

2020

Project and Design Management


25 YEARS OF RESEARCH

Silvio Melhado

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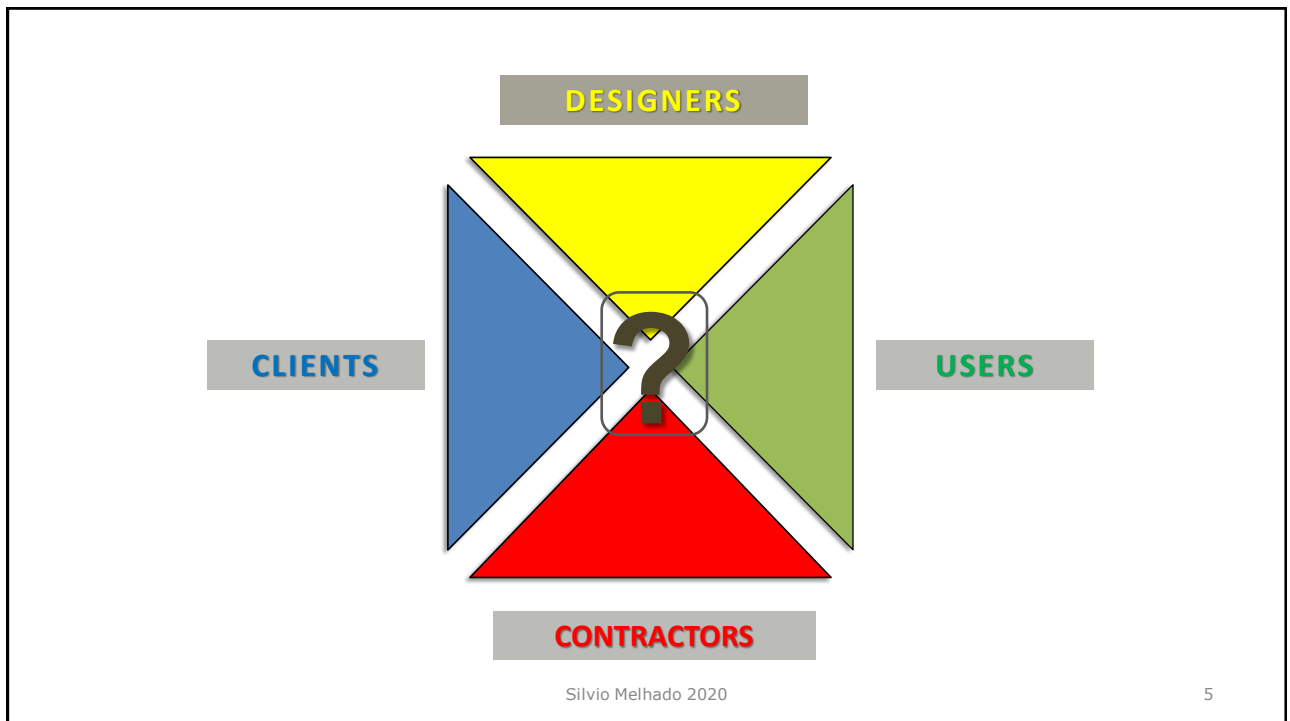


