BIM APPLICATION IN THE OPERATION AND MAINTENANCE MANAGEMENT OF A SPORTS INFRASTRUCTURE

Giankeving Guzman and Wilfredo Ulloa

Department of Civil Engineering, National University of Engineering, Perú

Problem Statement

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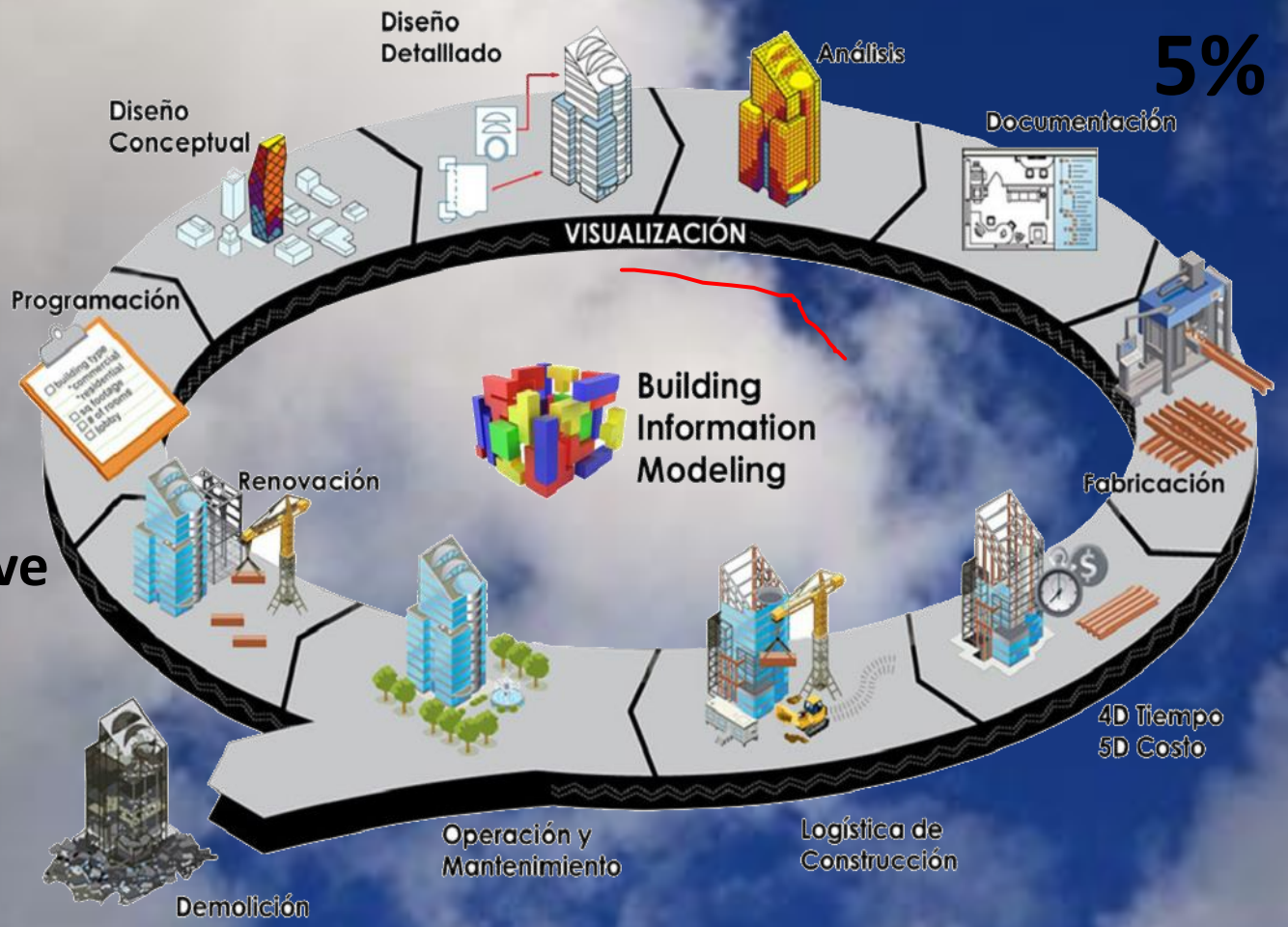

