

# **A CONCEPTUAL MODEL TO DETERMINE THE IMPACT OF OFF-SITE CONSTRUCTION ON LABOUR PRODUCTIVITY**

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# AGENDA

- The importance of labour productivity in construction industry
- Conceptual model to describe factors' influence on labour productivity
- Conceptual model to determine the impact of off-site construction
- Conclusions and recommendations

# THE IMPORTANCE OF LABOUR PRODUCTIVITY IN CONSTRUCTION INDUSTRY

- Labour productivity is an important indicator in construction industry.
- Construction industry is lacking behind other industries in labour productivity.
- But how can companies increase their labour productivity?

$$Productivity = \frac{output}{input}$$

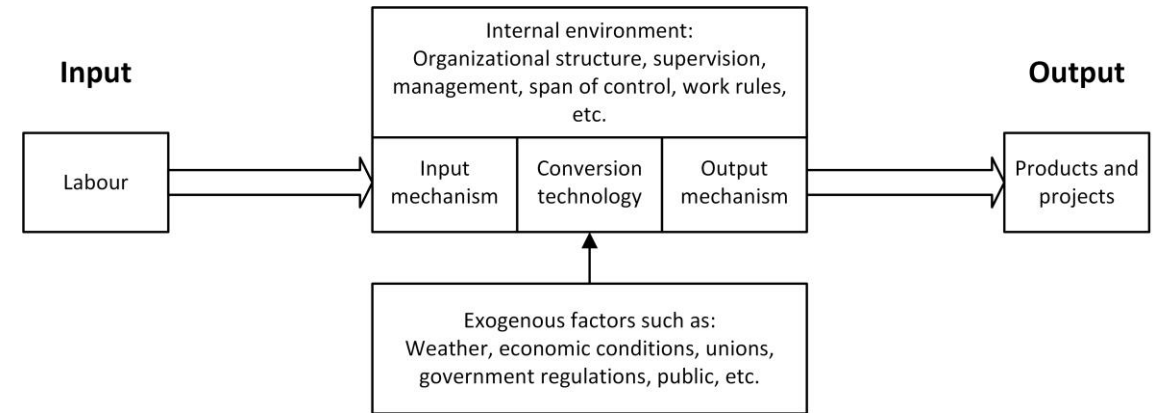
$$Labour\ productivity = \frac{output}{work\ hour}$$

# HOW TO INCREASE LABOUR PRODUCTIVITY?

1. Identify factors that influence labour productivity.
2. Design intervention for improvement.

Goals of this study:

1. Elaborating the model of Drewin
2. A conceptual mode to determine the impact of off-site construction on labour productivity.



**Figure 1.** Conceptual model for labour productivity (Drewin 1982)

# CONCEPTUAL MODEL TO DESCRIBE FACTORS' INFLUENCE ON LABOUR PRODUCTIVITY

- 13 studies that list factors and report cause and effect relations.
  - 90 factors affecting construction labour productivity
  - More than 100 causal links
- Four primary groups:
    - External factors
    - Management factors
    - Labour factors
    - Material and equipment factors

