

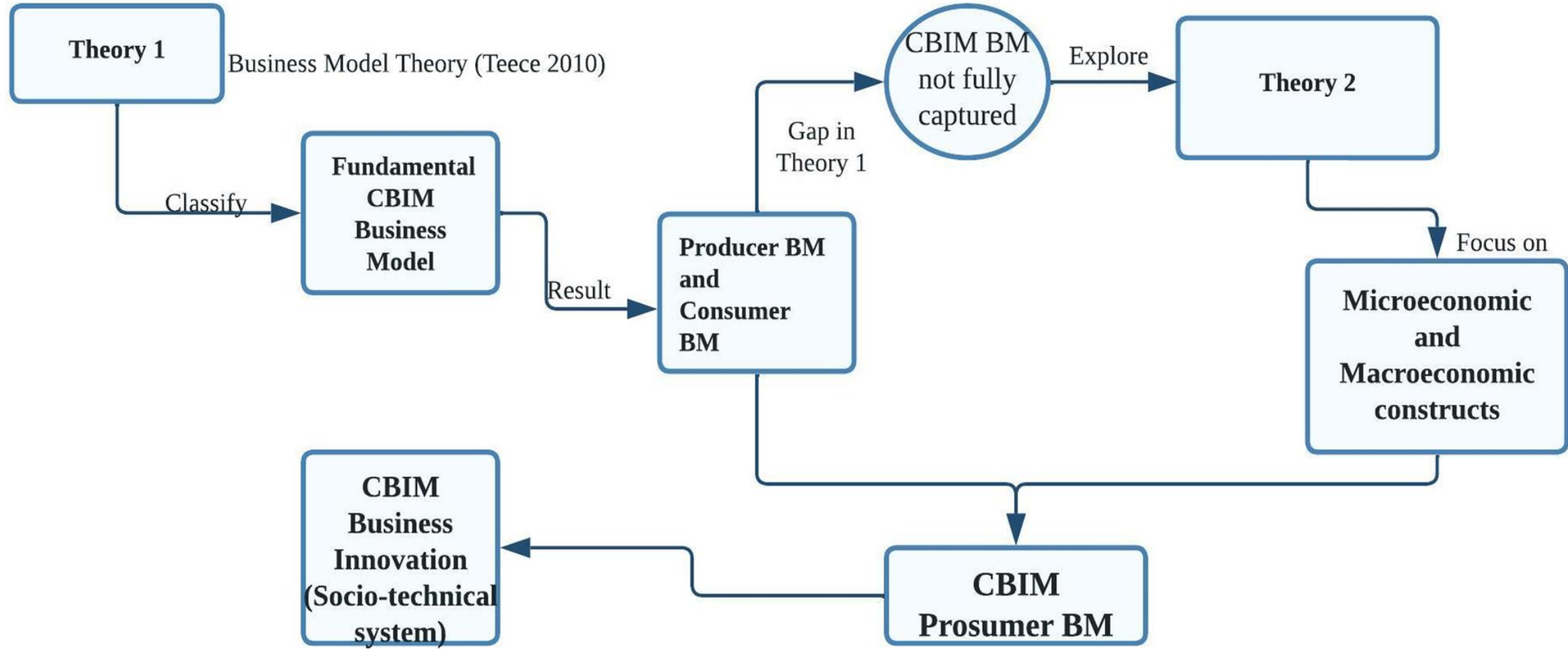


Business Modelling for Cloud-based BIM.

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Research Synopsis

CBIM Business Model as a System





Secondments and Results

- Trimble
- Bentley and Cohesive.

- **Results**
- **Obj 1, 2 and 3**



Research Problem

- Currently, there is a paucity of evidence on core **CBIM** business model (**BM**) **classifications**
- Existing **business innovations** do not fully capture CBIM **business models**.
- Current **business constructs** not adequate for CBIM business **competitive advantage**



Research Aim & Objectives

Aim: To model businesses around CBIM innovations.

Objectives:

1. Classify **core** business models around **CBIM**
2. Evaluate the **required changes** to the **core** CBIM business model.
3. Evaluate a CBIM **Prosumer's** competitiveness through **macroeconomic** business model constructs

Research Approach

➤ **Ethnography and Action Research**

- 20 Interviews (5 unstructured and Semi structured)
- 4 expert (result validation)

➤ **Participants**

- Engineering firms;
- Construction and engineering software firm;
- Software vendor;
- Digital advisory companies.

