Lessons from BIM Projects
in Korea

韓國 BIMプロジェクトからの教訓

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Designed by Ohyoon Kwon

Main Research/Teaching Interests

- **Information Technology (IT) in Construction**
- **Building Information Modeling (BIM)**

Hardware

Software

Social-cultural

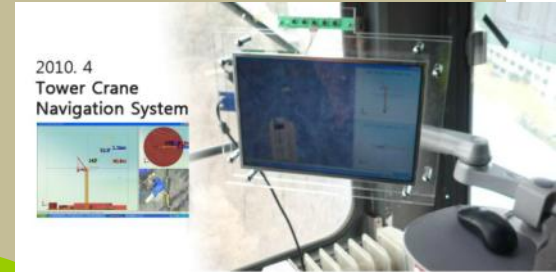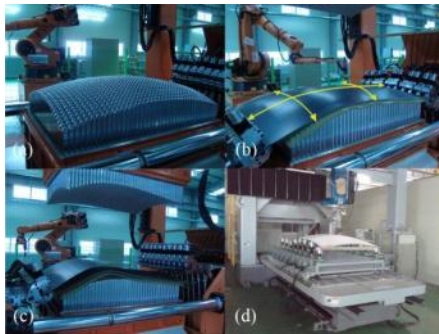Technical

Dr. Underground

IFC Model View Extractor

CompareP21

xPPM

- Parametric and constraint-based modeling
- Rule-based design/constructability analysis
- Knowledge and data elicitation and management / Ontology
- Software engineering
- Interoperability/Data exchange

