

CHAPTER 8 - CONCLUSION



8.1 INTRODUCTION

Modern enterprises have become so complex over the last decade that division and distribution of business entities have become inevitable. People are expected to practise their expertise in fragmented assignments and projects. Where it was possible in the past to manage human involvement in business, information and technology as a result of everything and everybody contained in a local and controlled business, information and technology environment, today's story is different. Humans at all work levels and in all work roles have access to technology and information, enabling them to form part of the global business, technical and social world.

Enterprise architecture is a strategy assisting enterprises in understanding, communicating and managing the 'bigger picture' of business, IM and IT integration. As an organisational initiative and strategy, EA cannot be separated from total human acceptance and involvement. If organisational knowledge and human knowledge are not valued as important assets and retained, EA does not live up to its promise. In a competitive and changing world, enterprises focus on delivering better services and products, faster and more cost effectively. Therefore, strategic and business issues are continuously addressed and IM is acknowledged as a basis for effective and efficient business operations. Although implementation of EA is a long-term process, it provides enterprises with a detailed description of all their assets and operations to assist them in understanding the complexity of how their business operations and IM integrates and is supported by IT. EA allows enterprises to keep their competitive business-focus when instituting change.

It was the premise of this research that human action and human interaction are dynamic issues in organisations that lead to positive energy, synergy and therefore more creative and successful business outcomes. Therefore the purpose of the research was composed as:

To identify human factors impacting on the acceptance of enterprise architecture in an organisation and compose a framework of human factors to assist in promoting and managing stakeholder involvement during acceptance of EA.

The aim of Chapter 8 is, first, to summarise and reflect on the research as described in the thesis and, second, to provide the reader with an overview of the research findings. The research strategy followed in the research is revisited and recommendations for further research are made.

8.2 SUMMARY OF THE THESIS

The structure and lay out of the thesis was presented in Section 1.8. The focus of each chapter is now briefly revisited.

Chapter 1 gave the background of the research and described the purpose of the research. The main research question was composed and asked:

What are the human factors that affect the acceptance of enterprise architecture (EA) and how can these factors be used in an organisation to manage the acceptance of enterprise architecture?

It was the argument of the research that EA adoption in enterprises happens at executive- and management work levels, but that acceptance of EA in organisations and enterprises should come from all stakeholders representing different work levels and work roles.

The contribution of the research was proposed and described as a Work-level Acceptance Framework for EA (WoLAF for EA) that will assist organisations in the management of human factors believed to be affecting EA acceptance.

The theoretical background and basis for the study was provided in chapters 2 and 3. EA was defined in Chapter 2 and the current state of research in EA was discussed. The relationship of EA to EE was highlighted and EA frameworks of importance to the research and EA management were addressed. Three EA frameworks were used to identify human factors from the EA literature: The Zachman Framework for Enterprise Architecture was discussed as ontology, TOGAF was accepted as a process and GERAM as an EA methodology.

In Chapter 3, the literature related to human factors was discussed. The chapter presented the concepts of “enterprise” and “organisation”. Organisational culture and human involvement in organisations over time were discussed. Acceptance models and theories (TAM and UTAUT) as well as other related theories (ANT and ST) were used as reference theories to identify human factors related to human acceptance of new strategies. Human factors were also identified from the EA and other literature. All the human factors identified were later used in the research as categories of human concerns. In the definition of EA accepted for the study, the purpose of EA was described as to understand the complexity of an enterprise and to manage change.

Chapter 4 presented the research design and methodology for the research. The research paradigm of design science research was accepted as the philosophical grounding for the study. The research strategy and research methodology of design research was followed. Data collection methods and data analysis methods relevant to the research were described from the literature. A detailed plan for the research was proposed in Chapter 4 (Figure 4.8). Ethical considerations for the research were discussed. Finally, the outcome of the research, a work-level-related framework for EA acceptance (WoLAF for EA) was introduced. WoLAF for EA consists of a model and a proposed method of use.

In Chapter 5 the research process and composition of the WoLAF for EA Model was described. The research started with an initial literature review after which the need for the study was established. An exploratory study was conducted in one enterprise to identify human factors impacting on EA acceptance. Human factors identified from acceptance models and theories, other related theories, the EA-related literature and EA frameworks were compared with human factors identified from the exploratory study. A combined list of human factors identified from theory and practice was compiled. Using the literature, a

classification scheme for human factors related to EA was constructed and the comprehensive list of human factors was mapped into six human concerns. The Zachman Framework for Enterprise Architecture was used as a reference framework to compose four different work levels applicable to EA. The classified list of human factors was mapped to the four work levels. Questionnaires were used to investigate whether the work-level-related list of human factors was valid in more organisations, which would mean that it was valid in other contexts. The data that was collected indicated the importance of EA for enterprises that were representatives of different contexts. The data also confirmed that the human factors identified as impacting on EA acceptance in one organisation were valid in more contexts.