25 years
of
Project and Design
Management
Research

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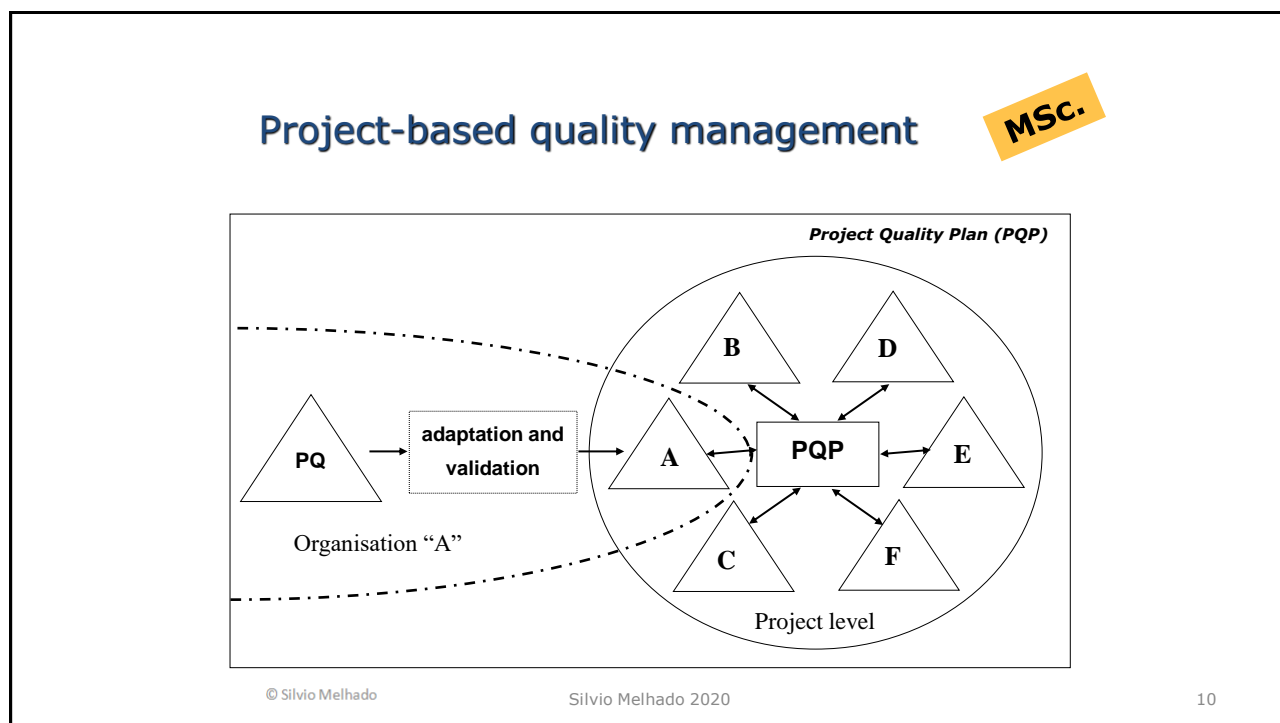
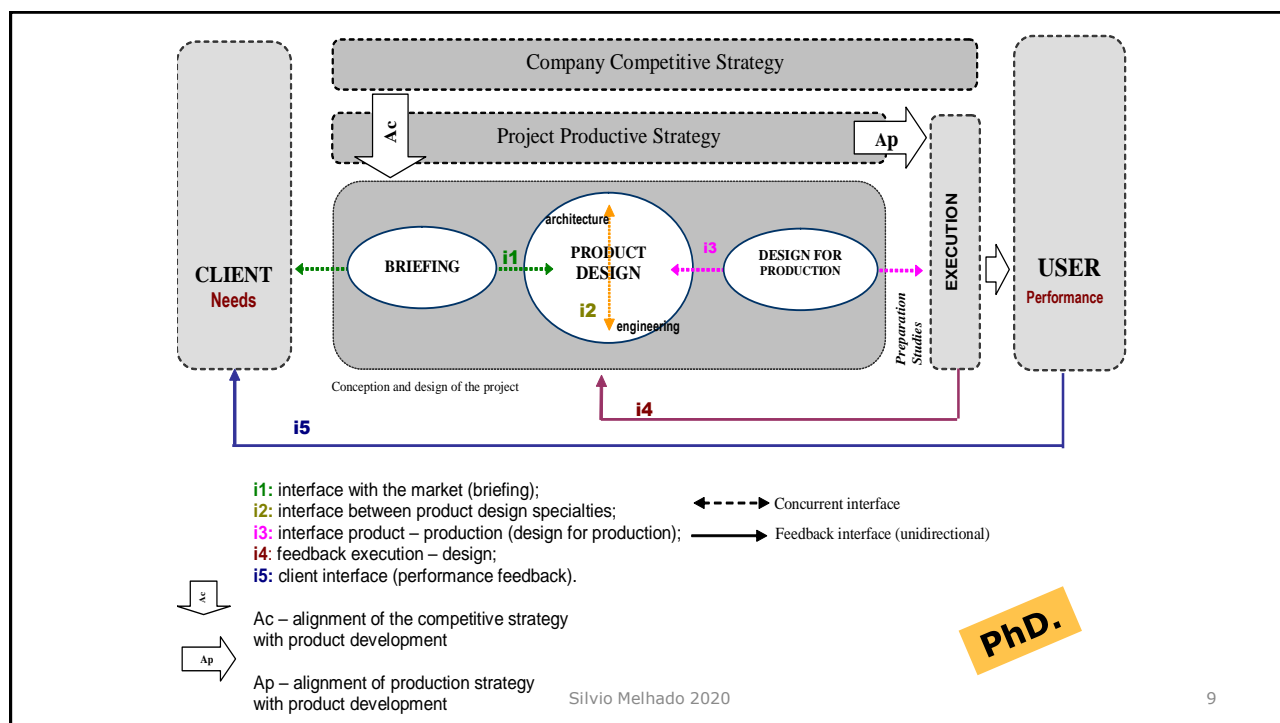


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Main research subjects

- Concurrent design for building projects
- Design for production
- Design management – modelling, planning and assessment
- Design firms management
- BIM implementation management
- Sustainability impact on design management methods

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The *Design for production* is based on concurrent design principles. It helps to improve buildability of the main building works:

- Formwork
- Concrete levelling and finishing
- Masonry partitions vs. plumbing
- Facade coverings
- etc.