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Hardware

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Technical

2010. 4
Automatic Multiple
H-beam holder
without additional power

2010. 4
Tower Crane
Navigation System

- Construction devices and methods
- Automation in construction

- Parametric and constraint-based modeling
- Rule-based design/constructability analysis
- Knowledge and data elicitation and management / Ontology
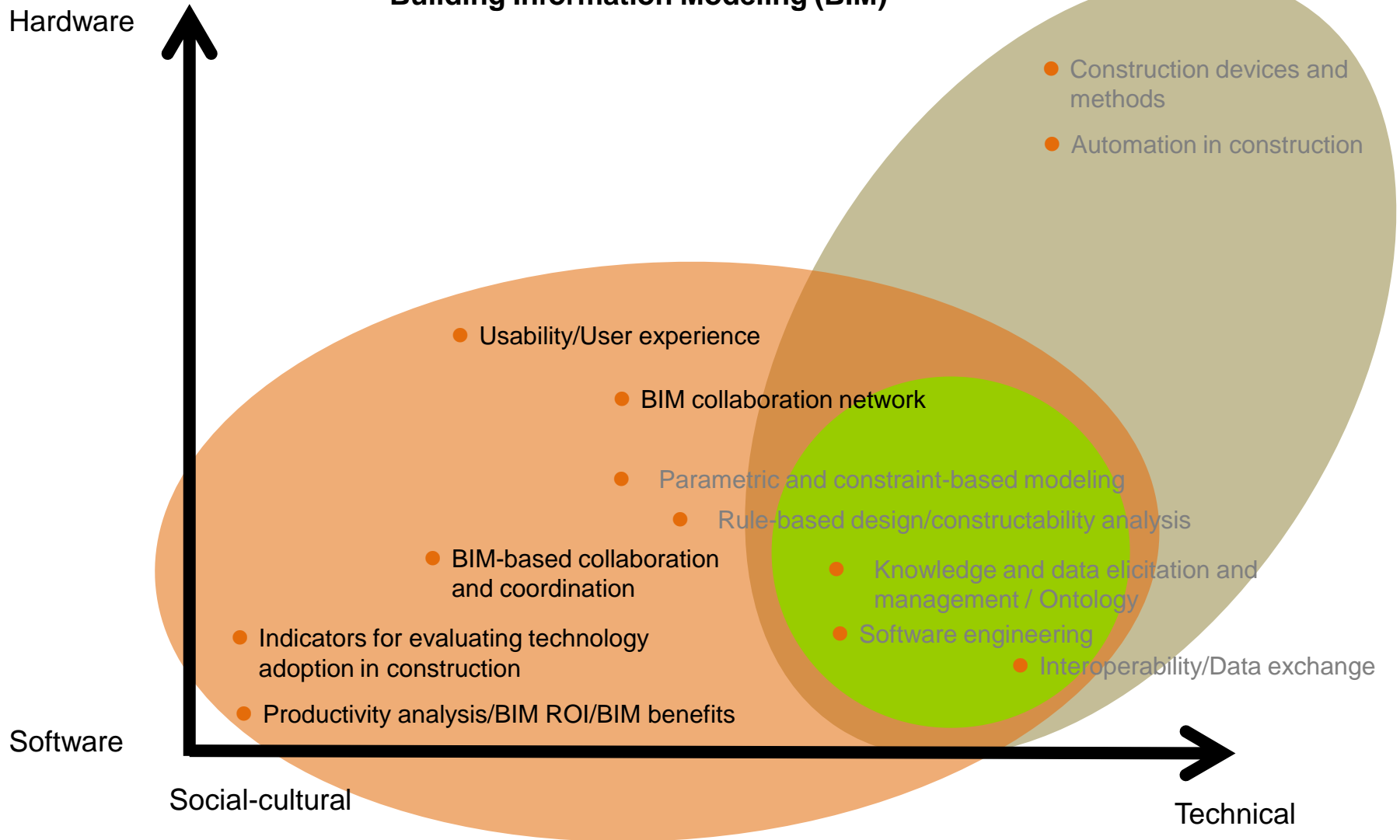- Software engineering
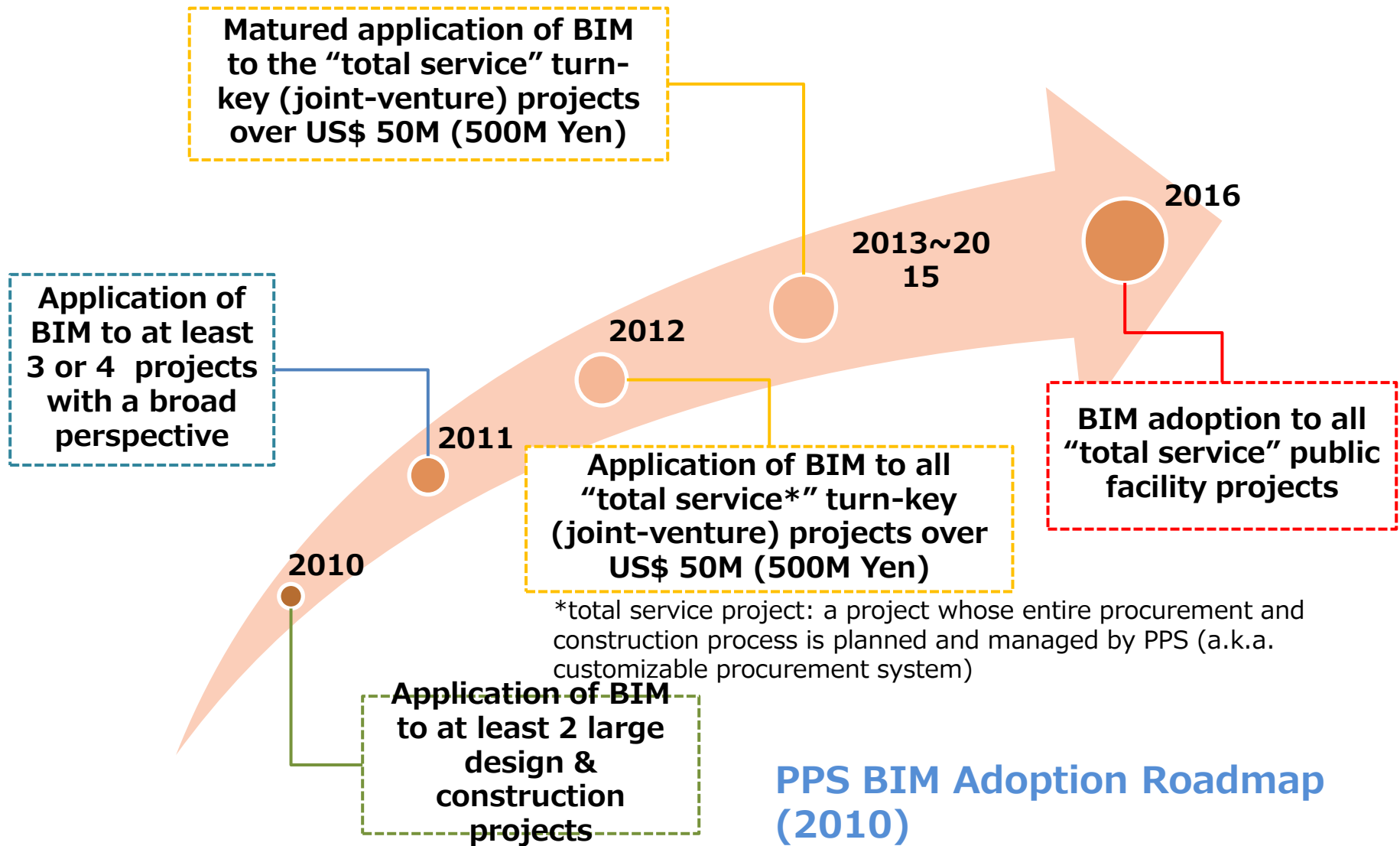- Interoperability/Data exchange

Dongdaemun Design Park (DDP)

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Main Research/Teaching Interests

- **Information Technology (IT) in Construction**
- **Building Information Modeling (BIM)**

Hardware

- Construction devices and methods
- Automation in construction
- Usability/User experience
- BIM collaboration network
- Parametric and constraint-based modeling
- Rule-based design/constructability analysis
- BIM-based collaboration and coordination
- Knowledge and data elicitation and management / Ontology
- Indicators for evaluating technology adoption in construction
- Software engineering
- Interoperability/Data exchange
- Productivity analysis/BIM ROI/BIM benefits