5%

15%

Most expensive
Largest

80%

Problem Statement

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Literature Review

LEAN PRINCIPLES / BIM FUNCTIONALITY	Reduce Variability	Reduce Cycle Times	Standardize	Use Visual Management	Verify and Validate	Tightly Coupling of Learning with Action
Generating As- Built Models	x					
Controlling Lifecycle Cost Data	x	x				
Controlling Lifecycle Environmental Data	x	x	x			
Effectively Locating Building Components		x		x		
Facilitating Retrieval of RealTime Integrated Building, Maintenance and Management Data	x	x		x		
Improving Maintainability Studies	x					
Streamlining Space Management	x			x	x	
Enabling Personnel Training in Virtual Reality				x		x

Interaction Matrix of Lean Principles and BIM Functionalities (Table 1 in Oskouie et al. 2012)

Case Study: Aquatic Center

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Project for Pan American Games Lima 2019

Designed and built under a collaborative IPD environment

Case Study: Aquatic Center

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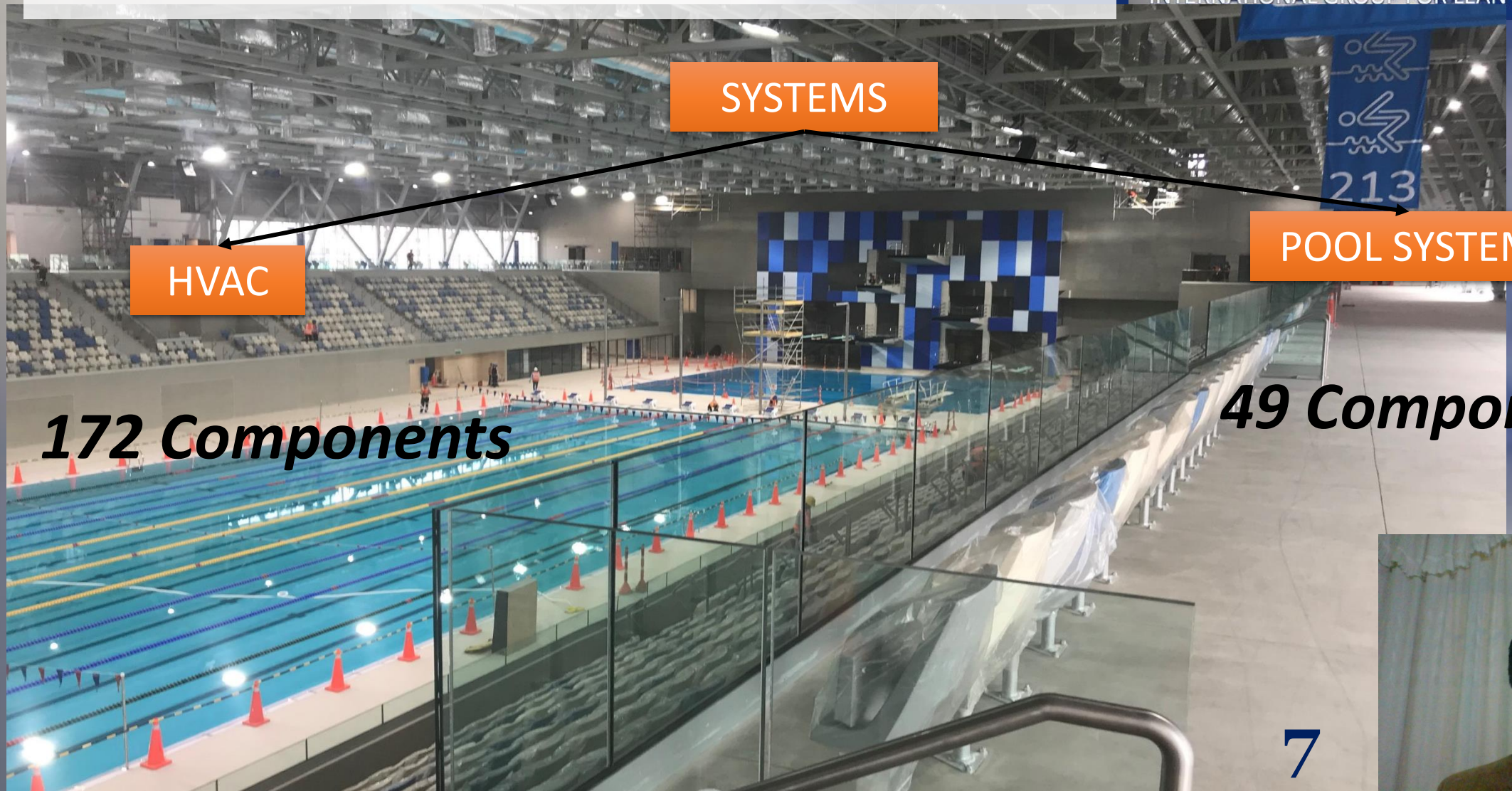


