in Singapore. Over 75% of the land is government owned, made up partly of former crown land from the colonial government and partly through compulsory acquisition of private land and land reclamation.\footnote{Yuen, Planning Singapore, 4.}

The planning process in Singapore is organized in the following way:

**Concept Plan**

The Concept Plan provides the concept/vision for how to optimize the limited land resources. It touches upon issues of flexibility, economic infrastructure costs, livability, and amenity to name just a few things. The major influencing elements include long term government policy regarding industrialization, housing and urban development, the need for expansion of the port and marine industries, the need to safeguard adequate lands for defense purposes, and the conversion and use of large tracts of reverted British Forces Bases land and facilities into civilian use through comprehensive planning and finally the existing land commitments.\footnote{Motha and Yuen, Singapore Real Property Guide, 114.}

The concept plan is reviewed every ten years to adjust the overall policies and directions that guide land use and transportation infrastructure to reflect changing needs of a growing population, as well as changes in market conditions. This is unique because it demonstrates flexibility towards land use planning and policy. As Belinda Yuen said in my interview with her, plans are no good if they can’t be implemented. Furthermore, cities are dynamic, and planning should find a way to reflect this dynamism through planning implementation and policy.

**Development Guide Plans**

This was a new process that was instituted during the creation of the 1999 Master Plan. The process to create development guide plans begins after the concept plan is formulated. Singapore is divided into 55 DGP areas, each with a population of roughly 150,000 people. Each DGP is a statement of the planning vision for the area and provides the control parameters such as land use, intensity, and height to guide development.
Master Plan

The Master Plan is the byproduct of the feedback and concepts generated from the Concept Plan. The Master Plan is the comprehensive land allocation plan describing the desired usage of land, the location of different activities in different areas and laying down the limits for density of development.\(^{49}\) It is the statutory land use plan that shows permissible land use and density. The Master Plan is reviewed every five years and is created through Development Guide Plans (DGP’s) for local planning areas. The DGP’s set out the planning objectives for the local areas within the strategic framework of the Concept Plan and guides development control. Without the Master Plan, the vision set forth in the Concept Plan would not occur.

Land Sales

Since the government owns roughly 75% of the land in Singapore, they are able to directly influence development pipeline. With the help of the Singapore Land Authority, the URA allocates land through the ‘sales of site’ program. Under this program, a steady supply of state land is released for the development of residential, commercial, hotel, and industrial property to meet demand and to achieve national development objectives.\(^{50}\) In this regard, the land optioning and assembly process is drastically different than in the United States. In the United States, most land is privately owned and traded in the private market. This means that land may not be efficiently assembled. In Singapore, land use policy has required for land disposition and development to be optimized, as Singapore is an island with finite land.

Development Control

Development control ensures that land and buildings are developed according to planning intentions of the master plan. The Planning Act requires all development and subdivision of land to obtain written permission in the form of a formal approval from the planning authority (URA) before they can be carried out.\(^{51}\) Development is conducted in this manner to ensure that land is optimized amongst competing uses, as well as to respond to rapidly changing economic and social conditions. In this regard, the URA can effectively restrain or increase supply depending on market demand. This is significant as it directly impacts land sales, which are a major source of revenue for the government of Singapore.

\(^{49}\) Ibid., 111.

\(^{50}\) Han, “Global City Making in Singapore,” 90.

\(^{51}\) Yuen, Planning Singapore, 2.
Source: Planning and Implementation in Singapore
This is the long term planning framework that will be used for this thesis. It is based upon the Singaporean planning model. The objective of this framework is to establish a clear process that all stakeholders must follow and understand in order to participate in the planning and development of the city.
3.1 Public Participation in Singapore Planning Efforts

In the current state of global competition, a ‘well-planned city’ no longer equates to a functional and efficient city, but also one that supports a good quality of life where citizens could take a more active role in shaping the urban environment.\(^{52}\)

Historically, Singapore has gained prominence on the world stage because of its top-down planning, rational planning approach that has been highly successful in its implementation. The role of public participation in the physical planning and development process in Singapore has left much to be desired in regards to public participation. Until 1991, planners within the planning authority prepared the master plan and concept plan and statutory public participation primarily involved submitting objections. This lack of interest in public participation is attributed to the state’s ability to satisfy the demands and expectations of citizens. Political legitimacy has been earned by Singapore’s ruling government through the efficient delivery of urban policies contributing to political stability of the country and economic prosperity of the population to the extent that community involvement would not have any value-added in policy formulation.\(^{53}\)

Singapore has addressed this concern and has made significant strides in not only including the public in planning decisions, but also improving the quantity and quality of participation that is achieved. This is most recently demonstrated through the processes that generated the Concept Plan of 2001 and the Master Plan of 2003.


\(^{53}\) Ibid., 32.
3.2 Public Participation Example: Concept Plan of 2001 and Master Plan 2003

To establish progressive methods of participation, the URA used the concept of focus groups and public forums in the development of the Concept Plan of 2001 and the Master Plan of 2003. The focus groups were established as a way to engage participants in problem-solving and not strictly raising opposition to current development plans. These groups provided a more effective way to share ideas and exchange viewpoints between various stakeholders in the planning and development process. Focus groups were seen as essential and ideal in the case of long term, strategic planning in Singapore, as they were focused specifically on tackling specific issues and oriented to problem solution. These focus groups were comprised of individuals believed to have a certain expertise in a component of the particular problem that the focus group was charged with tackling. This meant that the focus groups had a close relationship with the government, as the Urban Redevelopment Authority was the agency in charge of selecting the members of these committees. The selection criteria for these stakeholders required three things:

1. Participants had to observe the conditions and boundaries set by the state.
2. Citizens had to participate with the strategy and purpose of ‘consensus instead of contention’, requiring that criticism must be constructive, logical, and persuasive.
3. Participants must be ready to have their views scrutinized and challenged.

54 Ibid., 35.
55 Ibid., 37.
Those citizens that met these criteria were termed ‘Super Citizens’. These citizens were likely to be those having expert knowledge in related fields such as academics, real estate development, urban planning, or architecture. This group composition is significant as it gives them the ability to provide educated alternatives to proposed plans by the government. It is believed that Super-Citizens understand the subject matter in a capacity that provides them the ability to actively influence the discourse of the planning process.

As one can imagine, this process creates significant inequality in who is able to participate and how their feedback is ultimately used. The Urban Redevelopment Authority understands that there must by layers of participation that must be required in order to garner feedback from a larger subset of the population. Yuen addresses this by calling for the input of lay-citizens in the process. She defines lay-citizens as members of the public who do not share the same interest or vision of the group, or possess similar expertise. Finding ways to obtain these differing perspectives is important to the planning process, as it challenges biased groups that are potentially influenced by the over-arching institution responsible for the planning process. For this plan, they also initiated an extensive framework to solicit more general public feedback. A public dialogue including a public exhibition and a survey of feedback from the internet were included to ensure the feedback of lay-citizens was included in the analysis.

Many of the writings that address the planning process and the role of public participation, do so with the hope of creating an institutional framework that allows citizens to have genuine engagement during the process. To ensure that the engagement is meaningful, citizens need to play a more significant role earlier in the process. Generally, when people speak of public

Source: Yuen, Government Aided Participation in Planning

56 Ibid., 36.
participation, they do not think of efficiency; therefore, public participation and the concept of structural frameworks appear to be opposing ideas. This thesis hopes to provide a framework that allows for genuine engagement earlier in the process, while still providing developers with a way to better manage the land optioning and assembly process.

Most recently in the 2011 concept plan, one of the major ideas and recommendations was to deepen the sense of community and ownership. The goal was to make Singapore a place where citizens and residents could feel a strong sense of ownership and pride.