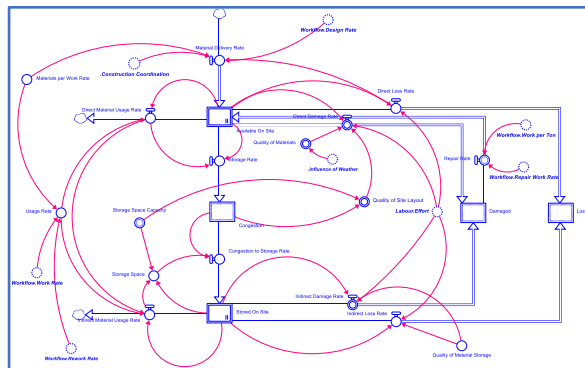


Figure 2. Materials and equipment

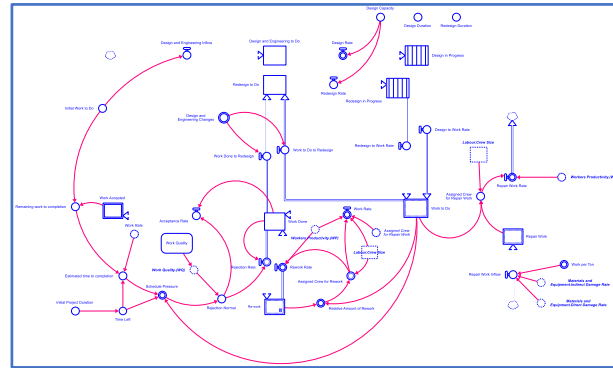


Figure 3. Construction process

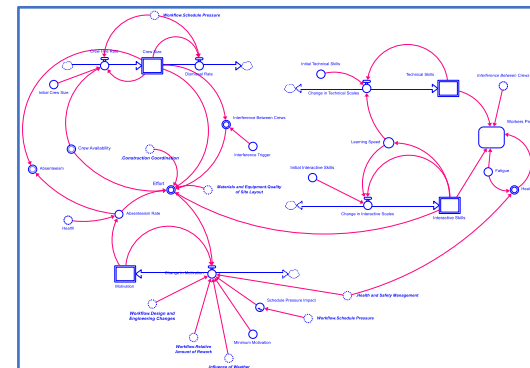


Figure 4. Labour

# CONCEPTUAL MODEL TO DESCRIBE FACTORS' INFLUENCE ON LABOUR PRODUCTIVITY

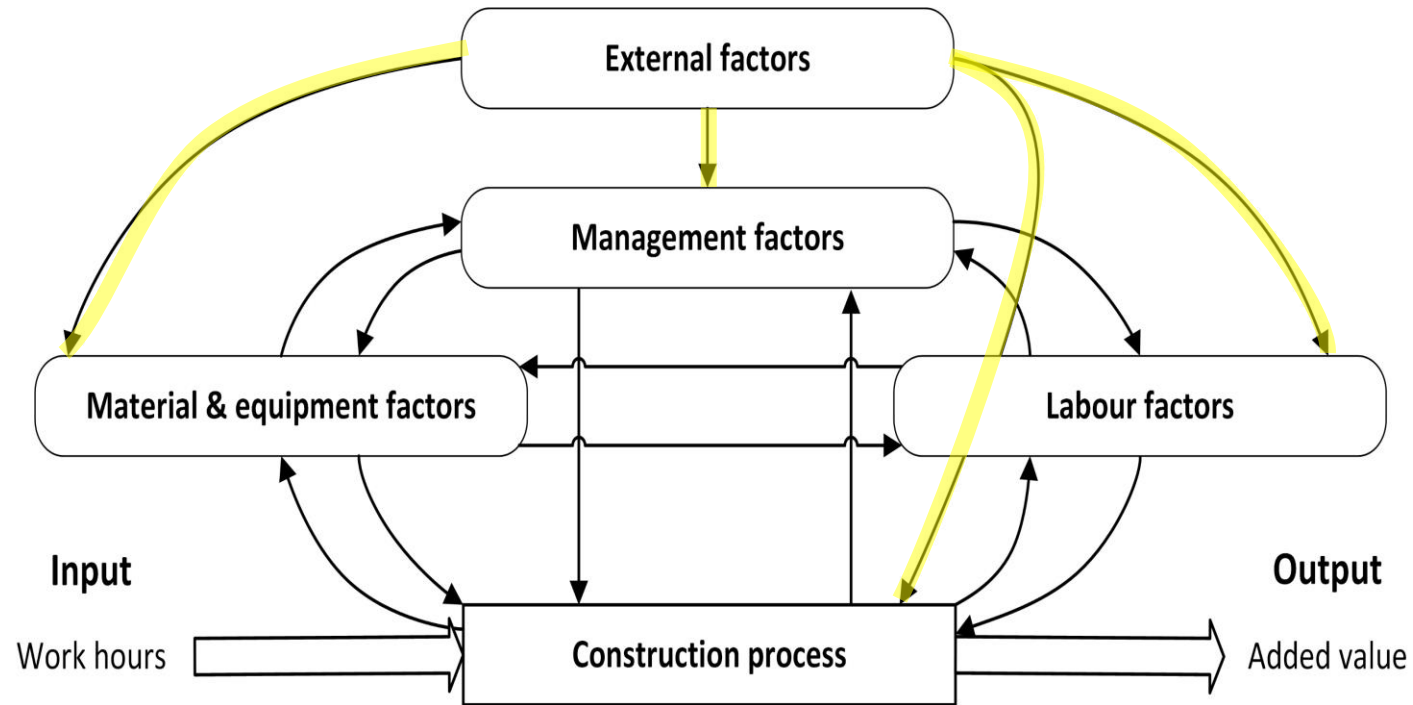
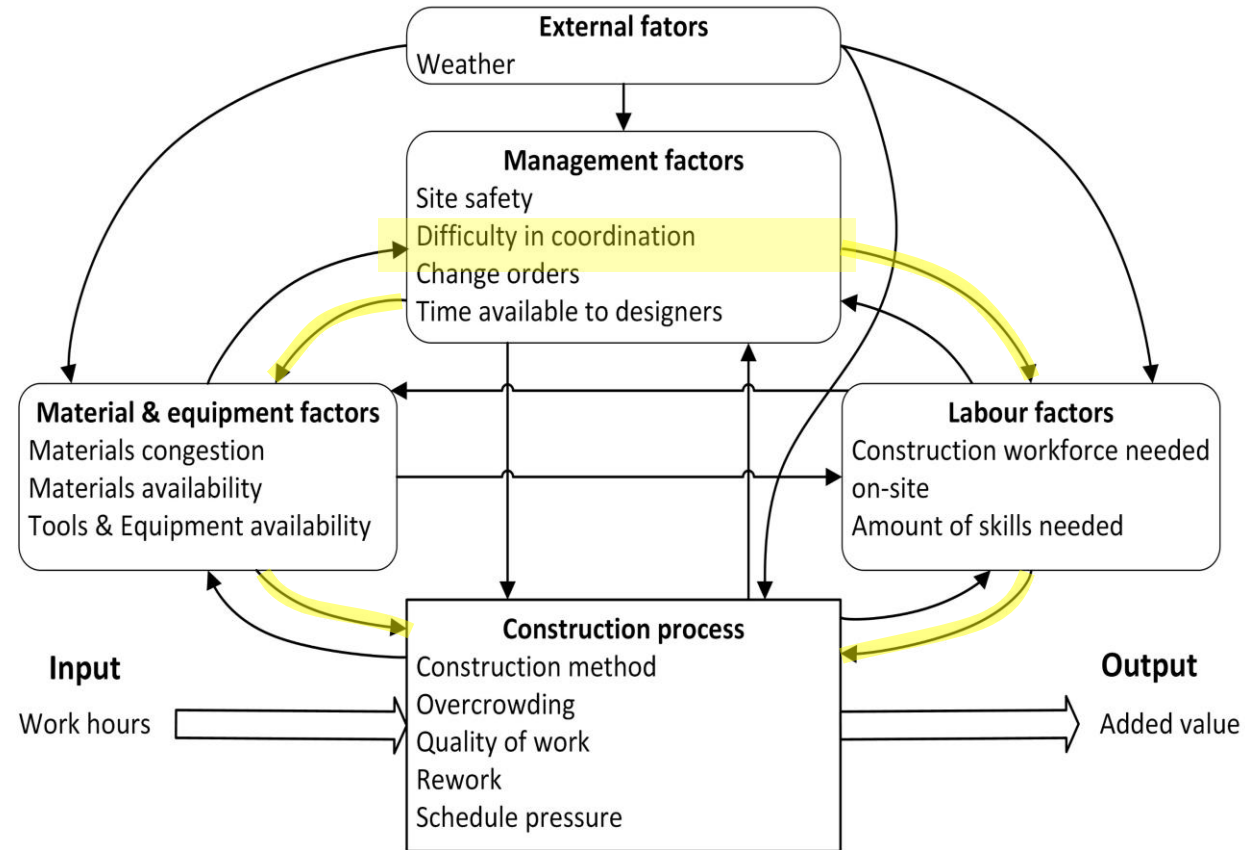