Objective 1. CBIM Business Model categories

- Method: Ethnography (Interviewing)
- **Results:**
 - Business Model **Taxonomy** (Nickerson et al 2013)
 - a. Producer CBIM Business Model
 - b. Consumer CBIM Business Model
 - **Grounded theories** (Business Model Taxonomy Theory)
 - *“efficiency is not proportional to more profitability for consumers, unlike the producer. This disadvantage propels consumers to redefine their value proposition for new CBIM solutions and sell more existing ones”*

Objective 1. Consumer and Producer CBIM BM

Meta-Analysis	Dimension	Consumer	Producer
Value creation	Value Proposition	<ul style="list-style-type: none"> They are building contractors, civil engineering firms, digital advisory companies, and design companies. Use CBIM-based solution. A need to reconfigure traditional value propositions to suit CBIM 	<ul style="list-style-type: none"> They are construction hardware and software vendors and database management companies. Produce CBIM software, and host CBIM database.
	Customer segment	<ul style="list-style-type: none"> Public and private infrastructure and engineering clients (including maritime clients) 	<ul style="list-style-type: none"> Public and private infrastructure and engineering clients
	Customer relationship	They create and maintain through: <ul style="list-style-type: none"> excellent user experience, long-term relations, Data Sharing 	<ul style="list-style-type: none"> They use several schemes to bring more value to client investment.
Value delivery	Key channels	<ul style="list-style-type: none"> These are people needed to drive digital transformation in all the business units. 	<ul style="list-style-type: none"> A mix of customer relationship and customer acquisition strategies.
	key resources	This revolves around people with the following: <ul style="list-style-type: none"> In-depth technology, CBIM processes, and the specific enterprise or business. 	This revolves around technology and process : <ul style="list-style-type: none"> For example, using the Amazon technology platform to host data.
	key activities	This revolves around people . They ensure : <ul style="list-style-type: none"> Adequate work culture to appreciate the digital team 	This revolves around process and product : <ul style="list-style-type: none"> In-house product development Other companies develop their products on APIs.
Value capture	Revenue	<ul style="list-style-type: none"> Efficiency from using CBIM tools doesn't equate to more revenue 	<ul style="list-style-type: none"> More revenue with CBIM
	pricing model	<ul style="list-style-type: none"> Pricing is disruptive for traditional pricing based on brain-per-hour and Lumpsum contracts. CBIM tool usage requires SaaS and Consumption-based pricing. 	<ul style="list-style-type: none"> SaaS (Subscription) Consumption-based BM

Objective 2. Changes to CBIM Business Model

- Method: Ethnography (Interviewing)

- **Results: Prosumer**

 - Prosumer CBIM Business Model

 - a. A Prosumer business model mixes the value offerings of Consumers and Producers.
 - b. CBIM prosumer business model incorporates microeconomic and macroeconomic factors as business constructs.

Objective 2: Constructs for CBIM Prosumer

Economic Constructs	Consumer	Producers
Microeconomics	<ul style="list-style-type: none">• Diversification (create a new separate Producer-business model while retaining the Consumer business model in the main business units).• Partnership (Because SMEs lack financial strength but have domain knowledge).• Digital Reskilling (Use tacit and institutional knowledge, reverse mentoring, peer-to-peer mentoring, and knowledge coaching from senior to junior).	<ul style="list-style-type: none">• Partnership (Academic institutions and similar producers).• Digital Reskilling (tacit and institutional knowledge).• Diversification (create a new separate business to retain domain expertise in producing CBIM innovations).
Macroeconomics	<ul style="list-style-type: none">• Information security (Need for reskilling during product development).• Cybersecurity.• Sustainability (Zero carbon Building; revenue model transformed to construction-as-a-service, machine learning).• Pandemic (Covid'19 did not negatively affect business because of digitalization).	<ul style="list-style-type: none">• Information security (Need for reskilling during product development)• Cybersecurity.• Sustainability (Zero carbon buildings, machine learning).• Pandemic (Covid'19 did not negatively affect business because of digitalization).

Objective 3: Prosumer's competitiveness (Information Security)

- Methods:
 - Action Research (Interviewing and expert opinion)
 - PESTEL and SWOT frameworks

- **Results: CBIM as a Socio-technical System**
 - a. **Changes** across AEC, Network and Actor Level
 - b. Envision competitiveness across **timeline**
 - **Roadmap 1:** Socio-political engagement in the AEC
 - **Roadmap 2:** Business innovation