Software

Social-cultural

Technical

Public Procurement Service (PPS, 調達庁) BIM Adoption Roadmap

Matured application of BIM to the "total service" turn-key (joint-venture) projects over US$ 50M (500M Yen)

2016

2013~2015

Application of BIM to at least 3 or 4 projects with a broad perspective

2012

2011

Application of BIM to all "total service*" turn-key (joint-venture) projects over US$ 50M (500M Yen)

BIM adoption to all "total service" public facility projects

2010

*total service project: a project whose entire procurement and construction process is planned and managed by PPS (a.k.a. customizable procurement system)

Application of BIM to at least 2 large design & construction projects

PPS BIM Adoption Roadmap (2010)

Four BIM Waves in Korea

"Two-track BIM"
(Drawing-led project)
(図面主導のプロジェクト)

"Primitive BIM"
(原始 BIM)

"Full BIM"
(BIM-led project)
(BIM主導のプロジェクト)

"Superficial BIM"
(上辺だけ BIM)

2008

2010

2012/2014

2016

The Current Status of BIM Adoption
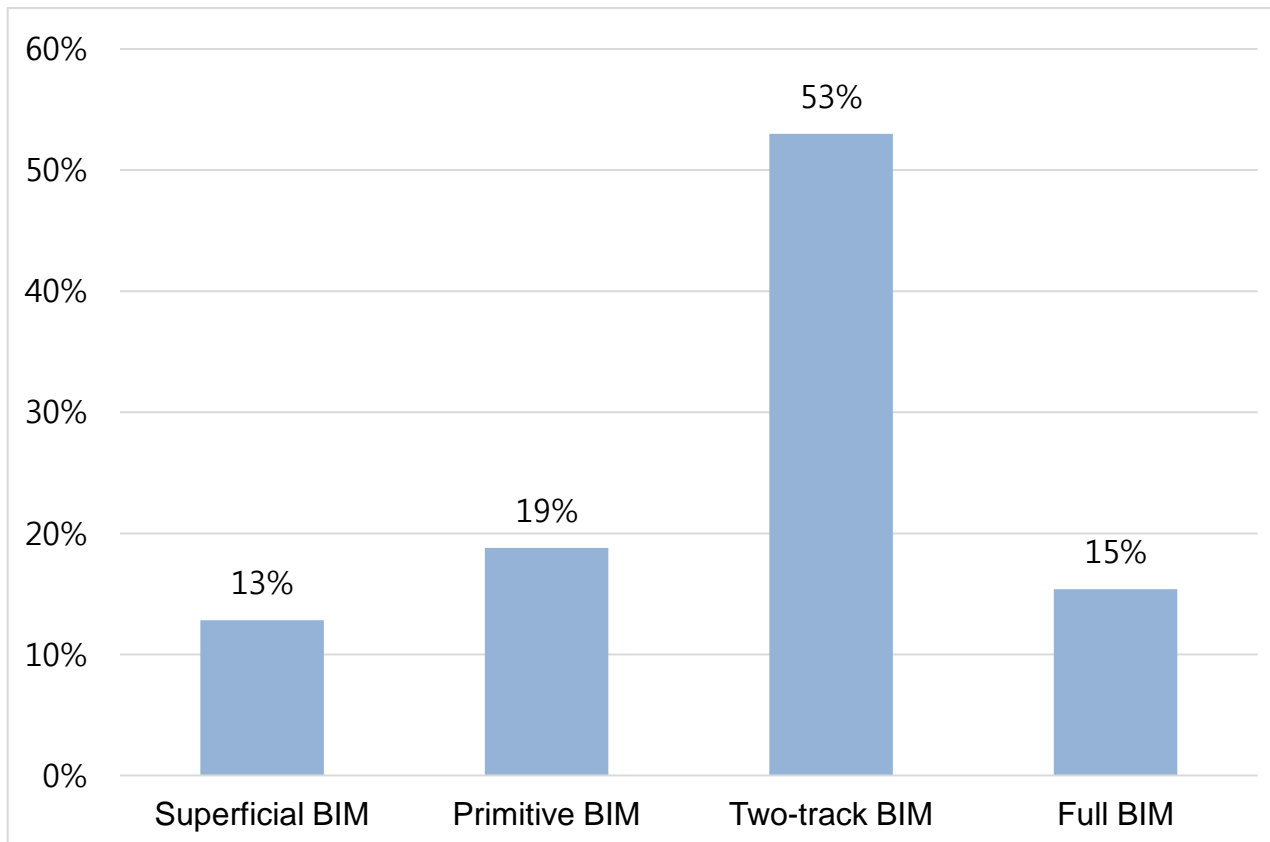
Building Informatics Group (2016), The Korea BIM Survey 2016, Yonsei University, Seoul, Korea

Lessons

Selection of the pilot projects

Project size doesn't matter.

The willingness of a project manager matters.

Identify and implement a BIM process that works best for your project.