3.3 Public Participation in an American Context

As one can see from the concept plan of 2001 example, the community engagement aspect of the planning process in Singapore is deliberate in its attempt to receive genuine public feedback. In an American context, the public participation process in the planning process has struggled to gain more relevance over time. Historically, planning was viewed as an act to be done to or for the public, not with the public. In this regard, public input in the planning process was relegated to public hearings. For decades, state enabling statutes have required that public hearings precede official decisions on land use, environmental protection, and urban revitalization. These hearings were generally organized and run from the top down and more often are scheduled at the end of the process, directly prior to the adoption of the measure being considered.57

More recently, planning processes have turned more toward the consensus building approach to engagement. This method of engagement has allowed for more viewpoints to be addressed in the planning process. More importantly, this has provided an opportunity for engagement to be more than just providing the tacit approval to pre-determined planning and development initiatives.

The Practice of Local Government Planning provides ten principles for Consensus Building:

1. Involve interests as early as possible
2. Tailor the process
3. Be inclusive
4. Identify and nurture shared interests
5. Share credible information
6. Provide impartial and collaborative leadership
7. Consider using professional help
8. Maintain momentum
9. Validate Results
10. Involve the media

The first two of these principles is where the developer has potential to impact the planning process in a meaningful way. As previously mentioned, agency models have been lacking because they have not established a framework that allows for people to understand their role within the planning and development process.

This analysis of how public participation is included in the planning process is imperative to understand as I move forward with explaining how the development process in Punggol can be adjusted to be more inclusive. The belief that introducing the public in the development process adds more complexity might be true, but thinking about a structured process in this manner

can ultimately help define a new development framework that the Housing Development Board might use in order to more effectively deliver their product to better meet the needs of Singaporeans.

This is the community engagement framework that will be used for this thesis. It is based upon the public engagement framework discussed by Belinda Yuen. This framework establishes a clear process that allows the residents of Singapore to understand where they fit into the planning process in Singapore.
4.1 John Habraken and the Built Environment

“Human beings have a biological instinct to possess, an instinct that motivates them to take good care of their possessions. Making them party to decision-making should benefit the entire built environment, while letting them do as they please is sure to result in chaos. Supervised freedom was required: within certain limits, everyone should be given a wide range of options.”

John Habraken is a Dutch architect, educator, and theorist whose major contribution to the architectural profession has been in understanding how the end-user of architectural products can be more integrated into the design process. His major objective was in rethinking the role of the designer in the built environment, and providing new tools that allow designers to understand and contribute to the design process in a more significant way in their new role.

His philosophy grew out of his interest in mass housing in the Netherlands when he was a student of Delft University. Habraken had an interest in fields and not just a single building. He fought the prevalent idea in architecture that everyone in architecture must have a good idea and that it must be original. He was ultimately interested in how such complex organizations in the built environment could come about as a result of bottom up, ground-scale interventions. He believed that there was no reason not to introduce the user into the process. People believed in this idea, but did not think it could be possible; therefore, Habraken spent his career explaining why this was important to not just the individual but the built environment as well.

58 Bosma, Hoogstraten, and Vos, Housing for the Millions, 296.
This separation is basically a political problem. We have to agree where the individual's rights are located and where the community's obligations are located; what responsibility the individual has and what responsibility is to be borne by the community.  

In Habraken's first book Supports, he proposes a new, radical alternative to how mass-housing was constructed in the Netherlands. His analysis of mass housing in the Netherlands provided three main critiques, monotony, a lack of occupant participation, and the failure to benefit from industrialization. His alternative proposition was divided into two parts: Supports and infill. As defined in Supports, Habraken proposes the definition of a support to be a construction, which allows the provision of dwellings which can be built, altered and taken down, independently of the others. Habraken was concerned with understanding the forces that shape the built environment and the ways at which they change. By understanding these forces, he believed one could establish the basis on why some of these forces exist and how they might be modified. The role of the support in this regard was to provide a way for the function was to provide insight on these different conditions in the built environment. By thinking about housing in this manner, it placed an emphasis on meeting needs of a growing public and less on how these forms manifested themselves in the built environment. Habraken believed that a support structure was built in the knowledge that we cannot predict what is going to happen to it.

59 DE DRAGER / A Film about Architect John Habraken (English Subtitles).
60 Habraken, Supports, 8.
61 Ibid., 60.
The more variety housing can assume in the support structure, the better. It is therefore not an uncompleted building, but in itself a wholly complete one.\textsuperscript{62}

These theories recognized a desire to use industrial manufacturing methods to provide variation in millions of dwellings and to imbue ordinary dwellings with an individual character. By thinking about housing in this manner, the entire building cycle, from architectural design to product development had to be re-imagined. New roles for the institutional client, the architect, as well as the dweller were required to improve upon the current state. These new roles were significant as it completely eradicated traditional methods of thinking about housing design, development, as well as the financing of these products in the built environment. The role of everyone in this process had to be addressed and the way in which they intervened in the process of mass housing needed to be completely rethought.

John Habraken introduced an objective framework through which the built environment could be observed and understood. This was based upon “powers” and the relations between them. Powers were defined as every person or group of persons, who clearly had the capacity to change the built reality. Each of these powers had control over certain elements of the site at different times. Habraken believed that through identifying these powers one could study the relation between powers on the site. The relations are organized into the following: Form, Place, and Understanding.

\textsuperscript{62} \textit{Ibid.}, 61.
Source: Habraken, Form and Control
Form: Two live configurations that directly limit each other’s movement. When the distribution of one configuration restricts or influences the deployment of another. An example of this would be an existing road network that creates city blocks that limit the extent of construction possible within one city block.  

Place: This relation deals with the control of space. An example of this would be two adjacent spaces that contain elements that might be under control of different powers. Each power could refuse to allow certain elements to enter its space. Control of space is about admittance of elements. The power that controls space determines the selection of elements within its boundaries.  

Understanding: Powers that influence one another’s decisions about the selection and distribution of the configurations they control. Preferences of one power are often assumed by another. This relationship suggests some type of shared values that has to do with both selection and distribution. An example of this would be how one might find similar architectural styles in diverse corners of the world and applied over a period of several centuries.

By establishing a simplified framework, Habraken was able to more specifically study the various actors that intervene in the built environment. This provided a better understanding through which one could achieve a more ideal outcome. This ideal outcome for Habraken was increased autonomy for the individual in developing his or her own housing typology. Ideal outcomes do not need to be limited to this endeavor. Habraken’s framework provides an opportunity for ideals to be discussed and determined in a deliberate way and this is the major contribution of his work.

By applying this structural framework to the development process, those involved can critically think about the role that they play in the process. More importantly, this framework provides an opportunity to understand the various powers at play in the land optioning and assembly process and the control they each possess over various components of the process. Habraken’s framework provides a new way of thinking and a new set of diagrams and representation that can communicate ideas about the land optioning and assembly process. When thought of in this way, Habraken might serve as the solution to many of the critiques of the inability of agency models to provide useful insights into how the real estate development could more effectively be managed.

63 Habraken, Transformations of the Site / N.J. Habraken, 15.  
64 Ibid., 16.  
65 Ibid., 16–17.
This is the theoretical framework that will be used to establish the basis for new community engagement models for the land optioning and assembly process. It is based upon John Habraken’s theories of engagement, and provides a method to understand the limits of engagement in the development process.
This section is comprised of Chapter 5 and will explain Habraken's framework as it relates to the real estate development process. It serves as the theoretical underpinning of this thesis and demonstrates the applicability of Habraken's theory to the increased scale of the neighborhood or master planned development.
5. John Habraken and the Land Optioning and Assembly Process
5.1 John Habraken and the Real Estate Development Process

John Habraken’s framework for the built environment has larger applicability to the real estate development process, more specifically the land optioning and assembly process. As the earlier examples demonstrated a need for understanding the real estate development process through the new lens of product development, Habraken’s design philosophy offers insights to how one might begin to better understand the stakeholders in the land optioning process and how they might be better integrated into this process to increase predictability.