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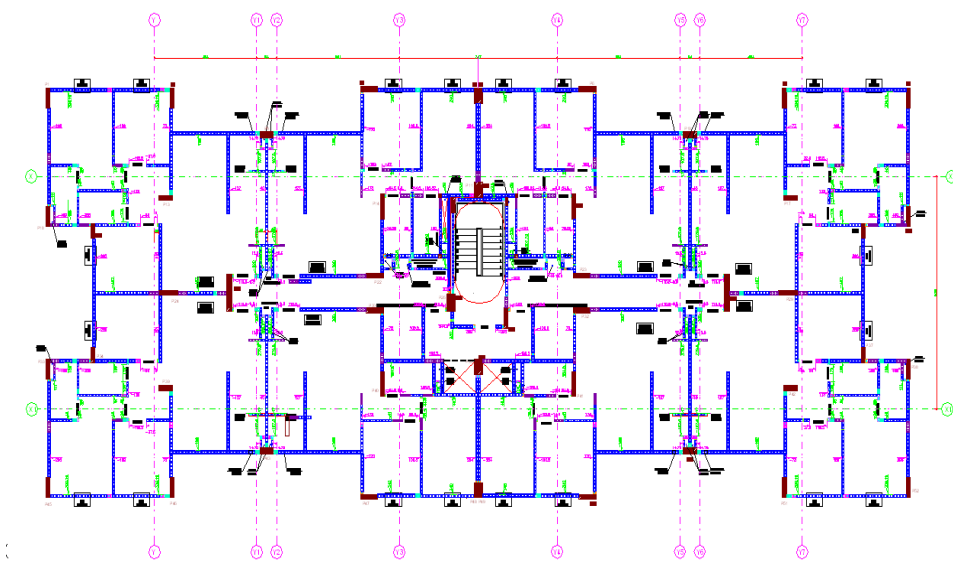
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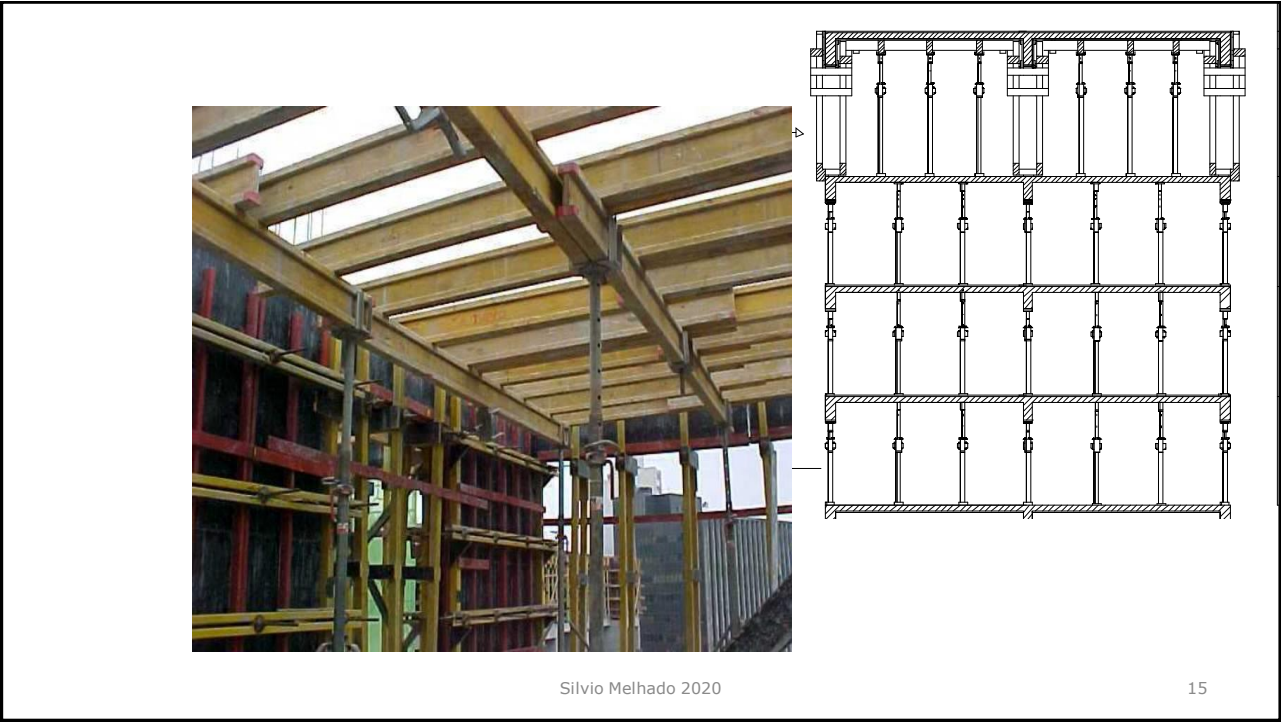