Problems

Focus on the problems of your project, not on how to use BIM

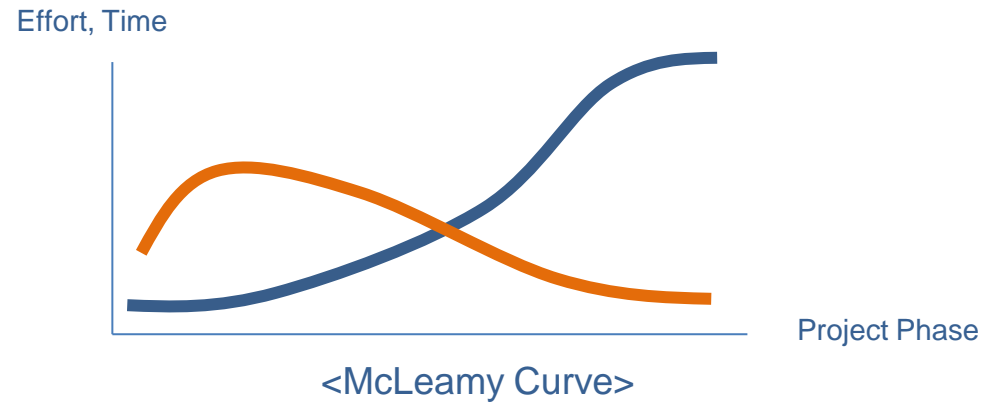Problems → Goals

Share goals in the early phase of a project

安全＋第一

Problems → Goals → Indicator(s)

Develop and share the indicator(s) to monitor the progress

無事故 1000日

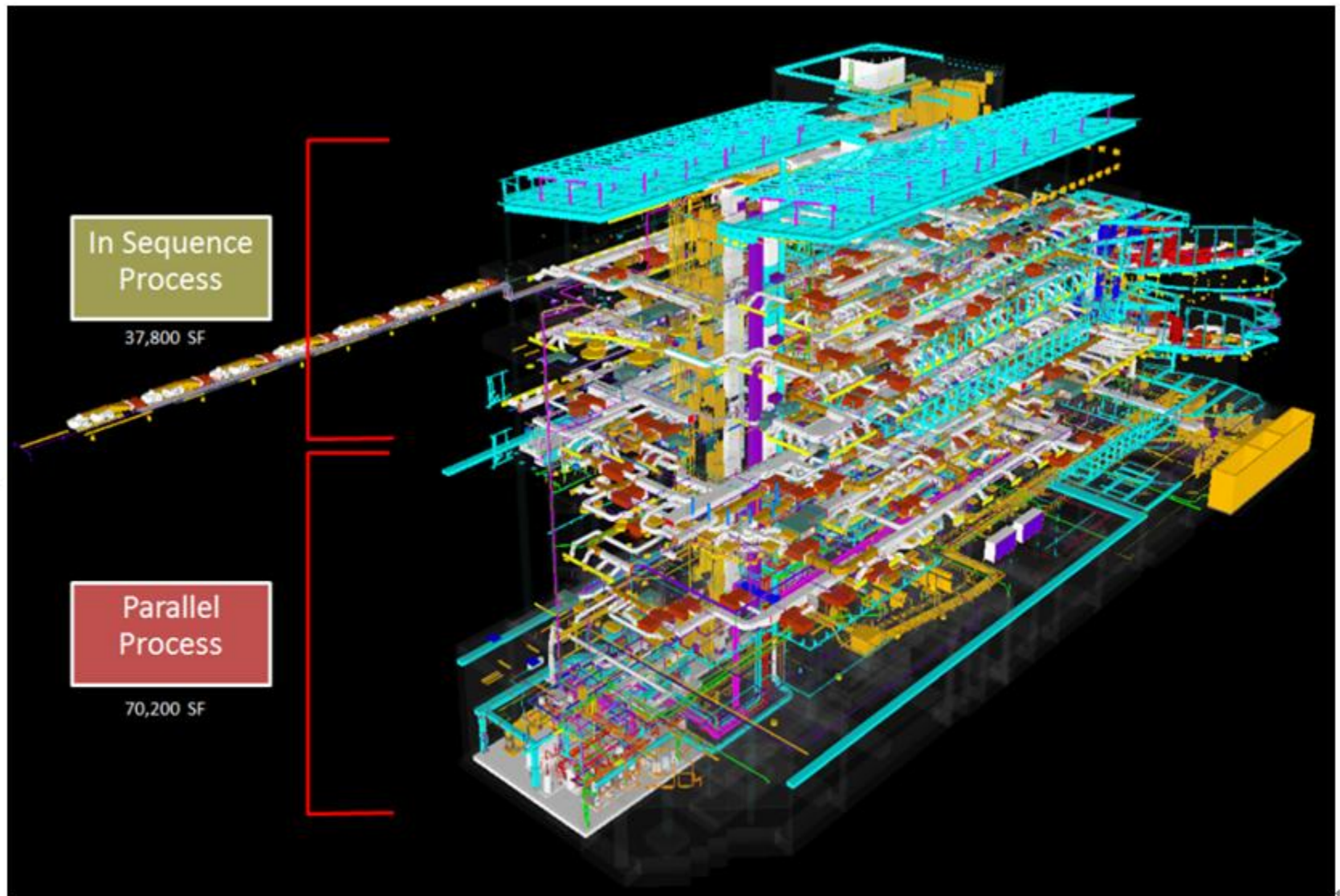# Don't be afraid of being slow in the beginning

Effort, Time

Project Phase

<McLeamy Curve>

Not all BIM projects are successful.