Habraken’s framework will be applied to the land optioning and assembly process through the use of various stakeholder’s ability to exercise their “option” in this phase of the development process. The “option” is similar to Habraken’s “powers” in that each stakeholder in the land optioning process has the option to participate in the process of land development. When applying Habraken’s framework of form, place, and understanding to the land optioning process, a new framework could be introduced to provide developer’s new alternatives to engage the community and better optimize this process. Form, place, and understanding as applied to the real estate development process are defined in the following manner:

Form: The structural framework that the land optioning and assembly process resides within. This component of the framework categorizes the land optioning and assembly process as part of the planning process. From this organizing concept arose the research questions: How should the land optioning and assembly process be overseen? Are there institutions and individuals that could provide better oversight of the land optioning and assembly process than is currently observed?
Place: There are different levels of ownership (both individuals and institutions) of the development process. These boundaries can include or exclude various stakeholders in the land optioning process. From this organizing concept arose the research question: How can ownership of the land optioning and assembly process be more inclusive and still clearly defined?

Understanding: Different stakeholders in the process assume the intentions and desires of other stakeholders in the process. From this organizing concept arose the research question: How can shared values be communicated and implemented in the land development process?

This Habraken framework as applied to the land optioning and assembly process hope to establish the following objectives.

1. By thoroughly analyzing who the true agents are in the development process and the level of control they possess within the land optioning process, one could begin to provide metrics that value the outcomes in the process.

2. If these agents are clearly identified, then a structural framework (support) could be used to apply to different land optioning and assembly processes. The implementation of the framework (infill) could vary based on context. This is important as it is referenced in the Practice of Local Governance Planning which states that the consensus-based planning process should not be the same for every location.
This is the development framework that will be used for this thesis. It is based upon the Daniel Kohlhepp development framework model. The objective of this framework is to establish that there is a value associated with each stage of the development process. This value can either be held or sold depending on the developers strategy for project development.
This is the community engagement framework that will be used for this thesis. It is based upon the public engagement framework discussed by Belinda Yuen. This framework establishes a clear process that allows the residents of Singapore to understand where they fit into the planning process in Singapore.

This is the theoretical framework that will be used to establish the basis for new community engagement models for the land optioning and assembly process. It is based upon John Habraken’s theories of engagement, and provides a method to understand the limits of engagement in the development process.
The goal of this thesis is to combine these four frameworks to establish an ideal land optioning and assembly process. This new process will help create new urban form typologies that will transform the way that individuals live in their communities.
This section is comprised of Chapter 6 and will introduce the data that was collected through the initial site observations and interviews. It will more specifically demonstrate how Habraken’s theory is manifested in the built environment of Punggol. Most importantly, this section will apply my proposed theoretical framework to the development process in Punggol.
6.1 Punggol

PHILOSOPHY AND PLACE

6.2 Habraken and Punggol (Built Environment)

PHILOSOPHY AND PROCESS

6.3 Habraken and Punggol (Process)
From its inception, Punggol was intended to serve as an example to Singaporeans, as well as to the world, the ability of Singapore to successfully implement planning ideas and strategies. As was mentioned previously, Punggol was planned to deal with Singapore’s growing population while also providing unprecedented levels of public space and amenities. The intent to which Punggol was planned has its roots in the Garden City movement as referenced by Ebenezer Howard. In the Garden City, the industrial uses were separated by a green belt where food could be produced. The over-arching goal of the Garden City planning model was to create self-sustaining communities. These self-sustaining communities had a set population, as well as a farming population, all enclosed by a green belt to control growth patterns.

As one can imagine, Garden City ideology is not implemented in the same manner in Singapore. It is more accurately perceived as a “neo-utopian ideal.” It is representative of the search to identify a global urban environment, where the daily-life setting, shaped by humans, would be inscribed in a large garden shared by the whole Singaporean population. The goal of the Housing Development Board is not to only provide affordable housing to the residents of Singapore, it is also to provide a high-quality living environment of which they can be proud. This means adequate public space, access to public transit and amenities. These are all ideals that manifest themselves in the planning and development of Punggol.

66 Wong, Yuen, and Goldblum, Spatial Planning for a Sustainable Singapore / Edited by Tai-Chee Wong, Belinda Yuen, and Charles Goldblum, 154.
In the development of Punggol, the Housing Development Board had to find a way to efficiently manage urban issues such as density, parking, and open space, while still creating an environment that was socially sustainable and reflected the needs and desires of Singaporeans. To achieve these objectives, the “garden city” ideal is used to specify a double planning process in the transformation of the built environment involving the “verticalization of housing” and an ongoing process of transformation of its landscape to optimize greenery as a public resource including land reclamation to extend the island territory. This is best demonstrated through the land use patterns that are envisioned. The Housing Development Board serves as the catalyst driving initial development patterns and they have determined certain parcels that will be released for private sector development as well as land that will remain undeveloped. This ability demonstrates an effectiveness of multiple government agencies working together to ensure that Singapore is developed in the most environmental and economical manner. By maintaining this integrated approach, Singapore is able to facilitate market rate development, while maintaining their objectives of providing high quality living environments to all of their residents. To continue this success, New Towns must be systematically planned and developed.

Punggol is organized into different districts that will be developed over time depending on market demand and growth patterns. The first of these neighborhoods was Punggol Central. The urban form of Punggol Central (and greater Punggol) is visually striking. A landscape of the built environment categorized by buildings of similar elevation and design. The designs of the buildings do not vary. They are all designed with a void deck.

Source: Singapore Straits Times

67 Ibid., 155.
on the first floor, which provides little activation of the street level. Each of the housing developments are also 17 stories tall, providing a homogenous urban form. More importantly from a development perspective, each cluster of housing units optimizes public space, parking, and density.

Some might describe the aesthetics of Punggol, as banal and monotonous, but the aesthetic qualities of these housing developments do not accurately reflect the design achievements that Punggol has accomplished. From initial observations of the site, it appeared that these housing developments lacked character and a certain type of quality desired in the type of spaces provided in dense urban environments. Public space and amenities appeared to be standardized amongst each of the various housing clusters, providing little opportunity for the individual to insert themselves into how spaces are created in their communities.

From the more fine-grained analysis at the human scale, which can be found in Appendix 1, it became clear that the urban form of housing developments in Punggol reflected a desire of the individual to claim more dwelling space. In these housing developments, the porous ground plane allows strangers to freely enter and walk through these housing developments. This unique design characteristic essentially brought the public realm to the front door of each resident; therefore, the corridor of apartments buildings were viewed as direct extensions of public space. We were able to walk freely throughout the entire housing development, observing and speaking with residents. This observation was the byproduct of the verticalization of the housing stock and the manner in which public space is integrated into the housing developments. The relationship between and building along a street, inducing simultaneously a specific orientation to the apartments is obsolete. The building becomes independent of
land. Simultaneously, land is given another status and function which tends to promote this idea of becoming a large garden.\textsuperscript{68} Community amenities such as daycare and health facilities are vertically integrated into housing clusters, further solidifying the relationship of the building to the street.

This observation raised the question of scale in the built environment. At what scale could people customize their environment within a given system? In such a monotonous environment as Punggol where the government has such a strong ability to achieve optimization, it was assumed that there was very little opportunity for the individual to alter their living environment outside of the immediate space adjacent to their dwelling unit. Additionally, the abundance of outdoor space that was provided for the residents was relatively deterministic. Every space was carefully planned and utilized, creating spaces that were well designed from a space optimization perspective, but significantly lacking on a programmatic and intensity of use perspective.