Floor axis plan - source: Mecatron Arquitetura

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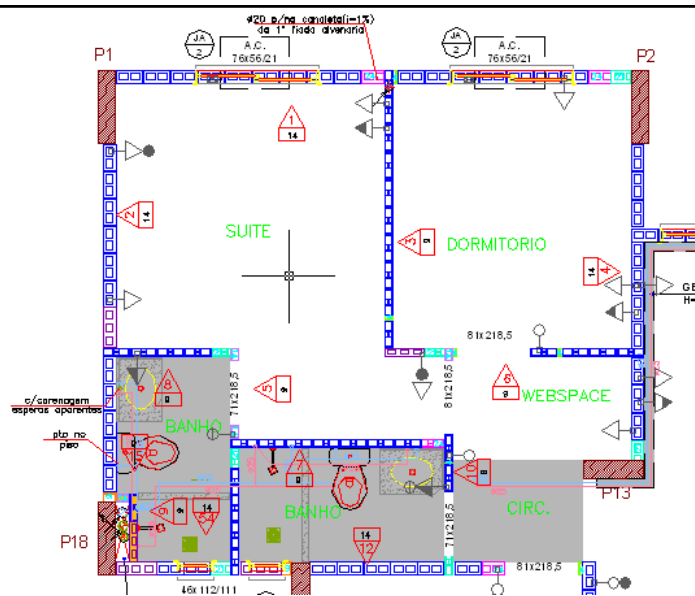
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1st line masonry plan - source: Mecatron Arquitetura

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Design planning with the Design Structure Matrix (DSM)

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Number of tasks in the DSM : 17 <note> new index used!

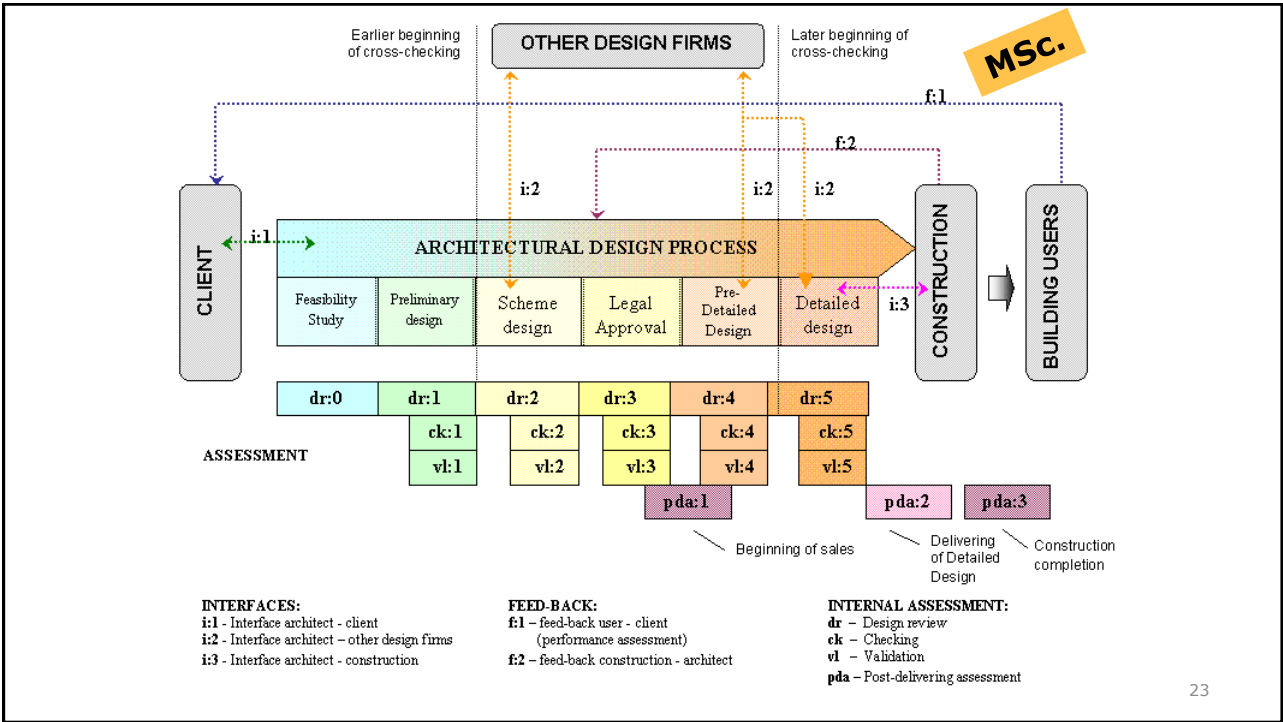
Task Name	Level	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Desenho dos equipamentos de ar condicionado [F]	1	1	1															1	
Cálculo da rede de dutos [H]	1	2		1					1									2	
Cálculo da laje do mezanino [I]	1	3			1													3	
Cálculo da estrutura metálica de piso do mezanino [K]	1	4	1	1	1													4	
Cálculo do dimensionamento das colunas [L]	1	5				1												5	
Desenho das alvenarias [M]	1	6					1											6	
Cálculo dos acionamentos elétricos [P]	1	7						1										7	
Cálculo da laje de piso [A]	2	8							1	1								8	
Desenho das estruturas metálicas [N]	2	9					1	1										9	
Desenho dos acionamentos elétricos [Q]	2	10							1									10	
Cálculo das fundações [C]	3	11						1										11	
Desenho da rede de dutos [G]	3	12	1	1							1							12	
Detalhamento das estruturas metálicas [O]	3	13				1	1					1						13	
Desenho das fundações [D]	4	14											1		1			14	
Desenho da laje do mezanino [J]	4	15	1		1									1		1		15	
Desenho das proteções das colunas metálicas [E]	5	16						1									1	16	
Desenho da laje de piso [B]	6	17								1	1		1					17	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