Fig. 3 Two zones coordinated using different MEP coordination strategies

Table 1 Coordination productivity

■

	Parallel Coordination (A)	Sequential Cascading Coordination (B)	A/B
Modeling and Coordination Time	244 days	36 days	6.8
Coordinated Floor Area	7,371 m^2 (79,336 ft^2)	3,884 m^2 (41,807 ft^2)	1.9
Coordination Productivity	**3.31 days / 100 m^2**	**0.93 days / 100 m^2**	**3.6**

Lee, G., and Kim, J. W. (2014). "Parallel vs. Sequential Cascading MEP Coordination Strategies: A Pharmaceutical Building Case Study." *Automation in Construction*, 43(0), 170-179, (doi: http://dx.doi.org/10.1016/j.autcon.2014.03.004).

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Table 2 MEP density of the coordinated areas

	Parallel Coordination	Sequential Cascading Coordination
MEP volume	499 m^3	339 m^3
Plenum space	4,788 m^3	2,611 m^3
MEP density	**10.4 %**	**13 %**

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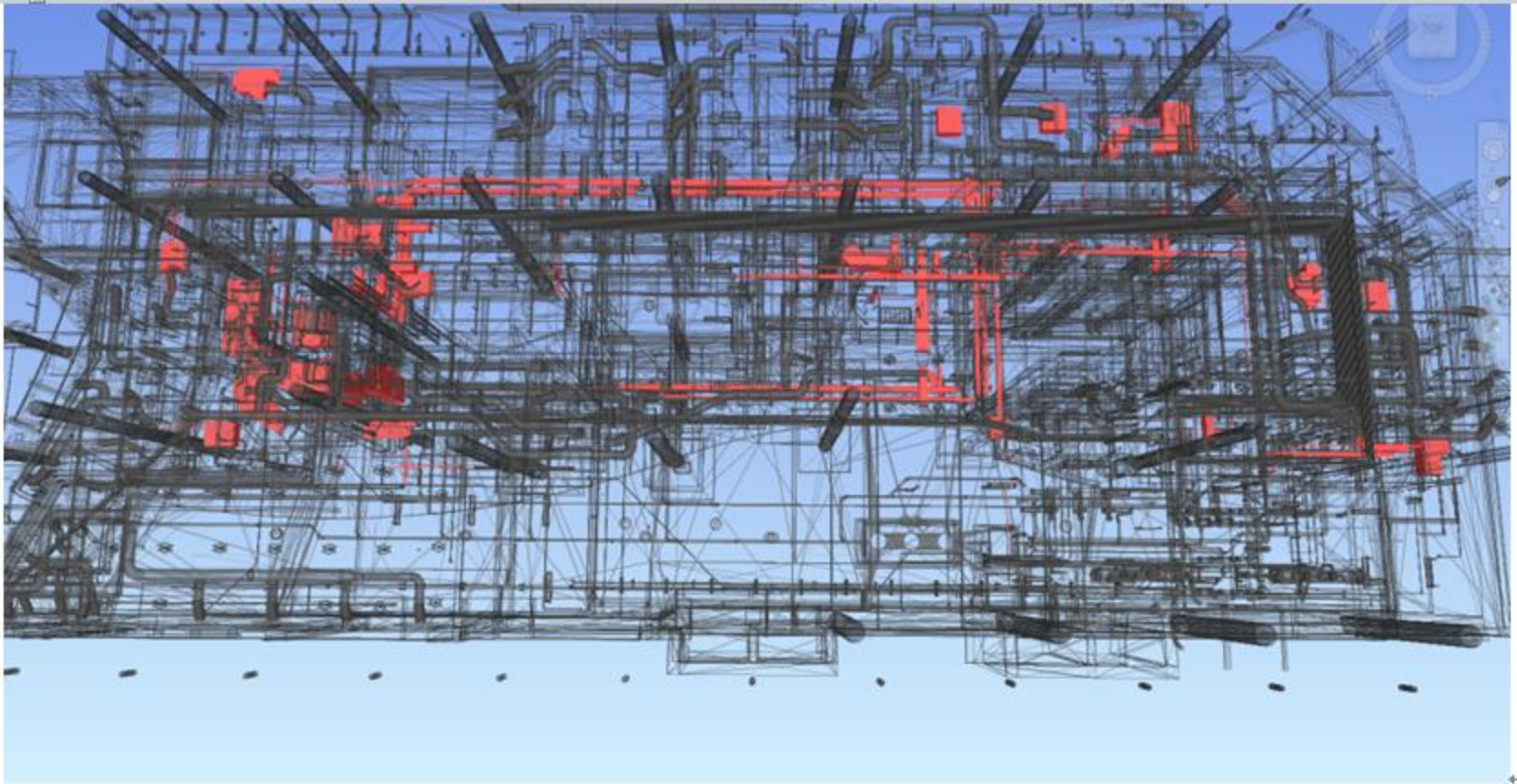연세대학교 건설 IT연구실
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Fig. 4 Result of the first run of clash detection during the parallel coordination process. (Clashes are highlighted in red.)