Figure 5. Conceptual model for factors influencing construction labour productivity

# CONCEPTUAL MODEL TO DETERMINE THE IMPACT OF OFF-SITE CONSTRUCTION

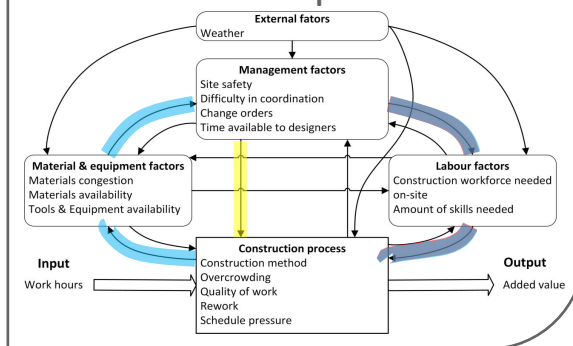


**Figure 6.** Conceptual model for determining the impact of off-site construction on labour productivity

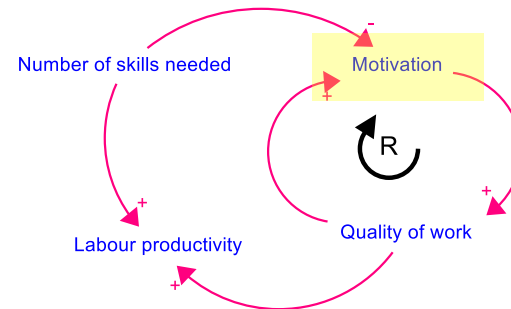
# CONCLUSIONS AND RECOMMENDATIONS

The 15 factors will affect construction process through:

1. direct cause effect relations,
2. indirect cause effect relations, and
3. causal loops



Future experiments has to focus on 15 factors, labour productivity **and** intermediate factors.



## Recommendations

1. Verify the results for specific projects under specific circumstances.
2. Create a mathematical model based on conceptual model.
3. Test the model with empirical data.



**THANK YOU!**

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