Traditional Methodology

TRADITIONAL FLOW

MAINTENANCE STAFF

Head of Maintenance

Procedures

Mant. Plan

Preventive Maintenance Scheduling.

Send order

Subcontract Maintenance

Firm/Approval

Physical and digital database

Check-in and Delivery

Protocols or checklist

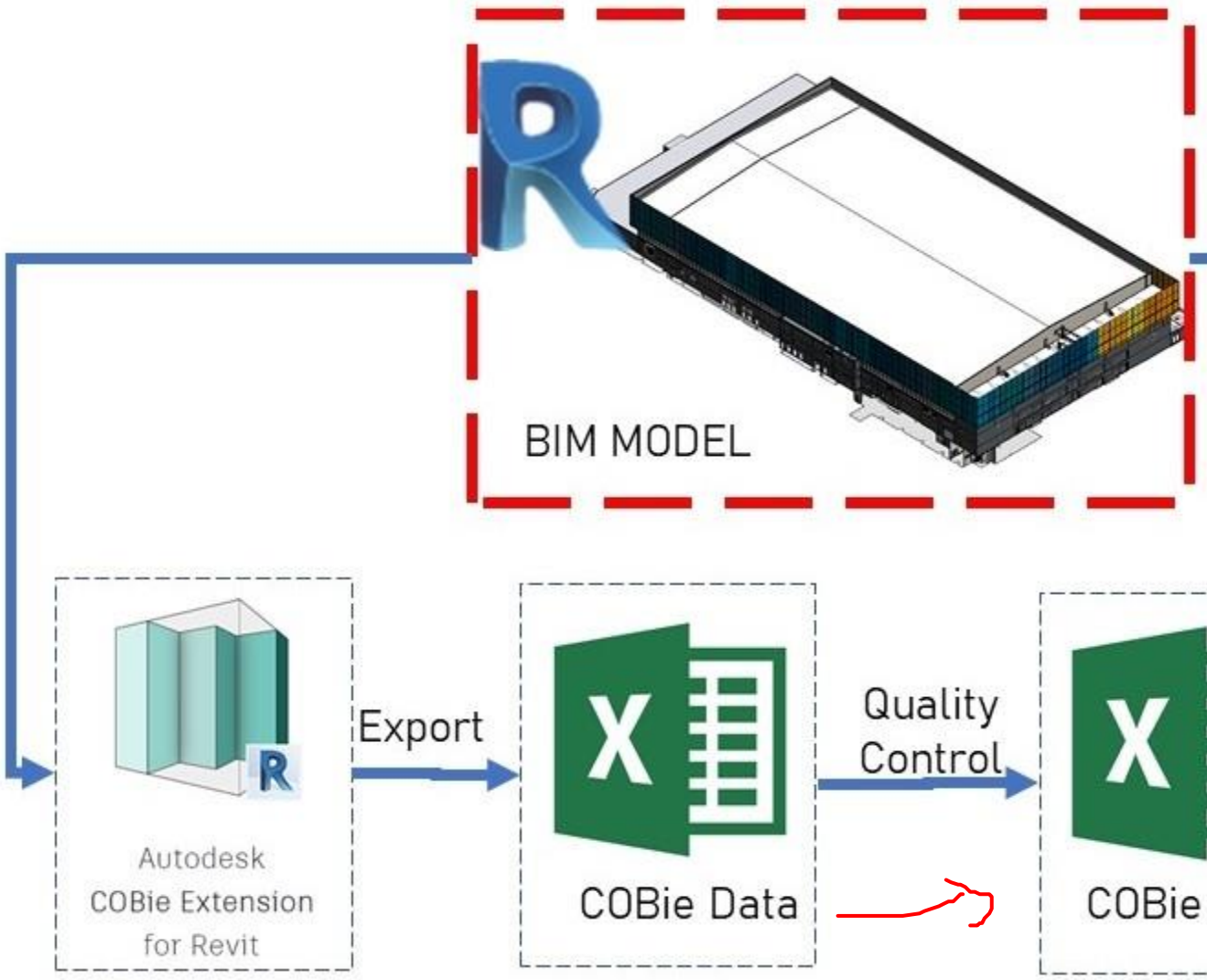
Prepare Information

W

BIM-FM Workflow Proposal

BIM-FM Workflow Proposal

EXCHANGE INFORMATION FLOW



BIM-FM Functionalities

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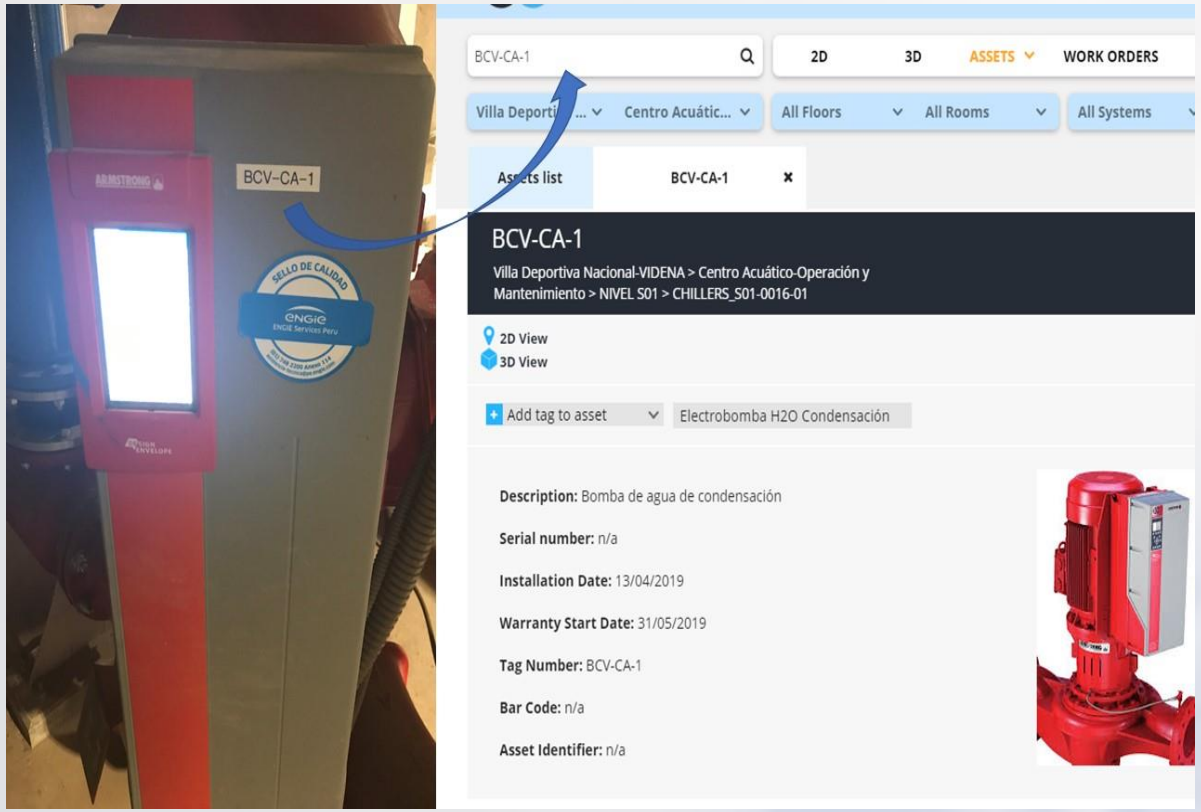
- Effectively Location Building Components