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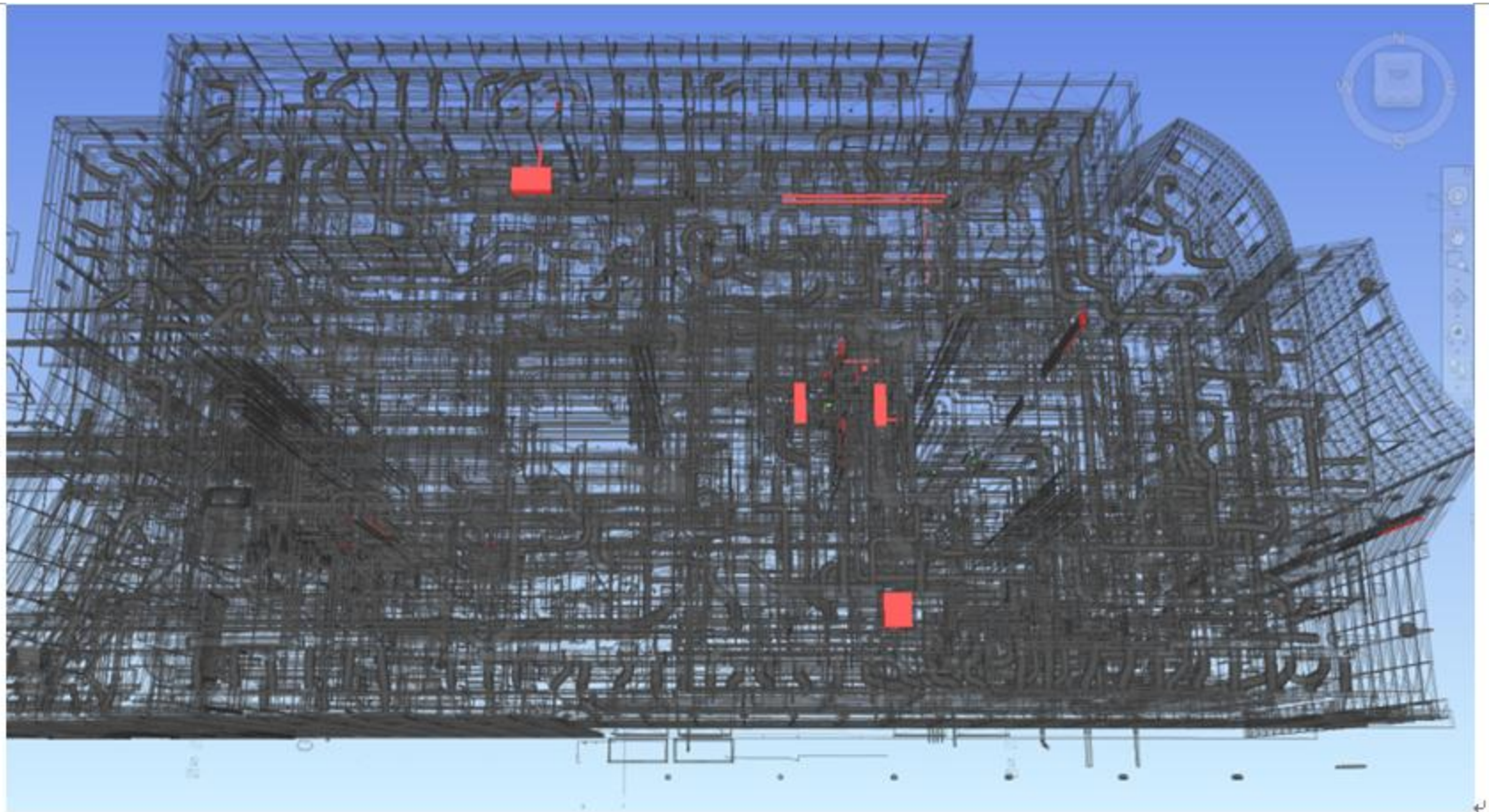
Fig. 5 Result of the first run of clash detection during the sequential cascading coordination process. (Clashes are highlighted in red.)