(Manziane, 2005)

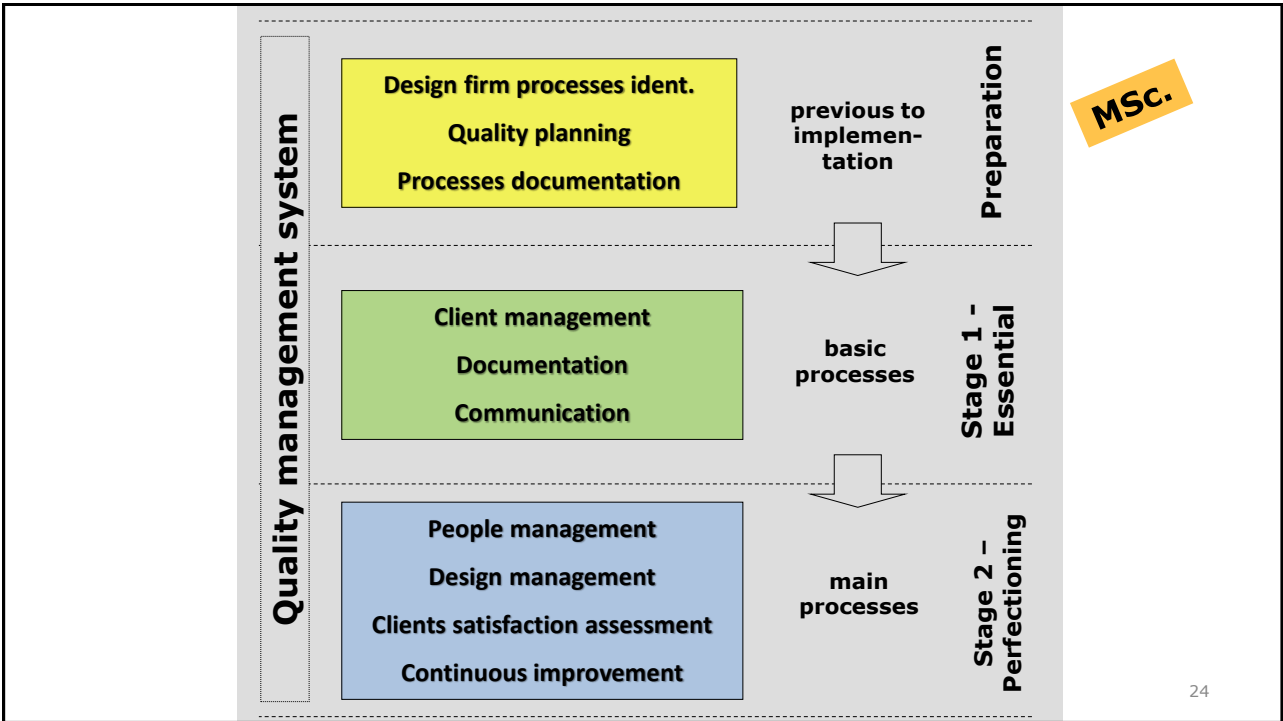
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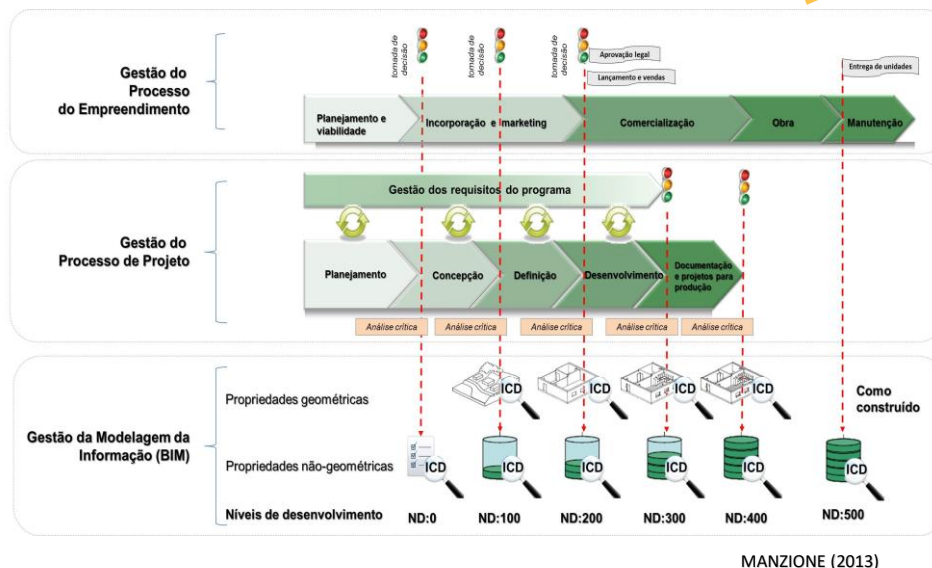


