

Productivity-driven Cloud-based Document Management in the Construction Industry: Benefits, Current Practice, Gaps and Improvement Measures



FSD HDR Built Environment (BE) Hub

RESEARCH SEMINAR SERIES [INAUGURAL]

17 May 2021

BLD01A-I-23

FSD HDR Research Collaborative Space

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AGENDA

1. Need for the Study / Research Problems

2. Research Aim

3. Research Questions

4. Research Objectives

5. Further Literature Reviews

6. Theoretical Framework

7. Research Method

8. Stages of Data Gathering

9. Research Process Flowchart

10. Data Gathering Instruments

11. Interview Questions

12. Method of Data Analysis

13. Research Hypotheses - SEM - 01

14. Research Hypotheses - SEM - 02

15. Research Progress Plan

16. Platforms for Project DM

17. Conclusion

RESEARCH PROBLEM 01

01 Existing DM* Issues in the Industry

Disputed contractors' claims due to insufficient documentation.

(Source: Abbasi, O. et al., 2020 & Tillmann, A., 2018).

Cost overruns due to poor tracking of expenditure records against budget.

(Source: Li, H., 2014, Mahamid, I., 2016)

Poor tracking of approved VOs* resulting in cost implications.

(Source: Senouci, A., Alsarraj, A., Gunduz, M., & Eldin, N., 2017)

Time overruns due to poor tracking of progress against baselines.

(Source: Babaeian Jelodar, H., 2021)

High cost of defective works due to poor quality assurance document control.

(Source: Love, L., 2000, Paton-Cole et al., 2020, Sunday, A., 2013)

*VOs: Variation Orders

*DM: Document Management

RESEARCH PROBLEM 02

02 Insufficient Research/Knowledge Gaps

Little research on the current practice gaps and improvement measures

(Source: Lingard, Wakefield & Walker; 2020)

Available research on DMS* relates to offshore context: little relevance to local context

(Source: Osgar, J., 2017)

Previous studies are outdated; new and emerging issues related to the topic need to be explored

(Source: Guo, F., Jahren, C., & Turkan, Y., 2021)

[Others to be identified during the fieldwork]

RESEARCH PROBLEM 03

03 Need to narrow the below knowledge gaps

Insufficient research on perceived benefits, current practice, gaps & improvement measures relating to CBDM*

(Source: Jin H, Cheng W. et al., 2021)

Need to take into consideration the socio-cultural, economic, contractual and regulatory environment unique to Australia

(Source: Osgar, J., 2017)

Need to prioritize and highlight 20% of the findings that contribute to 80% of the issues.

(Source: Thomas J Monroe, & Mario G Beruvides., 2018)

[Others to be identified during the fieldwork]

RESEARCH AIM

Perceived benefits, current practice, best practice gaps, and improvement measures relating to CBDM* in the construction industry.



RESEARCH QUESTIONS



1. What are the key benefits of efficient DM* in the construction industry?



2. What are the existing gaps between current DM practices and best practice procedure?



3. How could existing DM practices be improved?



4. What are the current platforms utilised by construction firms for project DM?

RESEARCH OBJECTIVES

01

To explore the key benefits of efficient DM* in the construction industry.

02

To compare current industry DM practices against best practice procedures.

03

To identify and validate DM improvement measures

04

To investigate the current platforms for project DM in the construction industry.

FURTHER LITERATURE REVIEWS: 01 CURRENT & EMERGING INDUSTRY DM* PRACTICES



Document Control Phases

1. Document storage
2. Document classification
3. Document revisions
4. Document transmittals

(Al Qady, K., 2013)



Evolving digitalisation and automation: key drivers

1. Improved agility / responsiveness
2. Productivity improvement
3. Safety enhancement
4. Improved sustainable practices
5. Improved bottom line

(Sotiroski, K., 2007)



Best practice RM*: Key benefits

1. Quick accessibility of records
2. Real time document sharing
3. Better adherence to ISO 9000 standards

(Alshibly, H., Chiong, R., & Bao, Y., 2016)



Re-engineering processes for cloud-based BIM in construction

1. Real time progress management
2. Greater stakeholder collaboration
3. More effective data-driven decision making
4. On-time project completion

(Matthews et al., 2015)

LITERATURE REVIEWS (CONTINUED):

02 KEY BENEFITS OF DM* IN THE CONSTRUCTION INDUSTRY



Web-based DM* & Communication Tools Benefits

1. transparency of work
2. less document duplication
3. simpler collaboration

(Rozman, T., Stjepanović, T., & Raspor, A., 2017)



EDMS* Benefits

1. saves time
2. efficiently locate, distribute & modify documents
3. Saving on labour

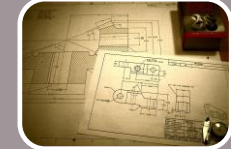
(Sotiroski, K., 2007)



Wider EDMS Benefits

1. Productivity Improvements
2. Improved cash flow
3. Improved information sharing
4. Cost cutting
5. Error minimisation

(Alshibly, H., Chiong, R., & Bao, Y., 2016)



Specific EDMS benefits for construction SME's

1. improved overall worker performance
2. Enhances communication
3. enhances efficiency & productivity

(Lazaro-Aleman, W., et al., 2020)