Lee, G., and Kim, J. W. (2014). "Parallel vs. Sequential Cascading MEP Coordination Strategies: A Pharmaceutical Building Case Study." *Automation in Construction*, 43(0), 170-179, (doi: http://dx.doi.org/10.1016/j.autcon.2014.03.004).
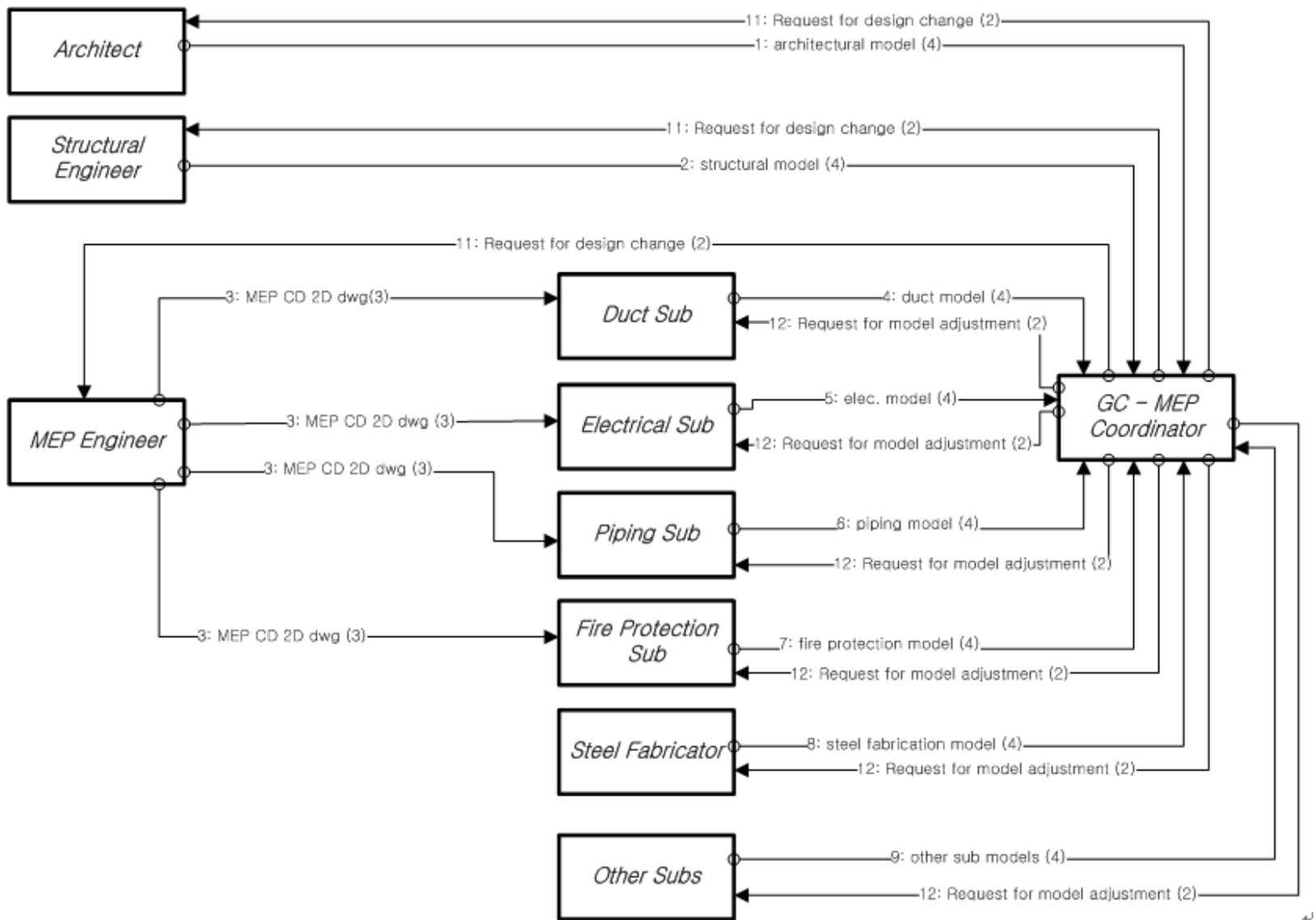
Fig. 7 The DEMA network of the parallel coordination process

Table 3 The DEMA results for the parallel coordination process

From/To	a)	b)	c)	d)	e)	f)	g)	h)	i)	j)	LDE (From)	nLDE (From)
a) Architect				4							4	**6%**
b) Structural Engineer				4							4	**6%**
c) MEP Engineer					3	3	3	3			12	**19%**
d) GC – MEP Coordinator	2	2	2		2	2	2	2	2	2	18	**29%**
e) Duct Sub				4							4	**6%**
f) Electrical Sub				4							4	**6%**
g) Piping Sub				4							4	**6%**
h) Fire Protection Sub				4							4	**6%**
i) Steel Fabricator				4							4	**6%**
j) Other Subs				4							4	**6%**
LDE (to)	2	2	2	32	5	5	5	5	2	2	62	
nLDE (To)	**3%**	**3%**	**3%**	**52%**	**8%**	**8%**	**8%**	**8%**	**3%**	**3%**		**100%**