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Design stages after BIM implementation

PhD.



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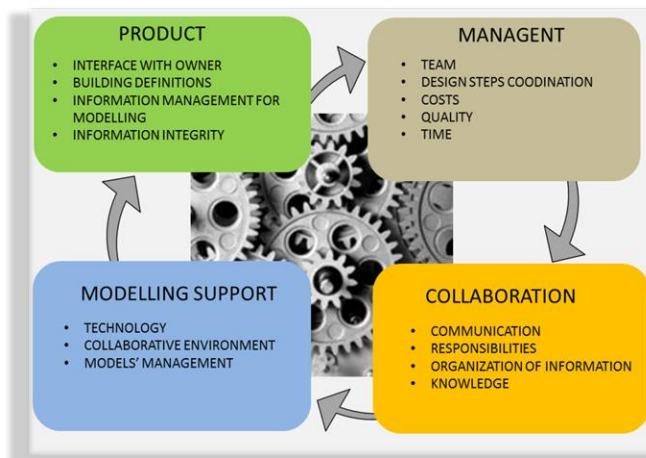
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BIM implementation in Real Estate Development Companies

PhD.

The Design Management Guide

- **5 design phases:** *conception, definition, detailing, construction, and operation*
- **Four categories of tasks:**
 - Product;*
 - Management;*
 - Collaboration and*
 - Modelling Support*
- **Focus on the Design Manager responsibilities**



Souza(2015)

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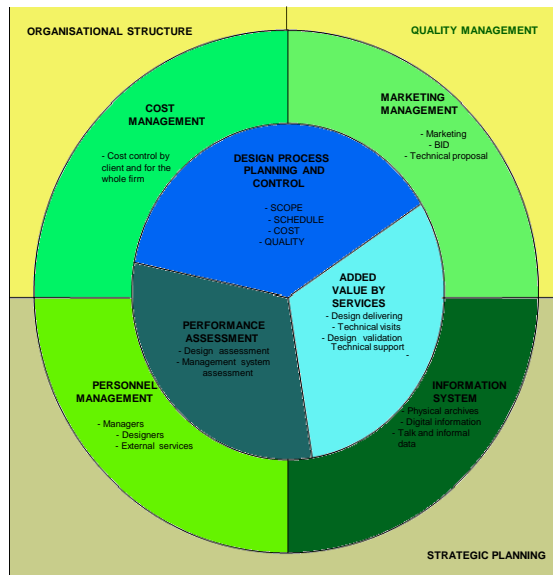
Management model for design firms

PhD.

