



ISG*ISARC2012

Describing collaborative working during meetings in construction

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Where innovation starts

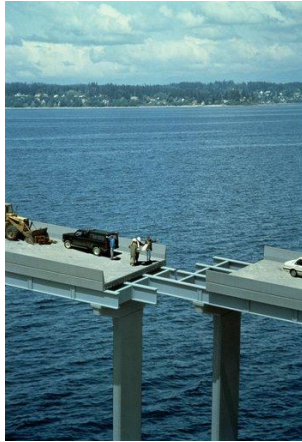
Title abstract:

Describing collaborative working during meetings in construction.

Content:

1. Problem
2. Building Technologies
3. Aim and Method
4. Results
5. To Conclude

Problem



The client and the society do not get the values they want.

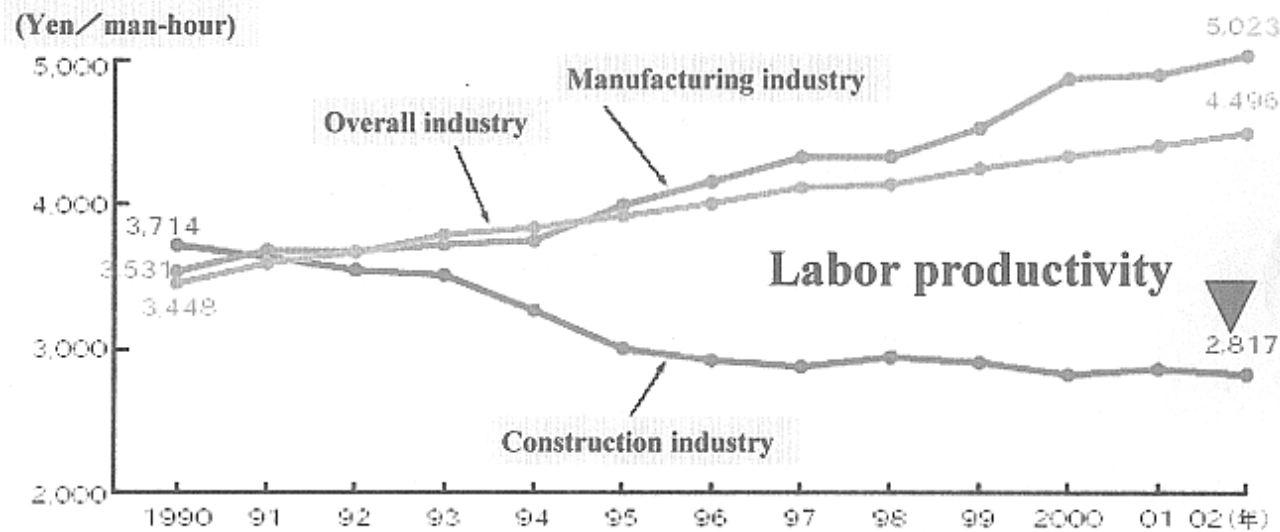
Values clients:

- Profability
- Usability
- Flexibility
- Quality

Values Society:

- Save energy
- Avoid waste and pollution
- Safe working conditions

Problem



"Construction Industry Handbook 2004"
(by Japan Federation of Construction Contractors)

New building technologies to enhance these values for clients and society, such as automation and robotics, do exist, but are not implemented as quickly as desired.

(Hasegawa)

Some concepts:

- Robotizing
- Mechanizing
- Automating
- Modular Building
- Mass Customization
- Pre-fabrication
- Industrial, Flexible and Demountable (IFD) Building
- Creative Meetings

Robotizing, Mechanizing and Automating



Robotizing, Mechanizing and Automating



Automated construction systems



Wabot House



Humanoid robots



Robotizing, Mechanizing and Automating

Mechanization

Some physical tasks → Equipment

Robotization

All physical and cognitive tasks →
Equipment, computers and
communication means

Automation

Some organizing tasks →
Computers and communication
means

Knowledge of:

- Materials
- Construction products
- Ergonomics
- Drive technology
- Machine controls
- Remote control
- Sensors
- Computer/software
- Communication means

Different
expert
designers
working
together

Modular Building



Self supporting modules



Not self supporting modules



Pre-fabrication



Office as
building
part



Bath room
as building
part

IFD Building

Flexible (client)

- Driven by Demand
- Adaptability
- Mass Customisation

Demountable (society)

- Sustainability
- Life Cycle Analyses
- Waste
- Re-use

Industrial (constructor)

- Prefabrication
- Mechanisation
- Robotization
- Dimension control
- Organisation
- Communication

**IFD
Building**

Integrated approach to initiation phase, production and use.



Collaborative Brainpower

Performed by:

- Workers
- Equipment
- Computers and software
- Means of communication
- Collaborative workers



MEETINGS





Project initiation

Awareness, formulation and statement of the needs - vision

Contract

Design

Construction

Use

Organizing
Architectural Meetings

Building Process

Aim research

**To develop a successful approach
for organizing collaborative meetings of the bonding type.**

Collaborative meetings:

A meeting attended by different professionals who make their own design thinking transparent and are able to listen with interest and respect for each other. They are willing to learn from each other.

Bonding type:

Meetings that fulfill a fundamental human need to communicate and bond, and hence foster team relationships. They create a sense of belonging and reflect the collective and cultural values of the temporary project organization.

(Emmitt, 2007)

Three phases;

- Getting insight in the relevant factors of a successful collaborative architectural meeting by desk research.
- Analyzing case studies.
- Developing a research model for meetings.

Meeting processes (1)

Social, Cognitive and Project aspects (Sebastian)

Social (environment, team work, behavior):

- Leadership (Hohn)
- Group interaction (Gorse)

Cognitive (creativity, knowledge decision)

- Learning styles (Kolb)
- Designing is learning (Dorst)
- Unconscious thinking (Dijksterhuis)
- Personality dynamic (Seagal and Horne)

Meeting processes (2)

Project (goal, vision, constraint, result)

- Collaborative design (Kvan)
- Systematic Inventive Techniques (SIT) (Horowitz & Maimon)
- Reformulating the problem (Basadur)
- Phases: naming, framing, moving and reflecting (Valkenburg)
- Phases: forming, storming, norming, performing and adjourning (Robbins)

Found variables

Variables
Date meeting
Use of a plan
Quality of the plan
Location
Aim
Meeting type
Number of participants
Professionalism of the participants
Control of the meeting
Meeting room layout
Type of group working
Duration meeting
Blocks in meeting
Special activities
Tools
Outcome documents
Feedback
Collaborative actions during and after meeting

Analyzing cases:

- IFD Today meetings
- 37 meetings
- Minutes as source

Input variables

Aim of the meeting:

- To learn competences
- To develop vision & mission
- To develop strategies
- To select solutions
- To control construction processes

Use of tools:

- White board
- Pictures and objects
- Collages
- Moodboard

Control:

- No specific person
- Participant
- Facilitator

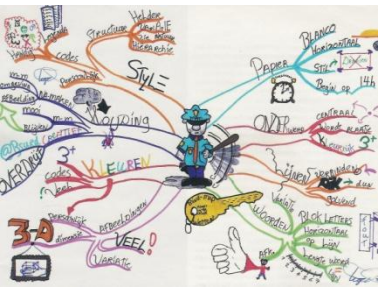
Outcomes:

- How many collaborative actions during meeting
- How many individual actions after meeting
- How many collaborative actions after the meeting

Type of participants:

- Novice expert
- Professionals

Tools

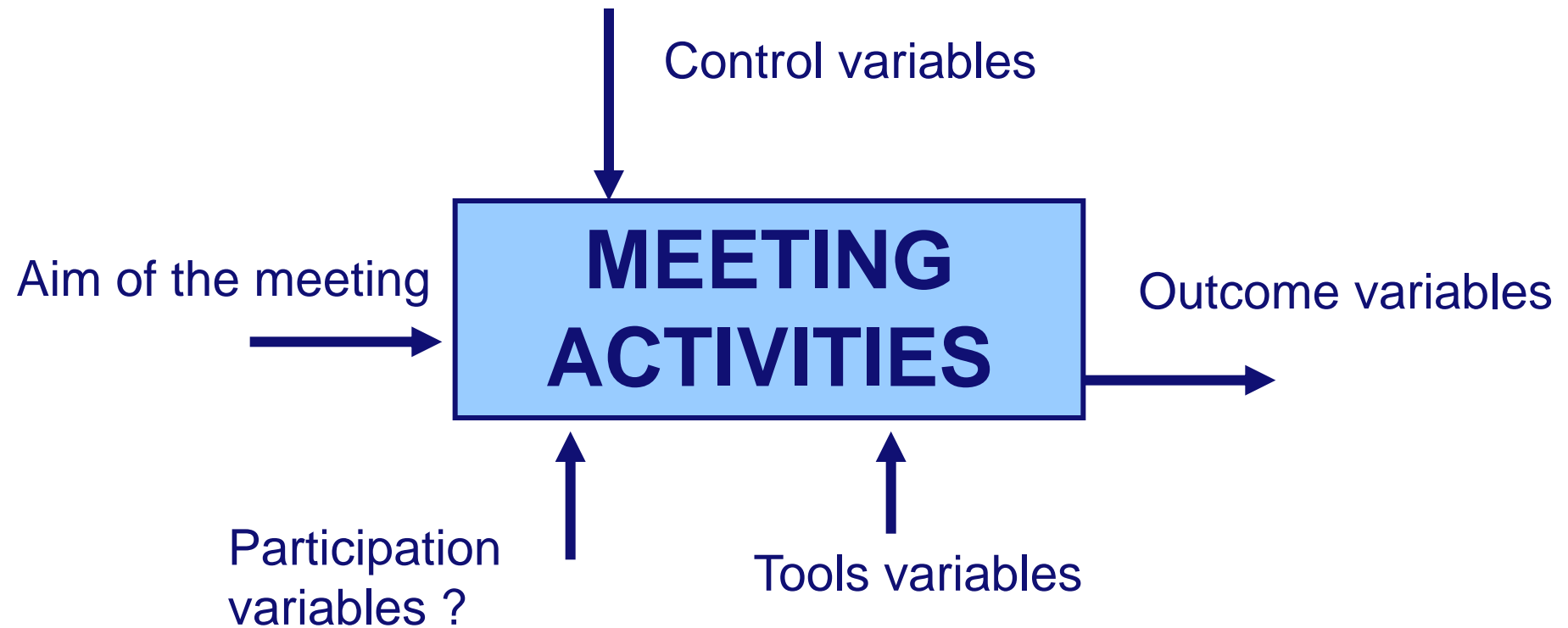


Results

The following active relations were found:

- Meetings with the Aim 'to develop strategies' result in 332% more (collaborative) actions *after* the meeting than meetings with the Aim 'to control construction processes'. N = 36;
- Meetings with the Aim 'to develop strategies' result in 200% more (collaborative) actions *during and after* the meeting than meetings with the Aim 'to control construction processes'. N = 36;
- Meetings with a facilitator result in 278% more (collaborative) actions *after* the meeting than meetings where one of the participants is facilitator. N = 35;
- Meetings with a facilitator result in 266% more (collaborative) actions *during and after* the meeting than meetings where one of the participants is facilitator. N = 35;
- Meetings where to a 'small extent' tools were used result in 612% more (collaborative) actions *during* the meeting than meetings where 'no tools' were used. N = 34;
- Meetings where to a 'small extent' tools were used result in 257% more (collaborative) actions *during and after* the meeting than meetings where 'no tools' were used. N = 34;

Result: meeting model



Questions

Tools variables

- Rational thinking
 - Intuitive thinking
 - Doing
 - Dreaming
 - Reflecting
-
- Individual appeal
 - Small group appeal
 - Plenary appeal



Tools

Systematic variables