From this analysis, it became clear that individuals believe their home to be more than just their private dwelling. There was an apparent tension between planning and development as a means to optimize scarce resources and the desire of the individual to have more personalized spaces in their community. As Habraken believed, the home is more than just a physical structure that is inhabited by its residents. As Habraken states, “The home is more than an object or instrument. The significance of the home transcends material description, it is part of one's culture…’to dwell’ is a verb that can be defined as: to make space something personal.”\textsuperscript{69}

\textsuperscript{68} Ibid.

\textsuperscript{69} Bosma, Hoogstraten, and Vos, Housing for the Millions, 12.
Furthermore, “Domestic life is not complete until one is also assimilated into the community through participation in social conventions, rituals, and shared beliefs. This interchange between group and place invites the telling of stories and the creation of myths. The result is a closeness that links rituals, family ties, and spatial patterns within the settlement.”

When combining the observations from the initial field study with Habraken’s belief on how the term dwelling is defined, it is clear that individuals see more than just their physical housing unit of personal space as part of their dwelling in Punggol. This New Town was intended to be a self-sustaining, lifestyle community; therefore, the design and development of spaces within the community should reflect the ideals and desires of those residents. If the opportunity arose, what might different urban typologies look like? Or, how could the existing housing typologies be modified to provide individuals with more freedom in determining the type of spaces they choose to interact within?

6.2 Habraken and Punggol (Built Environment)

“…we are all actors in the process which brings the built environment to its fruition….In short each one sees in the built environment a terrain for the exercise of one’s power. It is difficult to view objectively something in which one plays so much apart and from which one borrows one’s social and professional identification.”

John Habraken’s theories provided the best lens through which to analyze the role of ownership and control in the built environment in Punggol. More importantly, his philosophy regarding individuals and their ability to contribute to their built environment could be analyzed and observed to provide solutions to ways to modify the current state of urban form in Punggol. As mentioned previously, there are many different factors that play a role in how our environment is shaped. In Habraken’s terms, these are called “powers” and refer to every person or group of persons, who clearly has the capacity to change the built reality. This analysis is focused on understanding the various actors if/when they exercise power on the development process.

As mentioned in the introduction, there are three organizing ways in which we interact with powers: form, power, and understanding, and they manifest themselves in the built environment of Punggol in the following ways:

70 Ibid., 15.
71 Habraken, Housing and Settlement Design Series: The Built Environment and the Limits of Professional Practice, 2.
Form
Definition: Two live configurations directly limit each other’s movement. When the distribution of one configuration restricts or influences the deployment of another.

The housing developments in Singapore are primarily designed and developed by the Housing Development Board. The Housing Development Board was an agency that was established to provide public housing for the residents of Singapore. As an organization, they have become extremely efficient in developing public housing by utilizing standardized floor plans and prefabrication technologies. These established metrics for efficiency prevent future residents from providing modifications to the units. In this regard, the movement of the developer has physically constrained the ability of the individual to participate and engage in this process.

Place
Definition: Concerns itself with control of space. The power that controls space determines the selection of elements within its boundaries.\textsuperscript{72}

This is the order most easily interpreted and observed in Punggol. At the scale of the building, it was evident that the individual believed that introducing various personal elements into public spaces, such as hallways, that they were claiming a portion of the hallway as theirs.

\textsuperscript{72} Habraken, Transformations of the Site / N.J. Habraken, 16.
Understanding
Definition: Powers influence on another’s decisions about the selection and distribution of the configurations they control. Preferences of one power are often assumed by another.

This relationship suggests some type of shared values that has to do with both selection and distribution. The introduction of personal elements into public spaces mentioned above demonstrates shared values on the type of spaces that are desired.

73 Ibid., 16–17.
Figure 7
Based on these relations, Habraken’s philosophy has many different implications for the built environment of Punggol. To understand the different implications and opportunities in the built environment of Punggol, a Habraken framework needed to be redefined and contextualized to Singapore. The framework used in this instance was Habraken’s ladder of participation and ownership in the development of public housing in the Netherlands. His framework touches upon the different components of the planning and development process from the scale of regional planning, down to the intricacies of furniture plans designed specifically for different housing typologies. This is significant and relevant to Singapore, because of the unique way that planning and development occurs in Singapore. More importantly, if this framework is used in a Singapore context, it provides an opportunity to further understand the implications of relations of power that manifest themselves in the built environment. Additionally, this framework questions existing planning and development methodologies, while also projecting new development and planning ideals.

The adapted framework was established and then used to theorize how different levels of control within the physical development of buildings might transform standard housing developments in Punggol. The analysis, which can be further explored in Appendix 2, demonstrated what formal implications might occur if the level of control or ownership of different levels was increased or decreased. This analysis provided solutions to ways that the Housing Development Board could begin to implement changes in the formal qualities of how they designed and constructed their developments.

These iterations were conceptually significant because it demonstrated how a small shift in housing typology might change the perception of the dwelling unit in each of these housing developments in Singapore. More importantly, this analysis brought into question the role of ownership of not only the individual, but the larger community and institutional players that play a role in shaping the built environment. From this, came a more detailed analysis of who controls the development of different components of the development process. By studying the built environment in this manner, Habraken’s two suppositions that underlie professional existence become clear:

1. The built environment does not exist for us, but that we, as professionals, exist for the built environment.
2. We, as professionals, can present a significant contribution to the existence and quality of this same environment.

More specifically,

“Man caused the built environment to exist and he allows it to do so through continuing changes. We are talking about a process in which man continually intervenes. By studying the transformations of the built environment we can learn something about this process. For the changes are natural and not arbitrary.”

If one thinks of development in this manner, then there is value in providing specificity to the development process and understanding how each of the actors intervenes in the process. If those individuals that are recipients of new development upon completion could be more engaged earlier in the development process, how might this impact development patterns and the quality of development that is completed?

74 Habraken, Housing and Settlement Design Series: The Built Environment and the Limits of Professional Practice, 1.
6.3 Habraken and Punggol (Process)

*Housing Development Board as Masterplanner and Developer*

These proposed interventions within the formal qualities of the built environment were insightful, but they still did not provide a solution to how to develop more differentiated urban spaces. There was more to be achieved than simply theorizing new urban forms that might be implemented downstream of process or policy changes. As discussed in section 1.3 of this thesis, developers have a tendency to view development problems and opportunities through their ability to impact risk and return characteristics. If urban form should change to reflect more spatial and cultural phenomena, then developers need a new way to think of how communities are engaged in this process. John Habraken’s philosophy provides an opportunity for one to question how housing developments in Punggol are brought to market.

From the observations and data provided in Appendix 1 and 2 regarding the built environment in Punggol, I began to ask the question of why were these issues of individuality in the built environment so prevalent in Punggol. This question led me to question the process through which the Housing Development Board plans and develops New Town communities. Based upon such extensive planning and participation efforts undertaken by the URA, and Singapore as a whole, it was assumed that Punggol was planned and implemented in a similar way. John Habraken’s philosophy provides an opportunity for one to question how housing developments in Punggol are brought to market.

With the Housing Development Board as master developer, and more importantly as a government entity, my assumption was that HDB used similar planning processes as observed in the larger context of Singapore planning efforts. What was uncovered was that the planning process at the Housing Development Board was highly internalized. Although technically a government entity, it functioned much more like a private development company. An internal, integrated staff of architects, planners, urban designers, and developers conducted the iterative design and planning process. The output from this process was then submitted to the URA for inclusion into the master plan for greater Singapore, or in some cases presented directly to the public through various engagement techniques. The development and redevelopment plans for new towns and existing HDB estates are thoughtfully created, and HDB strives for the highest level of excellence in their work, but this discovery provided an opportunity to re-imagine how the community might be more effectively engaged in the development process.