MSc.

Post-
Doc.

Oliveira; Melhado (2006)



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■ Designing for rehabilitation: interface with construction stage

MSc.

Discusses the rehabilitation projects interfaces between design and construction and the role of design co-ordination. Results of case studies carried out in two rehabilitation projects, in São Paulo-Brazil and in Lyon-France.



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■ Guidelines for design of office buildings

MSC.

The aim was to investigate what critical information from several design specialties should be defined during the conceptual phase and its correct insertion sequence in the design process. The research was based on the case study method and a design information flow is proposed.



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■ Methodology for design of lightweight facades

PhD.

A methodology for designing lightweight facade systems, applicable either to new construction or to building renovation, discussing management and technology aspects. The research work was based on case studies realized in Brazil and in France.



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■ The façade design management – case studies

MSC.

The complexity of the façade subsystem is related to the difficulty of managing all the stages that take place before its assemblage. The work found recommendations to all the phases of the façade design process of multi-storey commercial buildings.



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■ Method of cost management in the early stages of building design

MSC.

The Real Estate companies profit depend on the accuracy of the cost defined at the early design stages. This work presents a simple and effective cost parameterization method to make engineering value analysis that is able to support design decisions, contributing for risk control.



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■ Design scope of partition walls and façade coverings

MSC.

Some researchers have demonstrated the relevance of design for production in the building industry; however, the content of those designs wasn't defined by academics or professionals. The work describes design for production scopes of partition walls and facade coverings.



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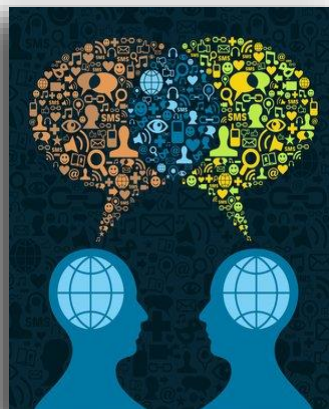
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■ Knowledge management in construction companies – case studies

MSC.

The case studies have show contractors performance in the design management. The knowledge management practices discussed include: communication and information; feedback mechanisms; information to the construction site; techniques to capture and store knowledge.



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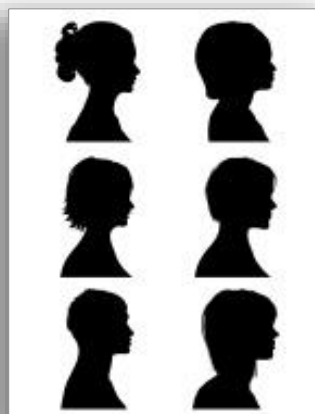
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■ The design manager profile in the Brazilian building sector

PhD.

This thesis discussed the profile, the activities and the autonomy for the design manager in the context of the Brazilian building sector. The Delphi method was adopted in the research and its three stages involved 28 managers from the ten most relevant states of Brazil.



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■ Collaborative design contracts for Building Information Modelling

MSC.

The American Institute of Architects proposes a contractual model called Integrated Project Delivery. This research aims to analyze the implementation of this dynamics in Brazil. As methodology, two structured surveys were analyzed and a case study was carried out on a real estate company.



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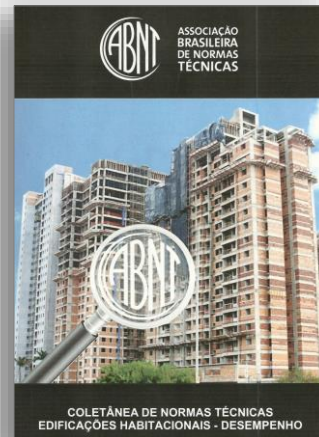
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■ The impact of performance standards on the building design process

MSC.

The research aims to identify the impacts caused by the Brazilian "Performance Standard", as it is known the NBR 15.575, on the design process.

The methods of case study and research-action have been applied, in order to describe how the design process has been changed by real estate and construction companies.



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■ Sustainable building design as a new demand for architectural firms

PhD.

Design highly influences the environmental performance of the buildings, but the new requests of sustainability are also a challenge to designers. This research aims to analyse how architectural firms have been reorganised facing up to those demands of more sustainable design solutions.



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■ Sustainability requirements for infrastructure construction firms

MSc.