*DM: Document Management

*EDMS: Electronic Document Management Systems

LITERATURE REVIEWS (CONTINUED): 03 KEY BENEFITS OF DM* (CONTINUED)



Impact on Workflows

1. Efficient Workflows
2. Improved Efficiency
3. Remote Data Access

54 Audit Trail

(Guo, F., Jahren, C. T., & Turkan, Y., 2021)



Impact on Transparency

1. Faster task completion
2. Greater Transparency
3. Increase in product quality
4. Easier amendments of records

(Aydinli, S., & Oral, E., 2017)



Impact on Record Management

1. Eliminates duplication of data
2. Share data across different platforms
3. Retention of a knowledge base
4. Enhances Transparency
5. Decrease in information loss

(Pappel, I., Butt, S., Pappel, I., & Draheim, D., 2021)



Impact on decision & risk management

1. Better management decision-making
2. Reduction of operation costs
3. Improved efficiency and productivity
4. Minimising litigation risks

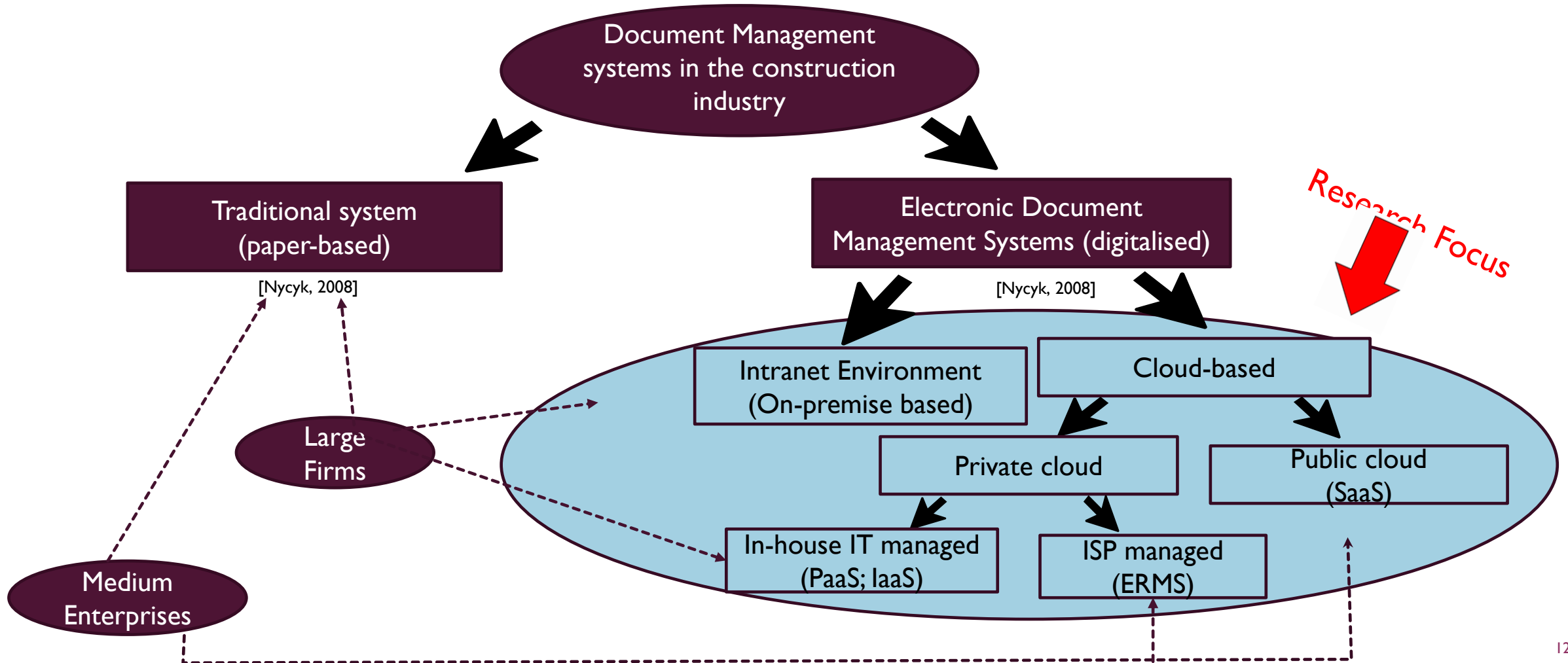
(Nengomasha, C., & Chikomba, A., 2018)