Chapter 6 was used to discuss the construction of the WoLAF for EA Method. The work-level-related framework for management of EA acceptance, WoLAF for EA, consisting of the WoLAF for EA Model and the WoLAF for EA Method was composed. The presentation and verification of WoLAF for EA was described and WoLAF for EA was confirmed.

Chapter 7 was used to describe the contribution of the research. This chapter focused firstly on the scientific contribution of the research to enrich the body of the literature focused on human factors in EA:

- The Work-level Acceptance Framework for EA Model (WoLAF for EA Model).
- An explanation of how adoption and acceptance of EA realise in organisations.
- The impact of the research on the theories and frameworks referenced in the research.

The second contribution of the research, a product contribution, was also discussed in Chapter 7:

- The Work-level Acceptance Framework for EA Method (WoLAF for EA Method).
- A work-level-related list of human factors and a self-assessment tool to assist organisations in the identification of human factors impacting on EA acceptance were presented.
- Finally, action steps were proposed to assist organisations in the management of human factors impacting on EA acceptance.

A summary of the research is presented in Section 8.3. Research objectives are revisited and the discussions that follow indicate how the research objectives were addressed and achieved.

8.3 SUMMARY OF THE RESEARCH

As described in Chapter 4, the strategy followed in the research was design research.

The awareness phase of the main design research cycle started with a literature investigation of EA and the role of humans in EA, after these issues had been raised at several EARF meetings where I was present. The literature was explored and human factors in organisations and human acceptance of new strategies such as technology acceptance in organisations as socio-technical communities were described (Chapter 3).