In regards to the development of Punggol, HDB used three major ways to solicit output from the larger community: surveys, public exhibitions, and a unique design competition.

*Surveys:*

The Sample Household Survey (SHS) is conducted every five years and serves as an important method of obtaining views and feedback from residents. Since the formation of HDB, they have completed nine SHS’s since their inception in 1968. The most recent survey was conducted in 2008 and captured the feedback of almost 8,000 residents across all 23 HDB towns and 3 estates. The major objectives of the sample household surveys are twofold: 1) to obtain the demographic and socio-economic profile of residents and identify changing needs and expectations. 2) to monitor residents’ level of satisfaction with various aspects of public housing, and identify areas for improvement to the physical and social environment in HDB towns.

---

75 *Housing Development Board, Sample Household Survey.*
The Housing Development Board utilizes these surveys because they understand the significant role they play in shaping how Singaporeans view their communities. Nearly 80% of Singaporeans live in HDB Housing Developments, and it is laudable that HDB strives to better understand the expectations and needs of citizens to ensure the best communities are developed. There are two insights from the 2008 SHS that are useful to the findings that were observed during the site visit, as well as opportunities for interventions in the future:

1. Based upon feedback from the survey, it was determined that about seven in ten of the residents met their neighbors within the block at places such as common corridors, lift lobbies and void decks. Beyond the block, residents would meet at linkways, markets, or eating places located within the neighborhood.

2. Since the 1998 SHS, community participation in activities such as block parties, or education and enrichment programs has increased nearly 30% over this ten year period.77

Each of these findings is significant, as it highlights the value of the observations that were found in the field, while also confirming a desire for more inclusion in the larger community. More importantly, the data from this household survey confirms the observation regarding public space, as it has been created by HDB in current developments. If the question could be asked to survey participants, how does the urban form of their housing development affect the way they interact with their community?

77 Ibid.
Although useful, it is important to note that these surveys still occur downstream of a substantial shift in policy or process that ensures HDB residents have the freedom to proactively participate in the planning development of their community. More importantly, it is important to highlight that the data that was obtained was aggregated across all HDB projects. The SHS 2008 report as found on the HDB website did not provide the data specific to Punggol. This raises questions regarding the effectiveness of these surveys to provide more localized and contextual improvements to HDB facilities. Under this current process of data collection, it appears that all HDB housing development are created equal, which may not necessarily be the case.

Public Exhibitions:

Upon completion of the master plan, a public exhibit is conducted in order to solicit feedback from the residents of Singapore. The public exhibition is important, as it provides an opportunity for the greater development community to understand how the Housing Development Board plans to address housing needs. With the development of New Towns, the Housing Development Board is the major catalyst in determining which parcels are developed for private land consumption. At the Housing Development Board headquarters sits a physical model of the town of Punggol. This model is updated when the plan is revised and reflects the current development trends and patterns. This allows people to see how their communities are projected to grow and change from a three-dimensional perspective. It provides for a more extensive understanding of development than the Master Plan, which shows land use patterns and plot ratios.

One of the first public exhibitions was held in 2008 and was part of a larger planning initiative entitled, Remaking Our Heartland. The Remaking our Heartland plans were initially
unveiled by the Prime Minister during the National Day Rally in August 2007. The public exhibition conducted obtained positive feedback and response from the community, with almost 80 percent expressing excitement over the plans. More importantly, HDB understood that the success of these plans depended on more engagement of residents in shaping their living environment.

Recently, there have been two notable public exhibitions. The first took place in October 2012 and was entitled, “Punggol: Discover Possibilities”. The purpose of this exhibition was to solicit specific feedback from the public and industry professionals on the next phase of development for Punggol. Traditionally, these public exhibitions are focused on specific ideas or topics that HDB deems necessary for the future development of their communities. The major topics to be addressed during the next phase of development were:

1. Establishing Signature Waterfront Housing Districts
2. Creating Punggol Downtown: A New Destination for the North-East Region
3. An Even Greener Punggol
4. Great Places for the Community
5. Moving Around Punggol.

As demonstrated through these key ideas, creating great places for the community is of great importance to HDB. They are looking for feedback, but could change their methods to ensure a higher quality of input.

Most recently in August 2013, HDB launched the “Future Homes, Better Lives” housing initiative. The purpose of this exhibit was to showcase broad development plans for three new housing areas –Biddari, Tampines North, and Punggol Matilda.

The key ideas to be discovered in this exhibition were:

1. Distinctive housing districts with unique identities
2. Green housing districts with community gardens and abundant greenery
3. Vibrant community spaces to encourage community activities
4. Rekindling memories to form new ties and communities
5. Promoting a healthy lifestyle with well-connected cycling and pedestrian networks

The public exhibitions also have an online component that allows for people to view recent developments in the plans of New Towns as well. The online platform is interactive with videos and other components that provide the community an opportunity to provide feedback. This method of distributing information and receiving feedback is useful, but how meaningful is this feedback when community members that may not fully understand the three-dimensional qualities of their environments are unable to look at the physical model that is at the HDB Hub.

Although highly effective, the success of this method is dependent upon those people that submit feedback coming to the HDB Headquarters. It raises the question of how often do community members come to observe and provide feedback on the physical model and descriptions that are located at the facility.

---

78 “Housing Development Board of Singapore | Annual Report 2008.”
79 Ibid.
Design Competitions:

Design competitions were used sparingly during the design of various aspects of Punggol. There were two major design competitions held as part of the development of Punggol. The first was the Punggol Waterway Landscape Design competition that was launched in May 2008, which attracted 11 entries from local architecture firms. The second of these competitions was the Punggol Waterfront Housing Design Competition, the competition to design the first public housing parcel along Punggol Waterway.

“By engaging a wider audience through the waterway and housing competitions, residents in Punggol can start to look forward to an exciting and new living environment in the near future.”

Punggol Waterway Landscape Design Competition

The winner of the Punggol Waterway Landscape Design Competition was Surbana International Consultants Pte Ltd and Sen Inc. The winning proposal successfully integrated heritage and history, while projecting a new model for waterfront living. The major aspect of the proposal was organized into four sectors.

2. Recreation Zone: for the active and the adventurous
3. Heritage Park: A pedestrian bridge is built to re-capture the idyllic mood of old Punggol with its fishing villages.
4. Green Gallery: Series of open spaces carved out of the existing terrain
5. Heritage Park

Punggol Waterfront Housing Design Competition

The waterfront housing design competition was intended to provide the opportunity for designers to imagine the first public housing parcel along Punggol Waterway. The major competition objectives were:

1. To generate fresh, innovative and new design ideas for high-rise public housing along the waterway
2. To secure the best housing design and concept for the first waterfront parcel
3. To introduce new sustainable development concepts and features to realize the theme “Green Living by the Waters”

From interviews and research, both of these design competitions were not originally conceived as part of the planning and development process of Punggol. These competitions arose out of the opportunity that presented itself when it was determined by engineers that the man-made waterway could be constructed. A construction project as extensive as creating a waterway and properly damming an existing body of water is time intensive. During this downtime, the Housing Development Board thought it would be an innovative idea to hold a design competition for the landscape design of the waterway and for the housing design competition. This decision served more as a marketing opportunity for the new Eco-Town of Punggol and less as

81 Ibid.
an opportunity for community engagement in the development and planning process. The Housing Development Board understood the opportunity that creating a man-made waterway provided to the development of private and public land parcels. Additional features such as the waterway would inherently create more value for the State when this land was auctioned as part of the Government Land Sales process.