*EDMS: Electronic Document Management Systems

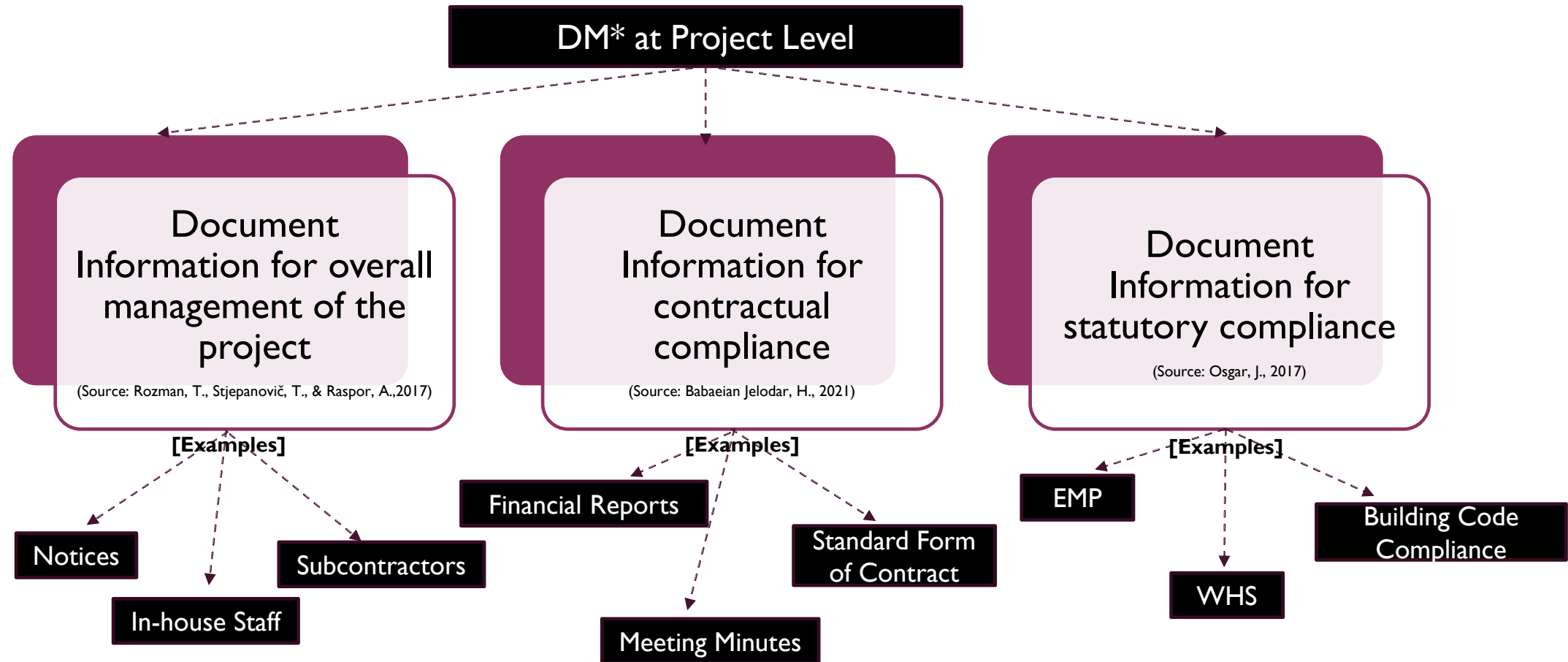
*EDRMS: Electronic Document & Record Management Systems

LITERATURE REVIEWS (CONTINUED)