Objective 3: Changes across Level

Level	Strength	Weaknesses
AEC industry	<p>Certifications leads to trust</p> <p>Progression from Level 1 to Leve 2 BIM via digitalization</p> <p>Availability of Private and Public Cloud hosts</p> <p>Most assets are owned by the government</p> <p>There are standards and industry codes for risk analysis</p>	<p>Fragementation of the Industry</p> <p>Sustainability challenge for maritime customer segment</p> <p>Security cannot be 100% as data is continually evolving.</p> <p>Government policies affect consumer purchasing power (e.g, Brexit)</p> <p>Data insecurity prone to terrorism attack</p>
Network Level	<p>Security standards helps businesses to get jobs</p> <p>cloud infrasturer enables the delivery CBIM-based assets</p> <p>The legal side of assest security management has commercial value</p> <p>Outsourcing to the rightt team or skillsets is a way of puting economic value into client's investment.</p> <p>Presence of data centers</p> <p>Cost of running assets lowered due to APIs via the cloud</p> <p>APIs and cloud applications are expected to reduce carbon level</p>	<p>Tendency of data corrupted or loss along the supply chain</p> <p>Data residency could be a threat</p> <p>Client are hesitant to invest in CBIM solutions</p> <p>Inadequate tacit and institutional knowledge</p> <p>Information and hardware device neglect</p> <p>Increased supply chain fosters cybersecurity attacks</p>
Actors and business models	<p>Cloud affords SaaS solution</p> <p>There is also the interactive effects of asset management tools for a CBIM business model.</p> <p>The legal side of assest security management has commercial value</p> <p>Incorporating sustainability factors in business models leads to cost saving</p> <p>Measures are available for handling customer complaints</p> <p>Customer segment diverse (maritime, construction, airport etc)</p> <p>Projecting data delivery alongside asset delivery</p> <p>Business side of CBIM through intellectual properties influences social side of BIM</p> <p>There is a commercial value to assest data security</p> <p>Products and services can be hosted on-premise and on cloud</p> <p>There are diverse methods of pricing and revenue generation</p>	<p>Customer relationship depends on the country or region customers are in</p> <p>Clients are concerned about their data portability and residency</p> <p>BIM is supposed to drive collaboration but it didn't achieve this because everyone openly shares information</p> <p>There are implementation, stakeholder problem and organizational problems</p> <p>Some countries have not put full data security measures in place</p> <p>The value of some information standards expires after a time frame</p> <p>Some BIM-based roles are not clear</p> <p>Aside reputational damage of cybersecurity attack, it is cost-intensive too</p> <p>Businesses cannot be totally transparent in a commercial setting about the use of data</p>

Objective 3: Roadmap 1: Socio-Political Engagement

Sub-roadmap 1: Socio-political engagement in the AEC in in terms of :

- (a) Improved stakeholder engagement in policy-making, standardisation, legislation that revolve around the core of information security (people, process, technology, and data);
- (b) Overcoming challenges due to the fragmentation of the AEC industry

Industry Level	Improving on standardization & legislation supporting information asset security	Ensuring political tenures doesn't stop strategy implementations (whole-life cycle of assets)	Free access to industry standards for all firms types especially SMEs
		Availing adequate funding for asset management	Future forecast and solutions for economic concerns (annual budgeting, price inflation, recession)
		Uptaking Level 3 BIM	Future forecast and solutions for social problems (Pamdemic)
Prosumer Network	Adequately educating the network on standards that fits into current BIM level	Thoroughly simplifying the contents of level 3 BIM as it emerges	
		Enhanced partnership between CBIM Produces, Consumers, and platform owners	
Business Model	Improved employee social satisfaction	Incorporate more Public and Private partnership	Incorporating safety measures into CBIM tools that could adversely influence human behaviour
		Changing the norm of asset ownership (private owning more than the public)	
<i>Short term</i>			<i>Middle Term</i>
			<i>Long term</i>

Objective 3: Roadmap 2: Business Innovation

Sub-roadmap 2: Business innovation

(a) Key performance indicators based on people, process, technology and data

(b) Increased efficiency as a Prosumer

Industry Level		Innovation with all Prosumers, Consumers, and Platform Host	Measuring the sustainability of CBIM solution	
		New technologies tailored to industry specific problems		
	Prosumer Network	Updating current business model Introducing microeconomic and macroeconomic concepts as business constructs	Strategic Partnership that can be leveraged upon to cushion the restriction of cross-country data transfer	
Business Model	Security-minded approach	Redefining value proposition	Employee satisfaction	
	Maintaining a track record of efficiency in service and product delivery	Improving tactic & institutional knowledge	Improving customer relationship that pivots clients becoming intelligent in their investment	
	Redefining business innovation process (pricing and revenue logic)	Bridging the gap between on-premise-based customer segment and cloud-based customer segment		
		<i>Short term</i>	<i>Middle Term</i>	<i>Long term</i>



Thank you!



CBIM - European Training Network
Cloud-based Building Information Modelling

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