Furthermore, Surbana International Consultants is an offshoot of the original Housing Development Board. This raises the question of what type of engagement did the design competition really provide in the realm of soliciting feedback from designers and members of the community. Surbana is still partially owned by the Temasek Holdings, the Singapore Government’s investment vehicle. This history of HDB and Surbana will be explored in the next section of this thesis, but it is important to raise here because it begs the question of biased and unbiased participation and challenges the current methods through which true participation is implemented.

**Corporatization of HDB**

Based upon site observations of more recent housing developments in Punggol, it was clear that there was an attempt to modify the urban form and typologies from the traditional monotony. Public spaces were programmed differently and the types of amenities that were provided at the housing developments were different. More importantly, the integration of infrastructure requirements was more effectively utilized. The assumption again was that these design changes were based upon increased participation by those in the community. This participation in the development process facilitated better design interventions to create the quality of spaces that were desired by residents. This assumption was incorrect. The improvements of the urban fabric have more to do with downstream organizational modifications. Based upon interviews with HDB, it was determined that the different urban typologies that are now observed were a byproduct of the corporatization of HDB and the ability of HDB as an organization to recruit planners and designers that intrinsically believe that design can solve problems and positively impact how people view their communities.

Prior to 2003, HDB was fully integrated, conducting the planning, architecture, and urban design for their communities, while also being the developer. The Building and Development Division of HDB was responsible for the design and development of HDB flats, implementation of upgrading programmes, township development, procurement of construction services and resources, project management, building and design of building structures and infrastructure, and land surveying and administration. The underlying purpose of reorganizing HDB was grounded in the technical expertise that the Building Development Division had acquired over the years. The Ministry of National Development determined that the formation of HDB Corp. would give BDD the autonomy and flexibility to leverage on its current strengths to venture into housing development projects overseas.

Therefore, after 2003, HDB outsourced the architectural designs, while still maintaining in-house staff to manage the larger scale urban plan and urban design of new town developments. This change in process explains the differentiation in the urban forms that the public housing developments have taken since this time period. Although the housing developments are constructed through pre-fabricated methods, the architect was given freedom to think of new ways to meet the changing demands of a growing population. This freedom was managed by the HDB through design guidelines.

---

82 *Housing Development Board, “Media Release: Restructuring of HDB.”*
The other interesting factor was the desire for finding the best solution to design problems to provide the best housing communities to the residents of Singapore. In my interviews with officials from HDB and other practitioners in the field in Singapore, it was clear that the staff responsible for coordinating and developing New Towns was passionate and committed to providing the best product to the residents of Singapore. This may seem insignificant, but the importance of having employees that believe in the power of planning, truly strengthens the ability of the developer to create the best communities possible.

**Far East Development as Juxtaposition**

“The time of the skyscraper is finished. Real estate value is about the street level, the human scale interactions that give places character and create value. As a developer, that is where we focus our time, creating vibrant places. If you create vibrant places that reflect the desire of the public, the civic and financial value will soon follow.”

— Mr. Chia Boon Kuah (Far East Development)

Far East Development is the largest private property developer in Singapore. They have an extensive property portfolio that includes residential, office, hotel, retail, and industrial. As a private developer in Singapore, they must compete in the purchase of land. The Singapore Land Authority and the Urban Redevelopment Authority determine which land parcels should be sold and developed as part of the larger scale master plan for the city. This process requires that developers submit design proposals and a purchase price. After this process, the government then reviews the bids for purchase and designates a winner. As one could imagine, in a land constrained country such as Singapore, land prices can become astronomical for the developer to account for in their development project. Upon award of the land to the winning proposal, the developer must then proceed with development of the land parcel within a given time period.

To many people the financial and temporal constraints prevalent in Singapore would appear to be a constraining factor for development, but Far East Development has found a way to turn these constraints into value creation opportunities. When Far East Development is awarded land through the GLS process, the first step they take is to re-visit their proposal to ensure they have provided the best design. They begin a simultaneously process of seeking community input through focus groups, while also re-engaging their architect to determine how they can develop a building that creates the most value for their company, but also for greater Singapore.

If a market-rate developer has found a way to effectively include community input in part of their process, why has the Housing Development Board not created better metrics and processes to allow for citizen feedback? The Housing Development Board does not compete on land price, which should provide them an opportunity to re-imagine how citizen input can impact how land is optioned and assembled as part of a larger urban development plan. The Housing Development Board sits in a unique position, with the unique ability to imagine new development and planning ideals that can impact how community engagement is perceived and executed in the development process, and John Habraken’s methodology provides a means through which this might be understood.

83 “Singapore’s F&N Unit Makes Top Bid in State Land Sale | Reuters.” Most recently, Singapore’s Fraser and Neave put in a top bid of $725 million for a commercial site at a government land sale, the highest amount offered for state land since May 2011.
The manifestation of Habraken’s orders of relation in the built environment in Punggol demonstrates that there is a desire by those agents acting within the built environment to have some level of ownership. Existing residents of Punggol desire to be engaged in the future of their community. In order for this engagement and ownership to be meaningful, it must occur at the onset of the development process, more specifically when land is optioned and assembled. How can a structural development framework be implemented that allows those in the community to understand the role that they play in the process?

If people desire ownership and control of the built environment, how can this be implemented in the land optioning and assembly process?
EXISTING HDB DEVELOPMENT PROCESS

Under the existing HDB development process, development continues regardless of the community input that is received along the way. HDB makes planning and development decisions that maximize land value, while also optimizing for the necessary requirements of public space and parking.
This section is comprised of Chapter 7 and will provide process and policy recommendations for Punggol. More specifically, it will demonstrate how the Housing Development Board can implement a new framework and study its affect on the built environment through urban form and development process ex post analysis.
7.1 Recommendations for the Land Optioning and Assembly Process in Punggol
7.2 Relevance to the American Context
7.3 Future Research
7.1 What does this mean for Punggol?

The new town development of Punggol was intended to serve as a model for a new way of living for the residents of Singapore, as well as other rapidly urbanizing cities. As such, the Housing Development Board should seize the opportunity to test Habraken’s method of community participation in the land optioning and assembly process. Punggol provides a unique opportunity to test ideal processes and forms of development and urban design. The method through which Punggol is planned and developed could allow new methods of development to be implemented, and examined ex post to actually determine whether there is an improvement in the quality of life for residents if this new method is undertaken. The long development timeline for Punggol, uniformity of planning and development processes, and desire for creating new housing typologies for rapidly urbanizing regions is unrivaled as a case study.

In reference to the research questions of this thesis, the Housing Development Board could implement this methodology in the following way:

1. How should the land optioning and assembly process be overseen? Are there institutions or individuals that could provide better oversight of the land optioning and assembly process than is currently observed?

In the case of Punggol, the land optioning and assembly process is overseen by a combination of the Housing Development Board and the Urban Redevelopment Authority. For this methodology to have success, these organizations should maintain their oversight of the process. Since Singapore declared independence, they have demonstrated a unique ability to understand the changing dynamics of the world in which they live. As was demonstrated earlier in this thesis, they are unopposed
to adopting new organizational methodologies, such as with the creation of the Housing Development Board from the Singapore Investment Trust (SIT) when it became clear that SIT could not provide the scale of housing to halt slum dwellings. HDB and URA have worked well together and understand the value that each respective organization provides, and this strength should be viewed as an asset in implementing this new framework.

Furthermore, development and planning processes do not occur in a vacuum, there are institutions or groups that are responsible for oversight of this process. The Habraken methodology benefits from a strong institutional influence because it provides the structural framework and context through which different stakeholders might exercise ownership over parts of the process.