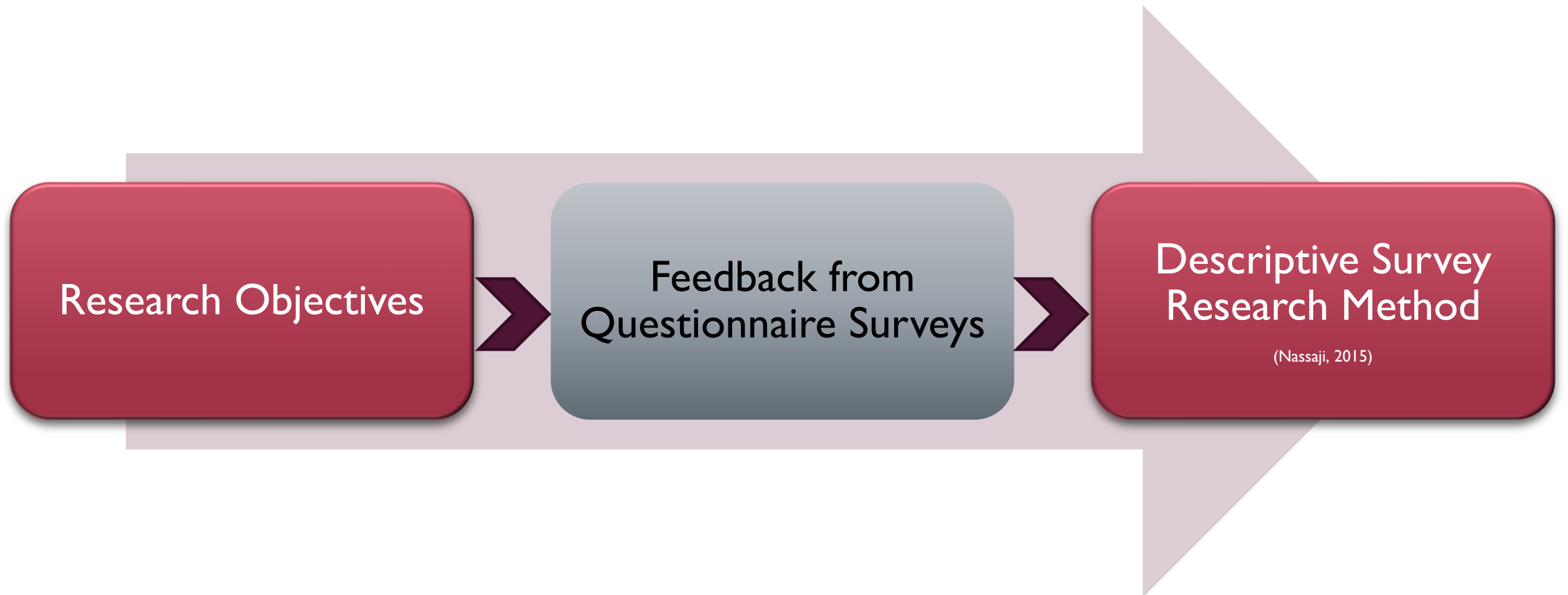
04 CURRENT PLATFORMS FOR PROJECT DM* IN THE CONSTRUCTION INDUSTRY

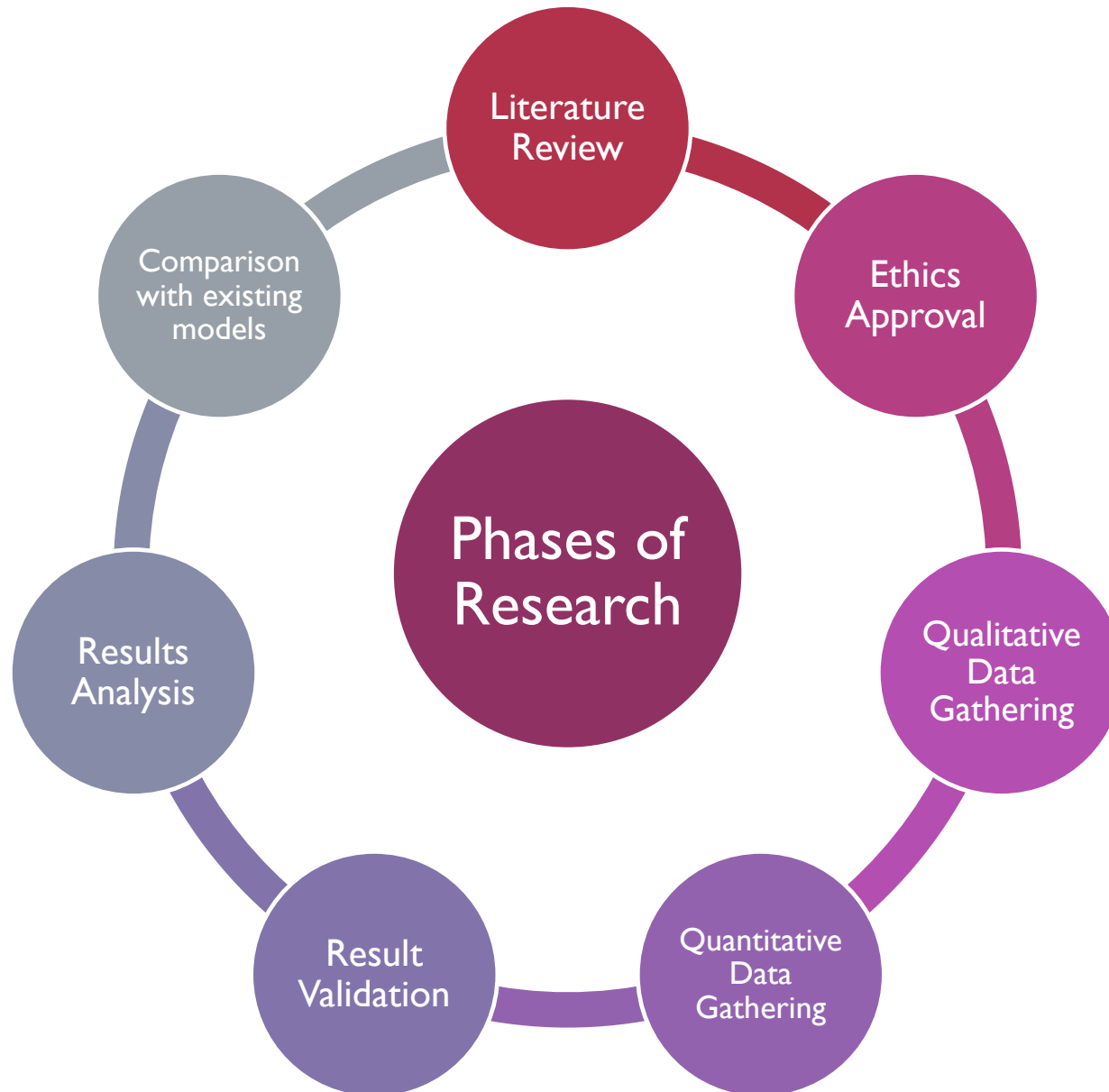


THEORETICAL FRAMEWORK



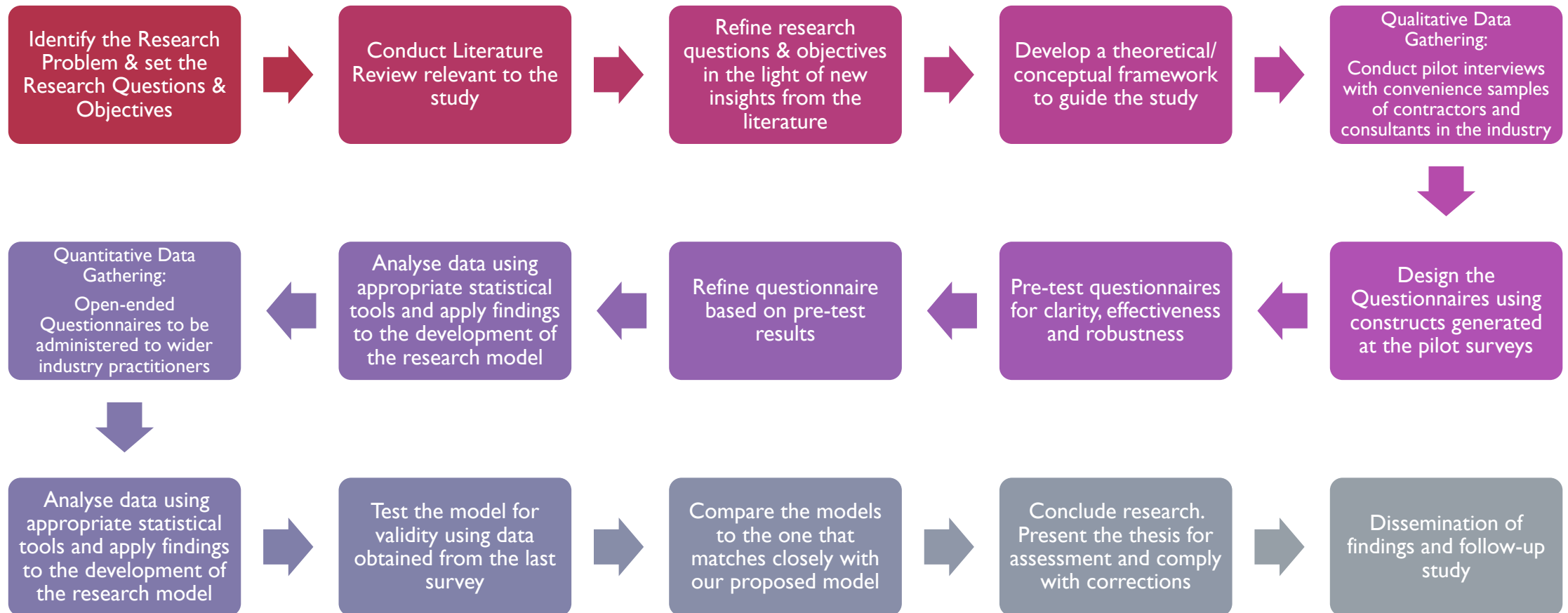
RESEARCH METHOD



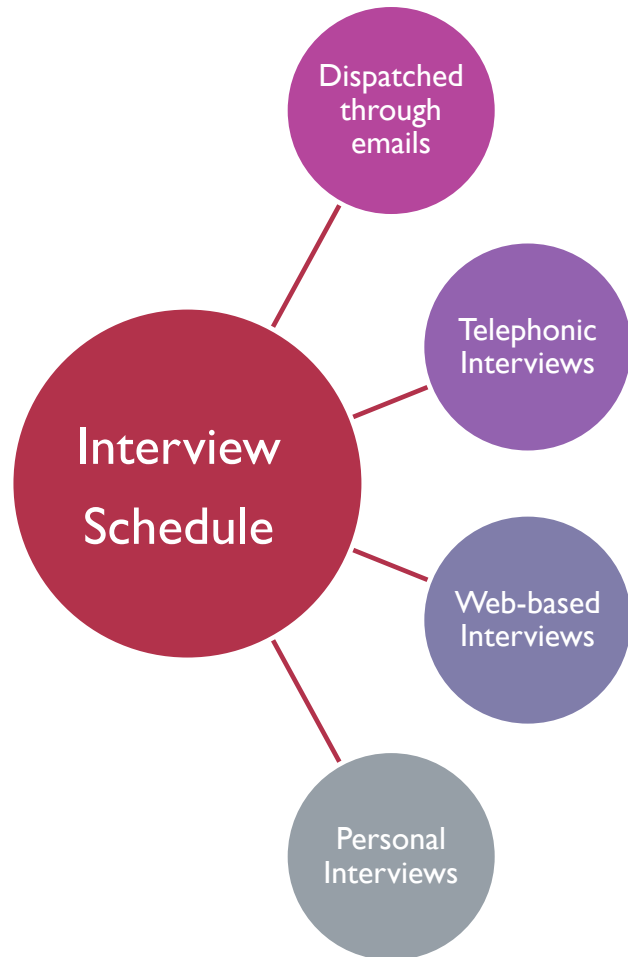


STAGES OF DATA GATHERING

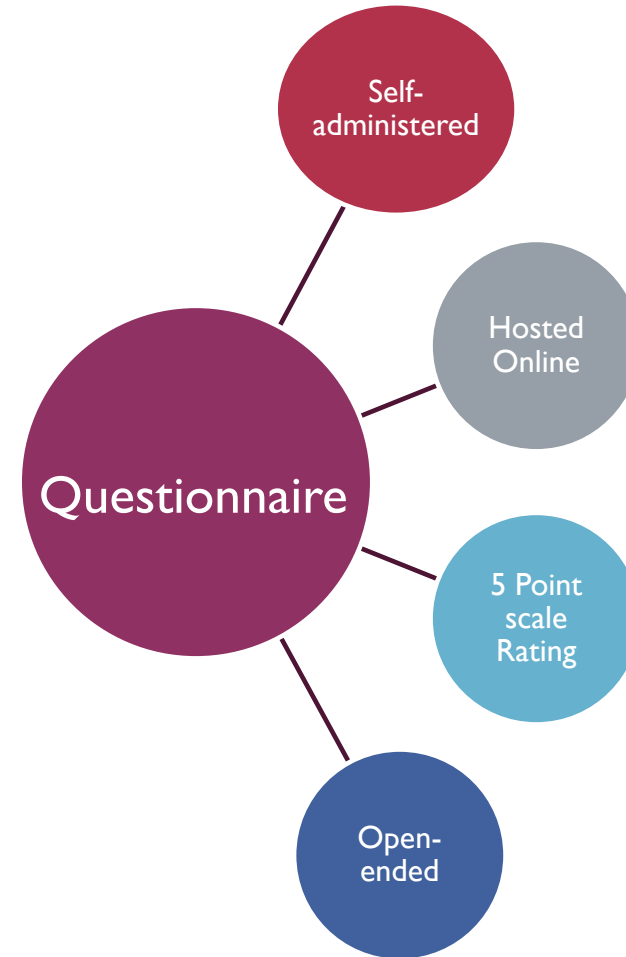