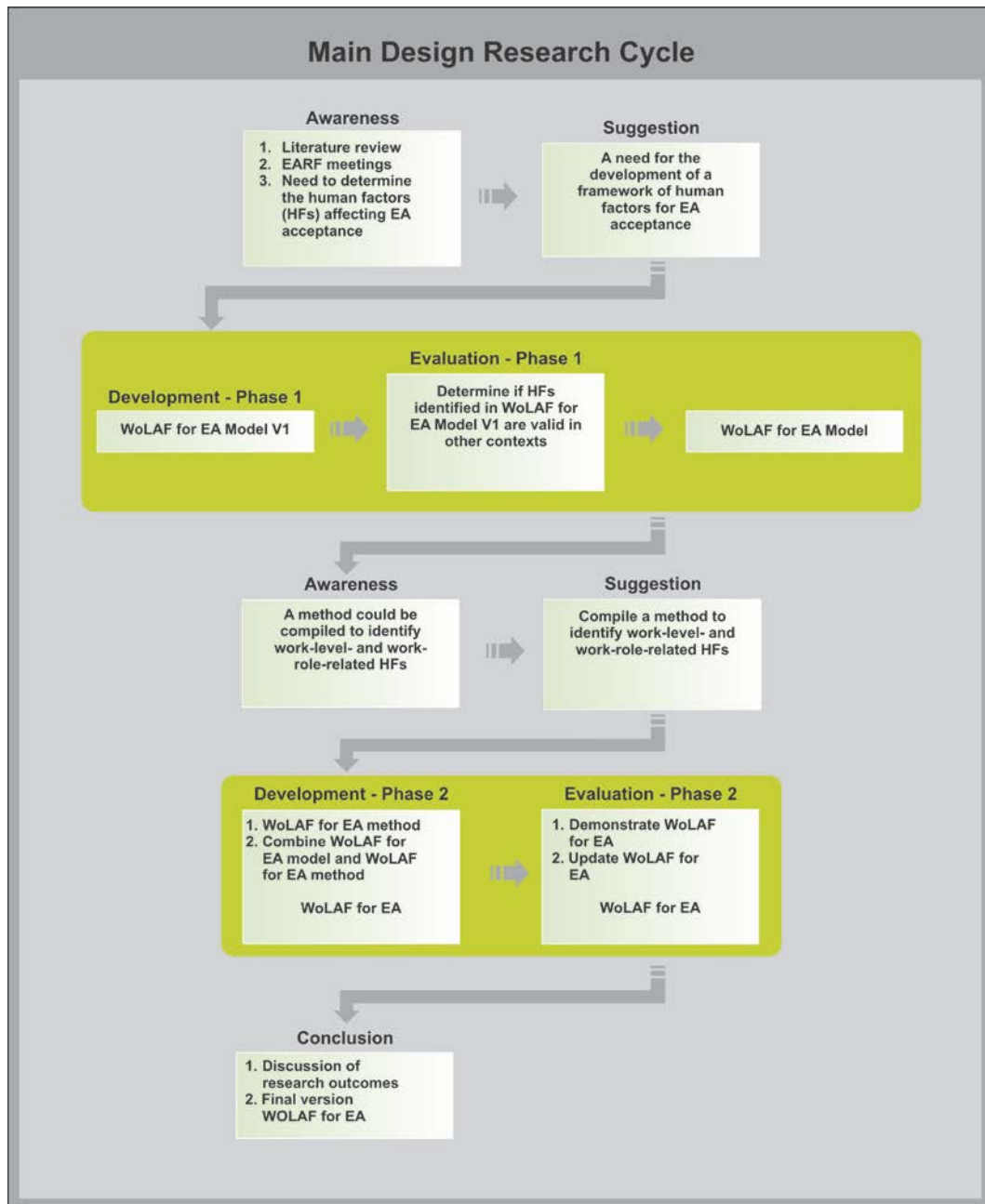


Figure 8.1: Main design research cycle of the research

The need for the research and development of a framework of human factors for EA acceptance was established and the main objective of the study composed:

To develop a framework of human factors to assist organisations in managing the acceptance of enterprise architecture.

Two research objectives were defined:

RO1: *To design a model that will assist organisations in management of EA acceptance.*

and

RO2: *To propose a method to use the model to assist organisations for management of EA acceptance.*

Two development phases were completed: In the first development phase of the main design research cycle, four design research sub-cycles were executed which resulted in the WoLAF for EA Model; the outcomes of a second development phase were the WoLAF for EA Method and the finalisation of the framework of human factors to assist organisations in managing EA acceptance.

In order to develop the WoLAF for EA Model, sub-objectives were defined.

- SO1.1: *To determine the human factors affecting EA acceptance.*
- SO1.2: *To determine the work levels applicable to EA.*
- SO1.3: *To categorise the human factors per work level into six EAHCs.*

In design research Sub-cycle 1, to realise SO1.1, an exploratory study was conducted in one organisation and human factors affecting EA acceptance were identified. Design research Sub-cycle 2 entailed a literature study where human factors applicable to EA, human factors described for technology-acceptance models and theories, and human factors identified from other related theories were identified. A combined list of human factors identified from organisational practice and through the exploration of literature was composed.

In design research Sub-cycle 3 of Development Phase 1, human factors useful for categorisation purposes were identified from the literature and the comprehensive list of human factors was categorised into six human concerns (EAHCs) (Section 4.8.1.2.3).

Sub-objective 1.2 was reached during the development phase of Sub-cycle 4 (Section 4.8.1.2.4). The EA literature was reviewed and work levels applicable to EA were identified from The Zachman Framework for Enterprise Architecture. Work levels identified from the literature were adjusted and defined for the purpose of the research. Human factors categorised into EAHCs were mapped into work levels and the outcome was named WoLAF for EA Model Version 1 (V1). Sub-objective 1.3 (SO1.3) was reached.

During an evaluation phase of the main design research cycle Development Phase 1, questionnaires were used to determine if WoLAF for EA Model V1 was valid in additional organisations. The WoLAF for EA Model was confirmed.

During Development Phase 2 of the main design research cycle, a method was proposed to assist organisations with management of EA acceptance. The framework of human factors for EA acceptance, WoLAF for EA, consisting of the WoLAF for EA Model and WoLAF for EA Method was compiled.

In an evaluation phase, WoLAF for EA was presented (Section 6.4). Interviews were conducted, results were analysed and WoLAF for EA was updated and confirmed as valid. A description of how WoLAF for EA was verified was provided in Section 6.4 to confirm its validity, usefulness and possibility of being used in organisations.

Useful information was extracted in the course of the research to prove the relevance of the research, something that is important in design science research (Gregor *et al.*, 2013:337; Vaishnavi *et al.*, 2013).

Throughout all interviews, the importance of EA as an organisational strategy was highlighted. EA is, however, not universally understood by humans and accepted as a strategy to align business, IM and IT in organisations. Human factors affect the acceptance and implementation of new strategies in organisations, more so if change happens as a result of the new strategy and the long-term- and ongoing process is not continuously communicated and understood.

The assumption was made by the researcher and confirmed by interview participants that the adoption of EA as an organisational strategy is costly and therefore happens at executive/management level (sections 3.4.1, 5.2.1.2 and 5.2.1.4) and is accepted as a strategy (Kwon *et al.*, 1987:233). In discussions with participants it was made clear by many that management should also envisage the change in work processes and accept ownership of EA. The need for transparency and good communication spanning different work levels was expressed.

The statement that EA acceptance happens bottom up when referring to work levels as described in Section 5.4 was validated by the semi-structured interviews (Section 6.4.2). According to Giblett (2011), management of stakeholder resistance to EA has to focus on two issues; namely, the understanding of the value added by EA to the organisation and the fact that different work roles demand different information – something that EA is possible to provide stakeholders with. The importance of human acceptance of EA and cooperation in the work place as a result of acceptance is highlighted by Norman (1993:146), in an explanation of how humans live and operate within a “physical world”:

People operate as a type of distributed intelligence, where much of our intelligent behaviour results from the interaction of mental processes with the objects and constraints of the world and where much behaviour takes place through a cooperative process with others (Norman, 1993:146).