![Punggol Pattern of User Participation](image-url)
2. How can ownership of the land optioning and assembly process be more inclusive and still clearly defined?

The land optioning and assembly process can be more inclusive and clearly defined by better utilizing the town council and residential community structure that already exists. Currently, the mission of the town councils is to provide high quality physical living environment for the residents, and the primary function of town councils is to control, manage, maintain, and improve the common property of residential and commercial property of the HDB within the town and to keep them in a state of good and serviceable repair and in a proper and clean condition. Town Councils have traditionally done a great job of carrying out these objectives, but they need a greater say in determining bigger things, such as the kind of public housing estate to be developed in the town and the type of transport that links these towns.

Since Punggol has been methodically planned into districts to be developed at different phases, neighborhoods could be empowered to participate in the development and planning process. Different residential clusters could play a more significant role in the development of the specific neighborhoods as defined in the Punggol Master Plan. There are many different residential clusters and each of these communities could provide a member to the larger scale RC committee. Organizing participation in this manner within the larger planning framework for Punggol, allows the community to determine how they choose to influence development in their community.

---

84 Han, “Global City Making in Singapore,” 166.
Figure 12
3. How can shared values be communicated and implemented in the land development process?

From a development perspective, one major obstacle to engaging the community in the development process is the fact that many community members don’t fully understand the complex projects that developers undertake. Residents and developers often speak two completely different languages. If a new framework such as this is introduced, it provides an opportunity for developers and those in the community to speak a common language and work together.

The “option” is a familiar term understood and used by those in the financial sector. In the financial sector, an option is the right without obligation to obtain something of value upon the payment or giving up of something else of value. In common terms, options are nothing more than choices. Every day people make basic choices and these choices are based upon individual established frameworks that might be guided by different objectives. If people use frameworks to determine the choices they make each day, why not provide a framework for people to understand and exercise choice in the development and planning of their communities?

Figure 13 demonstrates how this process might be carried out. As mentioned previously, Punggol is divided into different neighborhood districts and each of these districts is comprised of different housing clusters. In the diagram here, different housing clusters can determine how and if they want to participate in the development projects within their larger neighborhood. This type of integrated community engagement process would occur at the neighborhood scale, prior to land development by the developer.
Additionally, technological advancements have allowed information to be better communicated to different parties visually. The problem with many communities is that they have difficulty seeing the vision for how their community might change. With a more integrated development and planning model, community members and developers can more actively see the impacts that their decisions have on specific neighborhoods. Furthermore, if neighborhood members forego an option on a particular development project within a larger urban plan, they might be able to see how that option might be exercised in the future.

Implementation as Parametric Process

As mentioned throughout this analysis, Singapore is a highly regimented place where an emphasis is placed on clear processes and implementation strategies.

The ability to parametricize the community engagement aspect of the land optioning and assembly process gives the developer the opportunity to more effectively engage the community and understand the impact that their decisions might have upon the larger development framework of the neighborhood. In regards to the new HDB development framework illustrated in Figure 14, the developer must engage the community. At this intermediate stage prior to land development, the community can take options on the different types of developments in their neighborhood. This is significant because it provides a structure for community engagement to be included in the development process. Adapting the existing HDB development framework provides a level of predictability to the development process because developers know when, how, and who they must engage with to fulfill development objectives.

More importantly, these recommendations do not assume wholesale community input throughout the totality of the development process. This proposed development framework gives the developer the opportunity to be the driver for how the community might engage in the development process. By redefining the existing community engagement infrastructure and instituting a new development process, community groups will be empowered to participate in the development of their community in new ways. If the community is shown when they are able to participate in the process, and how the information they provide will be used, then a new relationship between the community and developer will be established. The existing HDB process demonstrated in Figure 8 has been modified and demonstrated in Figure 14 to demonstrate how the process should be modified to accommodate the recommendations.
NEW HDB DEVELOPMENT PROCESS

This new plan significantly modifies the development model under which HDB currently operates. In this amended model, the community must be consulted prior to land development. In the previous model, the planning and development process continues regardless of what the community has to say. In this new model, development projects can only move forward after they go through the community. Based upon the neighborhood plan, the community is able to decide whether they want to participate in different development projects. They are able to exercise their option of how they want to participate.
SCENARIO BUILDING

“In any good settlement, there should be places that are intensely private to persons and strong primary groups, and also some form of free or ‘waste’ land within their reach, which no external power effectively controls.”

- Kevin Lynch, Good City Form

What might participation ask for?
Public Space

Objective: To provide a high-quality contextually relevant public space

Every community needs public, open space. The public realm is an important part of the city, and how this space is programmed and allocated should reflect how local communities actually use public space. All parks or open spaces are not equal, and the way they are planned and designed should reflect this process. More importantly, each of the public exhibitions organized by HDB listed public/open space as a priority.

In this scenario, the residential community exercises its power to influence development patterns and spatial quality of their environments. By increasing the level of control of this organizational entity, more spatial opportunity can be determined. This scenario is designed to function within the existing institutional framework of Punggol and HDB. The Housing Development Board utilizes prefabrication techniques to provide low-cost, efficient housing to the residents of Singapore, and this scenario seeks to re-organize how these pre-fabricated pieces might be re-assembled to more effectively humanize public, open space. This reorganization occurs through the exercise of the option to determine how the community might intervene in the development process.
3. Determine residential communities within neighborhood district

4. Determine residential communities within neighborhood district

5. Create new typologies of urban form
7.2 What does this mean for American Development?

As demonstrated in this analysis, the land optioning and assembly process in Singapore is much different than that of the United States. So what does this analysis mean for this process in America?

In the American context, different localities and states have differing planning goals and objectives. There is not a centralized national planning authority that conceives and implements development goals and ideals. Additionally, the majority of land in America is privately owned, which inherently creates challenges to how land is optioned and assembled to ensure the most optimal use of land. These major obstacles prevent the implementation of Habraken’s framework. As previously mentioned, Singapore provides a unique opportunity to implement a framework such as Habraken’s because of its clear planning and development framework.

Although difficult to implement from an institutional standpoint, Habraken’s framework challenges the development and planning process as is currently practiced in the United States. From an American perspective, the strength of Habraken’s framework could be effectively applied to strengthen neighborhood planning goals, more specifically, the role of Community Development Corporations (CDC’s). As discussed previously, the Habraken framework benefits from a strong institutional force that provides oversight of the process. This could mean the re-engagement and empowerment of community development corporations (CDC’s), or neighborhood civic associations to allow them to more actively shape how their communities are developed. Historically, CDC’s have been charged with many initiatives, from job creation, to health issues, to affordable housing. In many cases, it has been argued that this wide embrace of issues has attributed to a lack of effectiveness. If CDC’s could be focused with the primary goal of facilitating more localized planning under this framework, they might better facilitate holistic changes in neighborhoods.

Real estate development requires financial capital, which comes from a complex web of global investors, but real estate development in an American context is inherently local and must follow local codes and planning initiatives. Therefore, a new development and planning framework that relies more on individual neighborhoods (or groups of neighborhoods) could provide a new institutional structure for development projects to be planned and brought to market.