RESEARCH PROCESS FLOWCHART



DATA GATHERING INSTRUMENTS



Qualitative Data Gathering



Quantitative Data Gathering

INTERVIEW QUESTIONS

01

What are the key benefits of efficient DM* in the construction industry?

02

What are the key issues in the existing DM practices and how could the practice be improved?

03

What are the current platforms used by construction firms for project DM?

QUESTIONNAIRE: SECTION A - MAIN QUESTIONS

01

Key benefits of efficient DM in the construction industry.

02

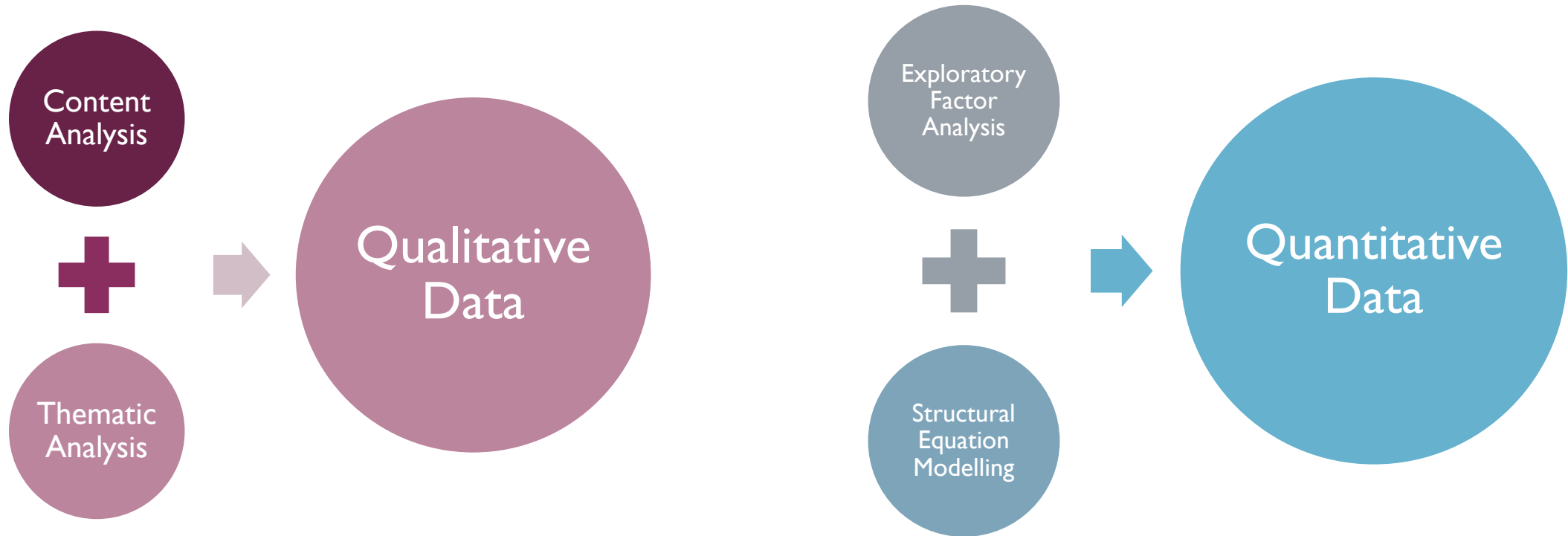
Current DM practices and platforms used by construction firms for project DM.

03

Ways of improving the existing DM practices in the construction industry.