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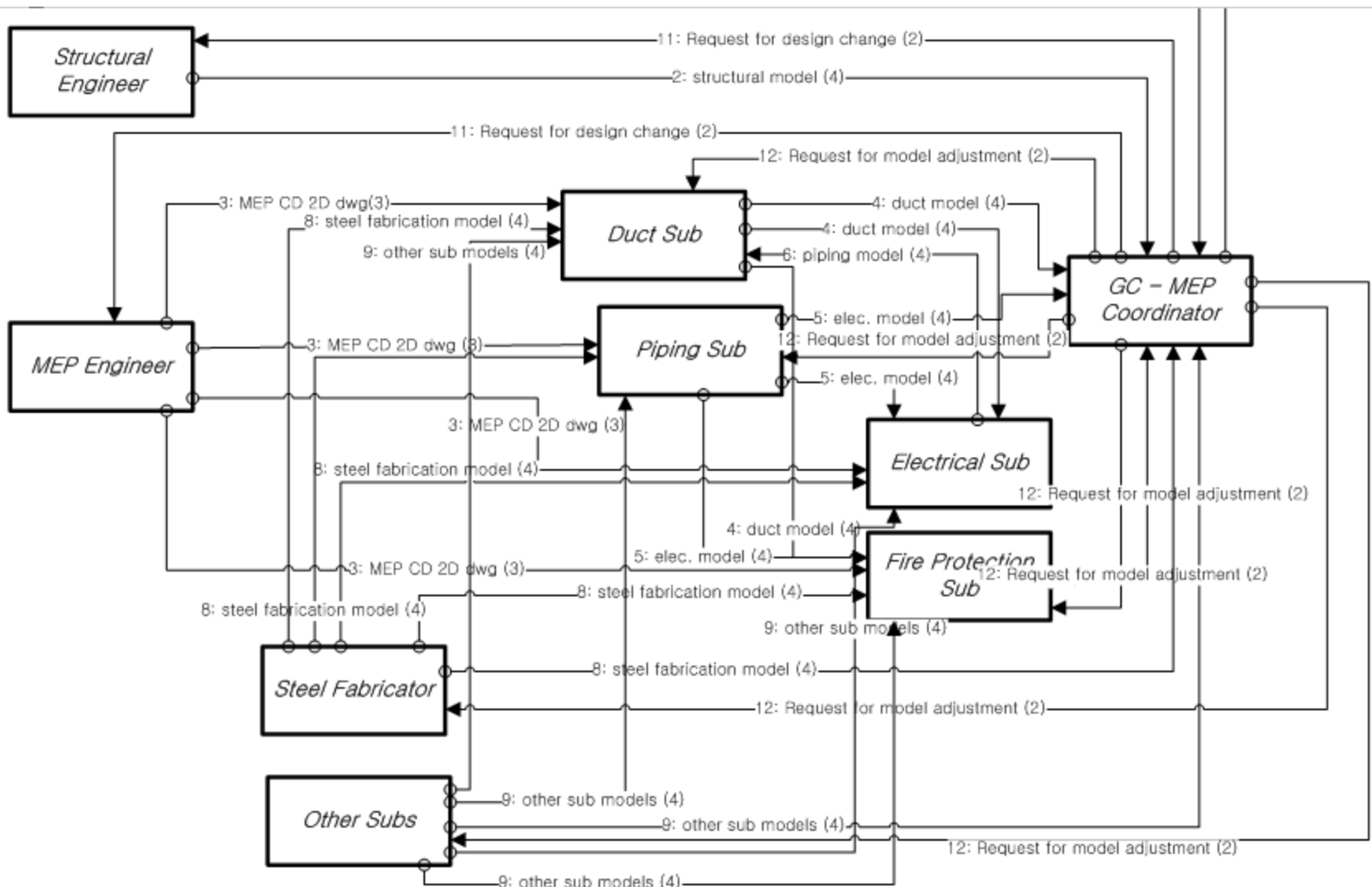YONSEI UNIVERSITY BUILDING INFORMATICS GROUP

Fig. 8 The DEMA network of the sequential cascading coordination process

Lee, G., and Kim, J. W. (2014). "Parallel vs. Sequential Cascading MEP Coordination Strategies: A Pharmaceutical Building Case Study." *Automation in Construction*, 43(0), 170-179, (doi: http://dx.doi.org/10.1016/j.autcon.2014.03.004).

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Table 4 The DEMA results for the sequential cascading coordination process

From/To	a)	b)	c)	d)	e)	f)	g)	h)	i)	j)	LDE (From)	nLDE (From)
a) Architect				4							4	**4%**
b) Structural Engineer				4							4	**4%**
c) MEP Engineer					3	3	3	3			12	**11%**
d) GC - MEP Coordinator	2	2	2		2	2		4	2	2	18	**16%**
e) Duct Sub				4			4	4			12	**11%**
f) Electrical Sub				8			4	4			16	**15%**
g) Piping Sub											0	**0%**
h) Fire Protection Sub				4							4	**4%**
i) Steel Fabricator				4	4	4	4	4			20	**18%**
j) Other Subs				4	4	4	4	4			20	**18%**
LDE (to)	2	2	2	32	13	13	19	23	2	2	110	
nLDE (To)	**2%**	**2%**	**2%**	**29%**	**12%**	**12%**	**17%**	**21%**	**2%**	**2%**		**100%**

Lee, G., and Kim, J. W. (2014). "Parallel vs. Sequential Cascading MEP Coordination Strategies: A Pharmaceutical Building Case Study." *Automation in Construction*, 43(0), 170-179, (doi: http://dx.doi.org/10.1016/j.autcon.2014.03.004).

BIM Project = BIM-assisted project

"Successful" BIM Project = BIM-led project