7.3 Future Research

Innovations in technology and data visualization have significantly impacted how communities are now developed and planned. In an American context, developers understand the risk and unpredictability associated with the land optioning and assembly phase of the development process. Will the community object to my project? How many public meetings and processes must be conducted in order get a project started? Because of questions such as these, developers are looking for new ways to engage the community the development process. Start-ups such as CoUrbanize are finding new ways to visualize data that is traditionally difficult for the public to understand. CoUrbanize is a start-up focused on taking data that is required as part of the entitlement process, such as environmental and traffic assessments and visualizing it in a way that is compelling and more easily understood by stakeholders in the community. Their web platform provides a repository for project specific information that can be accessed by community members so that they might better understand how various development projects impact their communities.
Additionally, Opportunityspace, a start-up started in 2013 has focused on re-defining the relationship between government, developers, and the community. OpportunitySpace is a web-based platform that enables governments to utilize their land and building assets to execute core operations and achieve social and economic policy objectives more effectively. OpportunitySpace may not directly be focused on methods of community engagement, but it does address a fundamental issue found in many local governments. Many local governments do not have accurate data on the land they own and how it might fit into the urban fabric. By providing this information, OpportunitySpace provides the opportunity for communities to think more holistically about how they can implement longer-term planning strategies, a fundamental requirement for the Habraken framework to be adopted.

Future research on the application of the Habraken framework to real estate development would be focused on designing a tool that allows the tradeoffs between engagement and land optioning to be visualized. This tool could help to provide developers with a framework through which they can understand the tradeoffs of engaging the community more deliberately at various stages of the development process. Technology has given us the means through which to determine the impacts of land optioning and assembly not only from an economics perspective, but also from a community engagement and quality of space perspective.
CONCLUDE
CONCLUDE

The analysis of this thesis has demonstrated that real estate is a unique investment vehicle that serves both the financial and spatial markets. The process of creating these environments is inherently complex and highly iterative, with feedback required from many different stakeholders. Because of increased emphasis on investor returns, the developer has focused on the elements of the development process where they can have direct control over the outcomes. Most recently, these innovations have occurred through the Design Structure Matrix (DSM). Although progressive in regards to understanding development efficiencies through management, the DSM leaves much to be desired in dealing with elements outside the developer’s expertise. The intent of this thesis was to establish a framework for developers to better understand aspects of the development process outside of their control, more specifically the role of community engagement and the land optioning and assembly process.

This thesis looked to the ideal state of Singapore and the new Eco-Town of Punggol to establish a stakeholder framework that could be implemented over a long-term planning and development timeline. This framework combined parametric design theory and community engagement processes and applied it to the land optioning and assembly phase of the real estate development process. Through this framework the author established a framework that could engage the community earlier in the development process, providing an opportunity for the developer to better understand the needs of the communities in which they build. More importantly, this stakeholder framework would allow the developer to understand how the community might more effectively engage in the development process. If the community is included in the land optioning and assembly process, there is an increased opportunity for the community to positively shape their communities.
More importantly, this thesis has demonstrated a different process to how innovation in the real estate development process might occur. It has combined development, planning, community participation, and theoretical frameworks to demonstrate how a new development process might be re-imagined and understood. These different frameworks were combined through parametric design thinking to create a new real estate development process for the Housing Development Board to implement in Punggol. This re-imagined development process embodies new development and planning ideals and how they might be theoretically implemented. It has established a framework that can proactively engage the community in a more meaningful way by demonstrating how and when different stakeholders might engage in the development and planning process.

Developers play a significant role in shaping the built environment, and are not inherently opposed to community engagement. If developers take a more proactive role in shaping the discourse of this conversation, then the benefit will not only be received to the private sector, but also to the communities and individuals these projects affect everyday.

Singapore, and the Housing Development Board have a unique opportunity to re-imagine how development projects are conceived and implemented. As a masterplanner and developer, HDB has the potential to transform how development projects are brought to market. Additionally, they have the ability to leverage private land sales with public housing to create more cohesive communities.

The recommendations provided in this thesis give HDB a clear methodology through which they can explore how this new framework impacts the quality of development in Punggol. By combining development, planning, community engagement, and a theoretical framework, this thesis has demonstrated how new ideals and processes might be conceived. The hope of this author is that the findings of this thesis empowers developers to think more proactively about the role they play in the development process and how this role could be re-imagined to achieve more significant urban design ideals.
BIBLIOGRAPHY


Seetharam, Kallidaikurichi, and Belinda K. P.Yuen. 2010.
oping Living Cities: From Analysis to Action / Editors, Seetharam Kallidaikurichi & Belinda Yuen; [supported By] Lee Kuan Yew School of Public Policy, National University of Singapore ... [et Al.], Singapore; Hackensack, N.J.: World Scientific Pub., c2010.


Third World Network. “Provision of Public Housing in Singapore.”


INTERVIEWS

Karin Brandt
coUrbanize
CEO

Mr. Chia Boon Kuah
Far East Development
Chief Operating Officer, Property Sales and Executive Director

Mr. Chong Fook Long
Housing Development Board
Project Director, Punggol

Ms. Sandra Sim
ERA Realty Network

Ms. Belinda Yuen
Lee Kuan Yew Center for Innovative Cities
Senior Research Fellow
The Spring 2013 Urban Design Ideals and Action seminar, taught by Professor Brent D. Ryan since 2010 at MIT, explored the topic of parametric urbanism, using the nation state of Singapore as site. The workshop was organized and sponsored in partnership with Professor Andres Sevtsuk of the Singapore University of Technology and Design and provided two case studies through which parametric urbanism could be studied. These two neighborhoods were Bugis and Punggol, and the latter serving as case study for this thesis. (Parametric Urbanism Workshop)

The work and analysis in this appendix comes from the fieldwork component of the Parametric Urbanism workshop. Upon our site visit, my group became fascinated with the amount of personal items that were accumulated in the corridors of each of these housing developments. We observed a significant number of building residents utilizing the public space directly in front of their homes for varying uses. My group conducted an extensive analysis of the use of this space, placing an emphasis on the role of the individual in shaping the urban form of their housing. We used the parameters of intensity, shape, type, and location, as the metrics of analysis in this study. The findings from this analysis were quantitative as well as qualitative, and can be found below.
**Shape of Customization**

- Building 114 A / 163 Units
  - 28 units: 17% (None), 44% (One Side), 23% (Two Side)
  - 26 units: 16% (L Shape)
  - 23 units: 16% (None)
  - 20 units: 31% (Medium), 39% (Low), 14% (High)

**Type of Use**

- Lounge: 4%
- None: 12%
- Religious: 13%
- Decorative: 29%
- Gardening: 39%
- Storage: 66%

**Intensity of Customization**

- Building 114 A / 163 Units
  - 28 units: 31%
  - 26 units: 39%
  - 23 units: 16%
  - 20 units: 16% (None), 31% (Medium), 39% (Low), 14% (High)
The Spring 2013 Urban Design Ideals and Action seminar, taught by Professor Brent D. Ryan since 2010 at MIT, explored the topic of parametric urbanism, using the nation state of Singapore as site. The first component of the semester work focused upon site research of Punggol. Upon returning to MIT, each group was charged with applying the theory of a “parametric urbanist” to the fieldwork case study. My group chose the philosophy of John Habraken as the basis for our exploration throughout the semester.

The work and analysis in this appendix comes from the concept development that occurred as my group used John Habraken as the method of analysis in Punggol. Habraken’s theory regarding form and control in the built environment provided an exemplary framework through which we could explore how different urban design techniques could be used to modify existing housing typologies in Punggol depending on the level of control that the individual was provided in the design of their living environment. This analysis touched upon issues of scale and the ability of the individual to participate in the design of their community at increasing scales. Some of the output from this work is shown below.
SINGAPORE’S PATTERN OF USER PARTICIPATION

- URA
- URA/HDB
- TOWN PLAN
- PUNGGOL
- NEIGHBORHOOD PLAN
- NEIGHBORHOOD
- CLUSTER PLAN
- CLUSTER
- BUILDING PLAN
- BUILDING
- FLOOR PLAN
- LEVEL
- CORRIDOR PLAN
- NOOK
- UNIT PLAN
- UNIT
- FURNITURE PLAN
- FURNITURE