Laura Pinfold

Department of
Construction
Management and
Quantity Surveying
INNOVATIVE PRACTICES FOR EFFECTIVE MANAGEMENT OF BUILDING PRODUCTION PROCESSES WITHIN URBAN CENTRES

STATEMENT OF RESEARCH PROBLEM

Construction firms are not innovative or dynamic when it comes to improving building production processes. This is problematic as the success of building construction in urban centres hinges upon the ability of the construction firm to be strategic, which is to know better than others, what direction to go in, what risks to take, the available resources and capabilities to develop in order to fulfil some planned goal.
RESEARCH QUESTIONS

**What strategic** building production processes are currently being employed in urban centres?

**How effective** are current building production processes in urban environments?

What strategies can be used to **mitigate weakness** in current building production process in urban centres?

**How can construction** firms be effectively managed within urban centres?
RESEARCH METHODOLOGY

Mixed method —
  – structured quantitative questionnaires, closed ended questions
  – qualitative interview, open ended questions

• Non-probability sampling and snowball sampling were used

• Consulting firms were used as a case study

• Experience respondents within construction industry
  Cape Town, South Africa
Personnel in close proximity to plant

Difficult to facilitate movement of plant on site

Health and safety issues due to the movement of plant and materials

Lack of space on site

Lack of space on site

Large amount of plant on site

Difficult to facilitate the various contractors on site

Overcrowding

Increased congestion on site

Review space assigned on site

Consult contractors on site

Consult external stakeholders

Try to segregate personnel from high risk activities

Revise the method of construction

Co-ordinate management issues

Increased resource management

Review work packages

Consult the programs of works

Monitor and control personnel movement on site

Difficult to coordinate movement of personnel on site

Implement strategies to mitigate issues

Consult the contractors on movement of personal on site

Revise the sequence assigned to work packages

Difficult to program the works

Project programming issues

Increase personnel management

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LITERATURE REVIEWED

• **Space management on a congested construction site is a key issue.** (Tommelein and Zouein (1993) and Sawacha et al. (1999) in Spillane et al (2011: p143)

• **Innovation using enhanced LAT to improve building processes and to support important decision-making tasks in the field is important.** (Yun-Yi Su 2010:1)

• **LAT is pertinent to decision making, tracking progress and safety.** (Razavi et al. 2012:239)

• **Indoor LAT’s are rapidly becoming a reality for construction practices; radio frequency identification (RFID) is being widely used for this application.** (Razavi et al. 2012:239)
LITERATURE REVIEWED (cont.)

• **Location technology has vast potential to assist with data collection on confined construction sites in urban areas.** Tracking and monitoring has many advantages on a confined construction site. **It can assist in operation and critical decision making, materials management and productivity tracking** (Razavi et al. 2012:239)

• **Remote sensing and monitoring personnel in real-time can improve construction safety by warning equipment operators and personnel on foot of a potential risk.** Cavanaugh and Amendolare (2010), Schiffbauer (2001), Teizer et al. (2008, 2010) and Zhang et al. (2009), cited in Razavi et al. (2012).

• **Importance of timely and accurate feedback information which describes actual operational data on the construction site.** Yun-Yi Su (2010:7)

• **Building Information Modelling (BIM) as a major innovative technology that can mitigate problems of interoperability and information integration.** Isikdag et al, (2008).
PRELIMINARY FINDINGS

Respondents were asked questions concerning:

The proximity of personnel to plant, overcrowding, communication, the start/stop nature of work, productivity, resource management, storage of materials, movement of materials, negative stakeholder response, air pollution, noise pollution and access.

• Respondents were in agreement that congested construction sites pose the following challenges:
  – **personnel in close proximity** to construction hazards
  – **problem of storage of materials** on site
  – **overcrowding** – plant, materials and personnel

• Respondents did not agree that the following poses a problem specifically on a congested construction site:
  – air pollution
  – communication
  – reduced productivity – difficult to measure
THE SURVEY

• Consultants who are involved in building construction in the Cape Town CBD were interviewed, mostly geomatics engineers who specialise in the use of LAT, BIM and other new technologies.

• Some of the construction consultants have used this technology for certain aspects of construction; **no comprehensive investments have been made on any of the projects in this respect.**

• However, **the prospect of using this technology in the future was positively expressed** by the respondents.
RESULTS

• The logistical costs of employing this technology is a major factor influencing the willingness of construction firms to use Location Awareness Technology (LAT).

• Respondents were unanimous that BIM is an important technology for building construction projects.

• BIM would be useful for programming, construction sequencing and would reduce mistakes on sites.

• Respondents felt that construction managers see BIM as futuristic, referring to it as ‘digital engineering’

• One respondent stated that South African engineers are up-to-date and are contributing to the development of BIM internationally.
RESULTS (cont)

• The suggestion of incorporating cloud storage in BIM was received enthusiastically and respondents agreed that laser scanners are becoming more practical on construction sites.

• Respondents felt digital engineering should be encouraged at universities so as to produce industry leaders in this regard.

• Respondents were excited about LAT on construction sites.

• A general comment was that the future of location technology lies in the combining of technologies on site.
Thank you