MSc.

The infrastructure industry has a role with regard to their economic importance and magnitude of environmental and social impacts caused by its large projects. This research aimed to define the sustainability requirements applicable to construction companies from the infrastructure sector.



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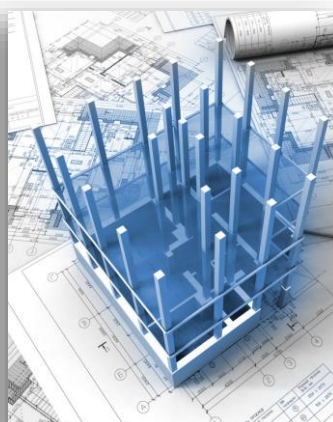
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■ The implementation of BIM in a Brazilian Public Bank

MSc.

Caixa Econômica Federal is the most important bank in the Brazilian Construction industry. It has a technical department that manually performs feasibility analysis, and verify the budgetary and financial development of building projects. New tools and modelling guidelines have been proposed to enhance its technical practices.



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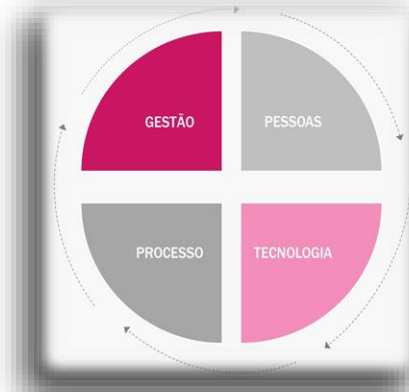
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■ The implementation of BIM in the Brazilian Architectural Firms

MSC.

Based on three case studies, this research aims to present an overview of the Brazilian architectural firms which are using BIM and evaluate their maturity stages related to processes, people and technology.



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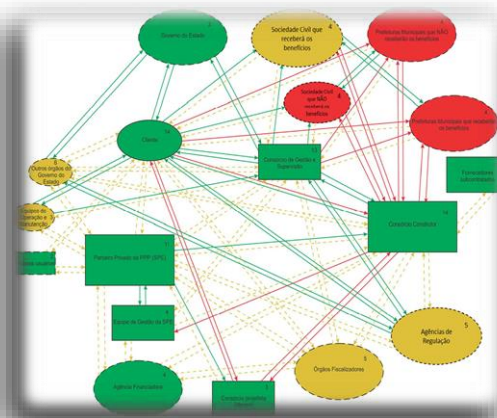
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■ Project Management Methods for Infrastructure Projects

MSC.

Using a case study approach, this study examines two large infrastructure projects in the Metropolitan Region of São Paulo, and discuss the influence of their main stakeholders and the applicability of project management methods.



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■ **Project management in infrastructure projects and foreign construction companies**

MSC.

The participation of foreign construction companies in Brazil has grown significantly and an efficient set of project management methods is required for their success. The work is based on case studies of recent projects.



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■ **The adoption of BIM in the Brazilian Infrastructure Companies**

MSC.

The thesis reports the distinct experiences of five large infrastructure companies of São Paulo city during its BIM adoption process and proposes a practical procedure to BIM adoption in infrastructure companies.




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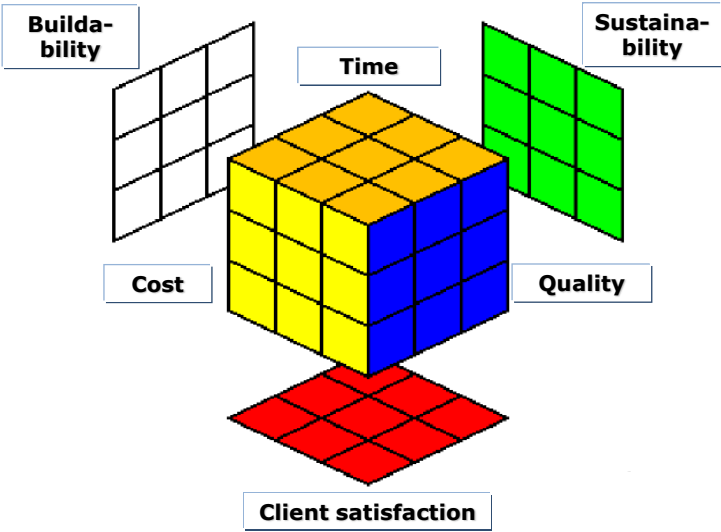
Summarising...

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Design management aims



Buildability

Time

Sustainability

Cost

Quality

Client satisfaction

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Thanks!
Merci!
Obrigado!

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