A Multi-method Study of Factors Associated with Hospital Information System Success in South Africa

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Outline: Multi-method study of CHIS success

• Background
• Study overview
• Methods
  – Interpretivist
  – Positivist
• Results
• Conclusion
Background: the problem

• *Problems with implementations of CHISs (computerised hospital information systems) in public sector hospitals in South Africa*
  
  – *could identification of factors affecting CHIS success or lack of success contribute to improved CHIS selection?*

• **Aim of project:**
  
  To identify factors which are associated with the successful implementation of CHISs in South African (SA) level 1 and level 2 hospitals

• *Complex environment – multi-method approach*
Background: the environment

- **Public sector health services in South Africa**
  - Service provision at provincial level; 9 provinces
  - Support approximately 80% of SA population.

- **Widespread implementation of computerised hospital information systems (CHISs) in the two study provinces:**
  - Study focus on level 1 and level 2 hospitals.
  - Limited CHIS scope: ADT and billing; limited clinical data.
  - Province 1: two CHISs in use.
  - Province 2: the same CHIS in all hospitals.

- **Limited or vulnerable resources to support implementation and maintenance of CHISs, especially at hospital level.**

- **Limited evaluation of status and/or success of implementations.**
Study overview

**Development of successive versions of a conceptual model of CHIS use:**

- Three pilot case studies
  - *Initial conceptual model*

- Fourth case study and expert interviews
  - *Extended conceptual model*

- Survey of 30 hospitals in two provinces
  - *Revised conceptual model of CHIS use.*
Diagram of the study process

1. Literature / background
2. Initial conceptual model
3. Case study - hosp 4
4. Expert interviews
5. Revised conceptual model
6. Survey in 2 provinces
7. Provincial expert informants
8. Pilot case studies

Steps:
- Literature / background
- Initial conceptual model
- Case study - hosp 4
- Expert interviews
- Revised conceptual model
- Survey in 2 provinces
- Provincial expert informants
- Pilot case studies
Revised conceptual model of CHIS use

Provincial-level factors:
- CHIS supplier knowledge and understanding of environment
- CHIS software fit with user requirements
- Resource availability
- Organisational and contractual mechanisms

Knowledge and understanding of CHIS

Appropriateness of CHIS design

Performance of CHIS

Resource availability and allocation

Perception of usefulness of CHIS

Management commitment to success

Effective use of CHIS and/or outputs
Methods: multiple methods to approach a complex problem

• Need to understand CHIS success in a complex environment:
  – hospitals
  – low-resource settings
  – relatively high resource requirement for acquisition/development, implementation and maintenance.

• Required multiple methods
  – combine approaches from differing perspectives:
    • Information systems: strong positivist influence
    • Health information systems: strong interpretivist influence
  – examine (relatively) large-scale implementations.
**Interpretivist: structured case study approach:**

- Development of an initial conceptual model, based on
  - Findings from three case studies
  - Literature
  - Researcher’s experience and knowledge of CHISs.
  - *Identified factors associated with CHIS success.*
- Development of an extended conceptual model, based on
  - Initial conceptual model
  - Findings from fourth case study
  - Expert interviews
  - Literature.
- [Interpretation of some of the results from the survey.]
Extended conceptual model of CHIS use: provincial and hospital level

**Provincial Level**
- CHIS supplier knowledge and understanding of environment
- CHIS software fit with user requirements
- Organisational and contractual mechanisms
- Resource availability

**Hospital Level**
- Knowledge and understanding of CHIS
- Appropriateness of CHIS design
- Performance of CHIS
- Resource availability and allocation

**Intermediate Levels**
- Perception of usefulness of CHIS
- Management commitment to success
- Effective use of CHIS and/or outputs
Multiple methods to approach a complex problem

**Positivist:**

- Testing hypotheses about the associations
  - between factors of the conceptual model and CHIS success;
  - among pairs of factors of the conceptual model.
- Define measures for factors of the conceptual model to enable analysis of results
  - This was a challenge for some factors.
- Survey data from 30 hospitals and 70 CHIS users at the survey hospitals
  - Hospitals across two provinces
  - Hospitals using one of three CHISs.
- Statistical analysis of results
  - Results interpreted with caution due to sample size.
Survey results: key issues

• Conceptual model was revised
  – Factors and relationships between factors at hospital level remained unchanged.

• The model developed on the basis of the case studies was generally applicable to the larger sample covered by the survey:
  – Case study hospitals used the same CHIS, and were located in the same province;
  – Survey hospitals used one of three CHISs, and were located in one of two provinces.

• Results of analyses also provided insights into similarities and differences in performance of the survey CHISs.
Revised conceptual model of CHIS use

Provincial-level factors:
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Knowledge and understanding of CHIS

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Effective use of CHIS and/or outputs
Conclusion

• There is a need to ensure effective use of available CHISs, especially in low resource environments.

• *Complex methods of analysis were used in this study to gain an understanding of a complex environment.*

• *In practice, there is a need for elegant, robust methods for ongoing evaluation, which are appropriate for application in low resource settings.*
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