Identified constructs will be rated using a 5-point Likert rating scale

METHODS OF DATA ANALYSIS



RESEARCH HYPOTHESES - SEM-01: *CBDM PLATFORM AND BEST PRACTICE *DM AS CONSTRUCTS THAT COULD HELP TO MAXIMISE BENEFITS OF CBDMS

H1

H1: Use of an appropriate online information & data management platform could maximise the benefits of *CBDM system for a construction firm (Alfred, R., Lim, Y., Havaluddin, H., & On, C., 2020)

H2

H2: Adopting best practice approach in *DM could maximise the benefits of *CBDM system for a construction firm (Bhoyar, R., Chopde, N., 2013)

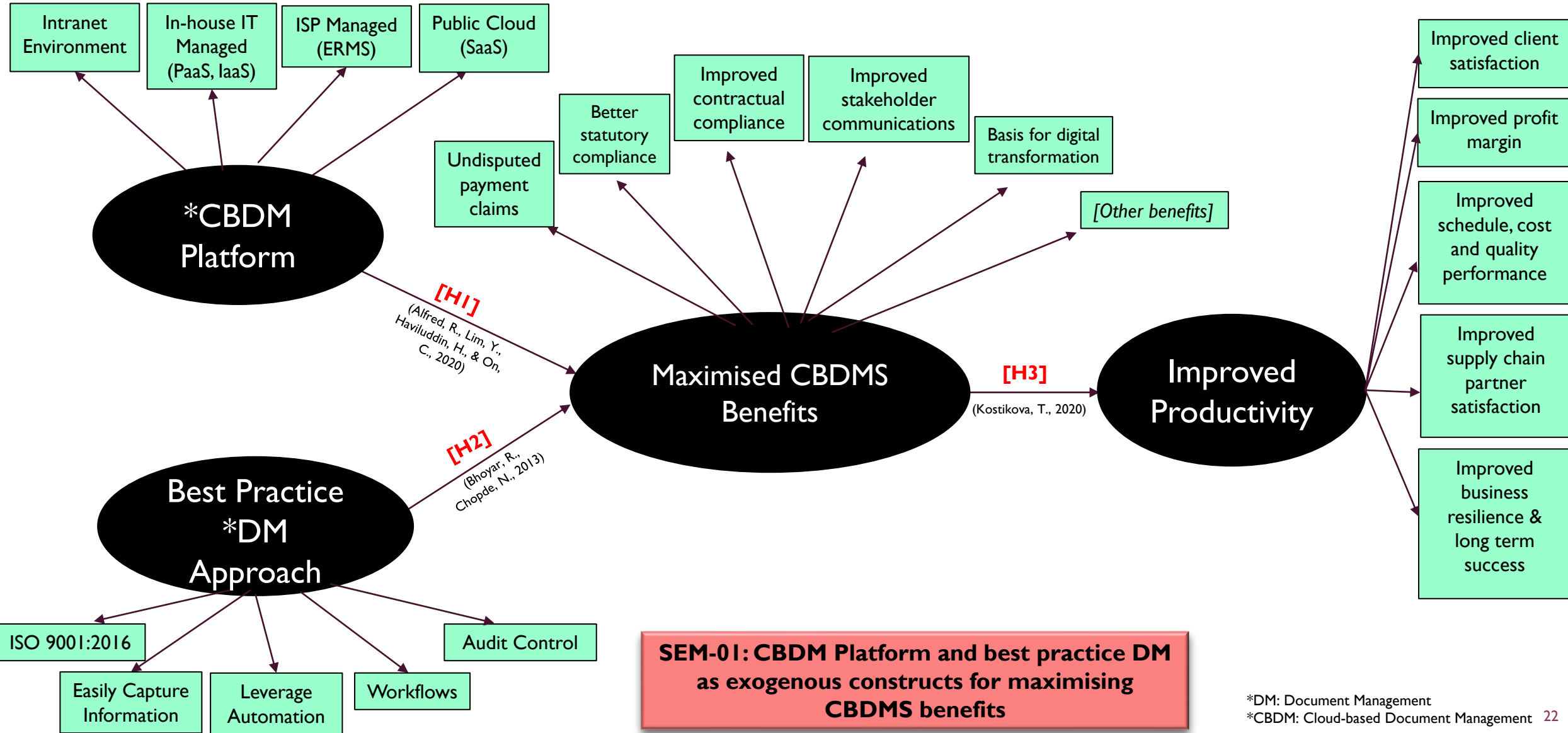
H3

H3: Maximized benefits of *CBDM system could contribute to enhanced productivity of construction firms (Kostikova, T., 2020)

*DM: Document Management

*CBDM: Cloud-based Document Management

Hypothesis-based Structural Equation Model - 0I for Data Analysis



RESEARCH HYPOTHESIS - SEM-02: *CBDM PLATFORM AND BEST PRACTICE *DM AS MEDIATING CONSTRUCTS IN THE CASUAL RELATIONS BETWEEN *CBDMS AND PRODUCTIVITY OF A CONSTRUCTION FIRM

H1

H1: Maximized benefits of *CBDM system could contribute to enhanced productivity of construction firms (Kostikova, T., 2020)

H2

H2: Use of appropriate information management platform **as a mediating variable** could enhance the contribution of maximised benefits of *CBDM system to improved productivity of a construction firm (Alfred, R., Lim, Y., Havaluddin, H., & On, C., 2020)