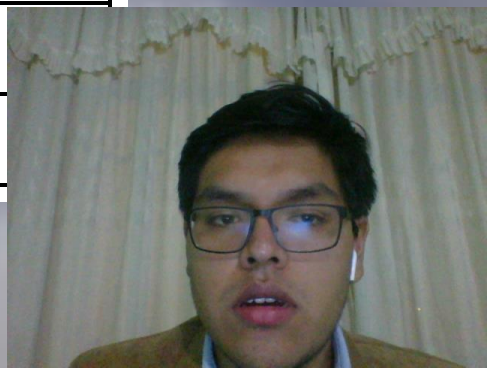
- Visual Management

Research Findings

	Traditional Maintenance flow	BIM-FM workflow
Information Storage	Stored in files boxes	Stored in the cloud
Information Presenting	Paper-based 2D- Drawings	3D Model COBie Standard
Information Recording	Paper reports	Task tracking into BIM-FM System
Information Searching	Searching the information on paper reports	Searching by tag component into BIM-FM System Navigation into BIM Model using filter tool Linking to external related i

Research Findings

Activity Description	Time(minutes)	
	Traditional	BIM-FM proposal
E-Mail reception	5	5
Instant messengers	0	0
Understanding the Event	10	5
Searching of Information	10	5
Task performance	T	T
Recording and data uploading	20	10
Total	45+T	25+T
Time saving per incident	**Δ= 20 minutes (1/3 hr)**	



Research Findings

Limitations and Barriers

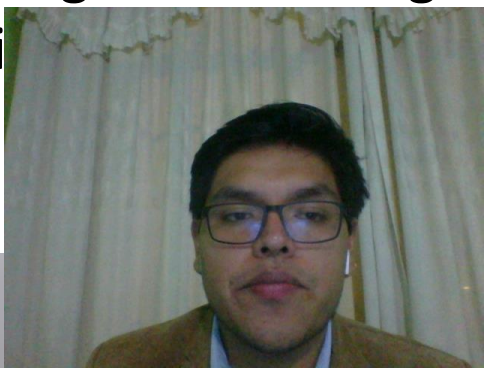
- **Lack of BIM Requirements to Operation and Maintenance phase**
- **Need for qualified staff in BIM tools**
- **Lack of proof positive return of investment**

Conclusions and future work

- The workflow proposal improves the efficiency and productivity of the workforce in Facility Management tasks because they have access to an integrated information platform.

- The interaction between BIM Functionalities and Lean principles is relevant to support the proposal because the approach promotes collaboration in the whole life cycle of building exchanging complete and appropriate information along with stakeholders.

- **Future work:** Study of other BIM functionalities such as real-time monitoring and Building Management System(BMS) is recommended for Facility Management practi



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Giankeving Guzman Ganto
gguzmang@uni.edu.pe

Wilfredo Ulloa Velásquez
wulloa@uni.edu.pe