H3

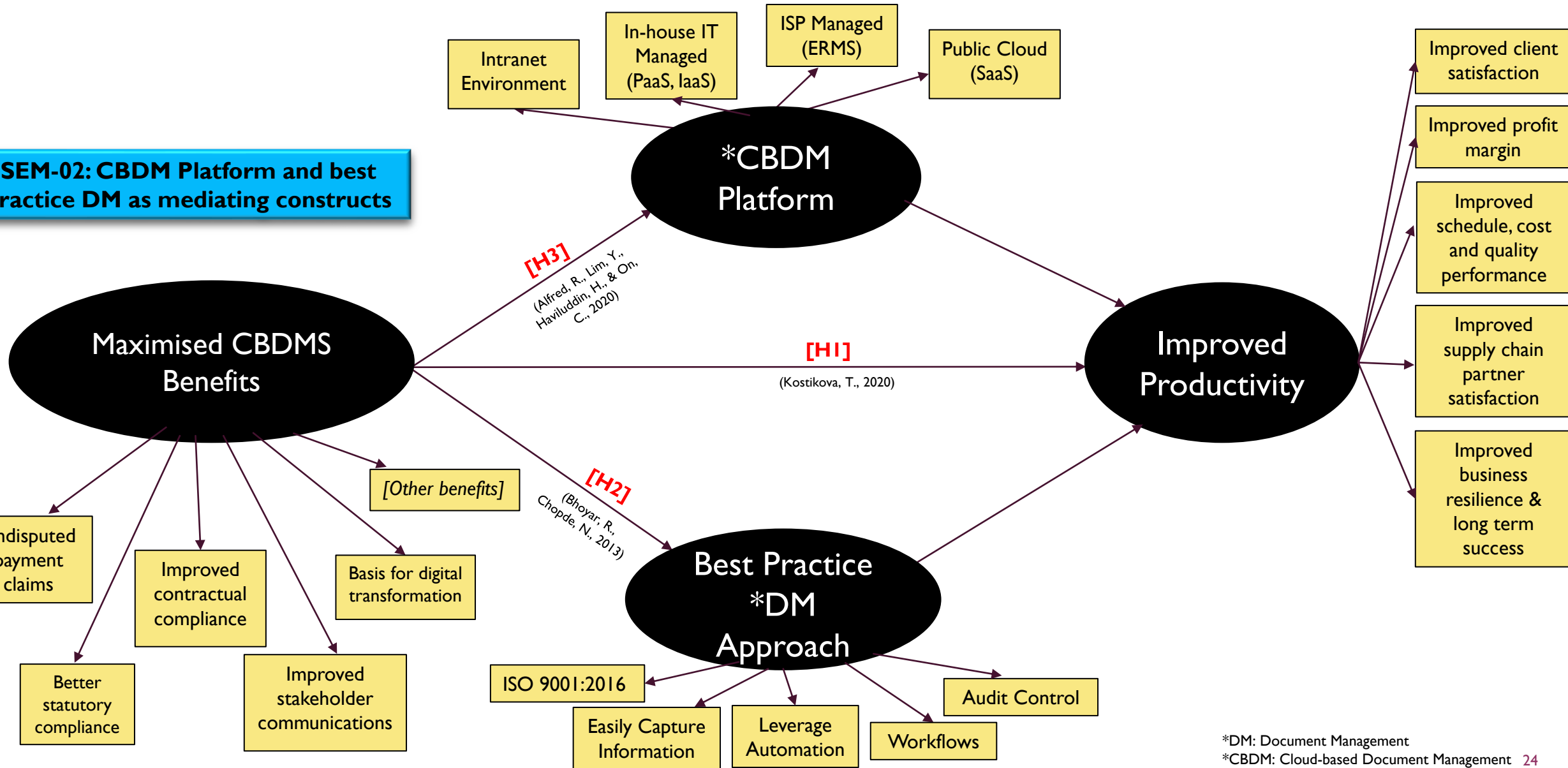
H3: Adopting best practice approach in *DM **as a mediating variable** could enhance the contribution of maximised benefits of *CBDM system to improved productivity of a construction firm (Bhojar, R., Chopde, N., 2013)

*DM: Document Management

*CBDM: Cloud-based Document Management

Hypothesis-based Structural Equation Model - 02 for Data Analysis

SEM-02: CBDM Platform and best practice DM as mediating constructs



RESEARCH PROGRESS PLAN

Sr. No	Task Name	Duration	Due Date	Status
1	Literature Review	6	28-Feb-21	Completed
2	Preliminary Research Proposal	3	26-Jan 21	Completed
3	Detailed Research Proposal	2	28-Feb-21	On-going
4	Qualitative Interview Design	1	28-Feb-21	On-going
5	Research Ethics Application	3	31-May-21	Work-in-progress
6	Qualitative Data Gathering	6	30-Nov-21	To be completed
7	Analysis of Qualitative Design	3	28-Feb-22	To be completed
8	Questionnaire Survey	6	31-Aug-22	To be completed
9	Analysis of Survey Responses	3	30-Sep-22	To be completed
10	Confirmation of Candidature	1	28-Sep-21	To be completed
11	Thesis Submission	1	31-Oct-23	To be completed
12	Thesis Examination	6	30-Apr-24	To be completed
13	Emendations & Final Thesis	5	28-Sep-24	To be completed

CONCLUSION

- Existing Document Management approach followed by the construction industry is largely paper-based which has led to many issues and consequences constraining productivity and project success.
- The solution proposed in this research to improving the current approach is by adopting a *CBDM system which allows the project team to access, edit and version control documents in real time.
- The methodologies used to achieve this solution is by using a mix of qualitative and quantitative data gathering techniques through interviews and open-ended questionnaires with industry practitioners.



THANK YOU!



THANK YOU!



ANY QUESTIONS ?

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