8.4 REFLECTION ON RESEARCH STRATEGY USED

The main output of my study and main research contribution is WoLAF for EA, a work-level-related framework of human factors to assist organisations in managing EA acceptance. Hevner and Chatterjee (2004:97; 2010:205) list requirements of a design science research (DSR) contribution that range from identification and a clear description of the problem to the explanation of the implications that the artefact might have on organisational management (Column 1 of Table 8.1). The second column of Table 8.1 provides a description of where the requirements have been addressed in the research.

Table 8.1 DSR requirements addressed by the research

REQUIREMENTS OF A DSR CONTRIBUTION	ADDRESSED BY RESEARCH
Identification and a clear description of an organisational problem	Using literature and through interaction with people from enterprises, a need for the development of a framework of human factors for EA acceptance was identified. The research objective was defined: <i>To develop a framework of human factors to assist organisations in managing the acceptance of enterprise architecture.</i>
Showing that no relevant solution to the problem exists	The literature on humans in organisations and EA were reviewed and no framework of human factors to assist in EA acceptance was found (chapters 2 and 3).
Design, development and presentation of an artefact that addresses the problem	A framework of human factors to assist in managing EA acceptance called WoLAF for EA was designed, developed and presented.
Rigorous evaluation of the artefact	Human factors identified were confirmed by means of a questionnaire. WoLAF for EA was presented during interviews, updated and confirmed to be valid.
Description of the knowledge base and practical value added	<p>The contribution to the EA body of knowledge was discussed in sections 7.2 and 7.3.</p> <p>Researchers in EA can utilise the model in EA related and socio-technical organisational acceptance problems.</p> <p>WoLAF for EA makes a contribution to the knowledge base of human behaviour in acceptance of new strategies in organisations.</p>
Explanation of the implications for management	<p>EA management teams or EA project managers can identify individual or group human concerns to be addressed before these concerns defer or delay EA process modelling and progression.</p> <p>Enterprise management can identify work-level-related human factors hindering organisational information- and knowledge retention and address these problems from an organisational management level.</p>

Vaishnavi and Kuechler (2013) and Gregor and Hevner (2013:342) emphasise that the focus of DSR is on a valid contribution of knowledge when an interesting phenomenon is created. The research strategy of DSR where cycles of awareness, suggestion, development and evaluation guided the research was found to be an appropriate and successful research strategy for my research. The interesting phenomenon of human factors affecting acceptance of organisational strategies was investigated and the WoLAF for EA artefact was created to assist organisations in the management of human factors.

The research could also have been approached from an impact angle. In such a case the literature could have been explored in an extensive literature study and human factors could have been identified. Human factors identified from the literature could have been used and implemented in one sub-organisation of one enterprise involved in EA. Using action research as a strategy, human factors impacting on EA in this one instance could have been tested over time, reviewed and re-evaluated.

Another alternative approach could have been a longitudinal study. Human factors impacting on EA acceptance could have been identified in an enterprise after which the organisation in collaboration with the researcher could have implemented suggested ways of addressing human factors impacting on EA acceptance. After an agreed upon period of time, another data collection could have been executed. Before and after data on human factors impacting on EA acceptance could have been compared and results reported.

In both abovementioned cases, the time for completion of such research would be too long for a PhD study, and DSR was therefore the preferred approach.

8.5 RECOMMENDATIONS FOR FURTHER RESEARCH

The study was short term and of an exploratory nature and its purpose was to investigate and identify human factors impacting on EA acceptance. The framework of human factors for managing EA acceptance, WoLAF for EA, has not been implemented in organisations and tested over time. It is proposed for further research that a longitudinal, action research study be performed in possibly more than one enterprise to test WoLAF for EA in practice.

The comprehensive list of work-level-related categorised human factors identified and presented in Section 5.5 is not a fixed list or exhaustive. It is possible to adjust or extend the list of human factors depending on need, experience or context of organisations.

It is a well-known fact that many of the human factors recorded in the study to impact on EA acceptance are not easy to measure. Multi-disciplinary research is proposed, which could provide methods fit for measuring human factors impacting on EA such as, for example, loyalty, trust and accountability to name but a few.

It would be possible to extend the WoLAF for EA Model presented in the thesis to include individual work roles in organisations and investigate what and how human factors impact on the EA role of individuals in organisations (Figure 8.2). Work roles of stakeholders or employees are defined according to functional tasks and work responsibilities. Specific skills are associated with work roles in organisations. It would be possible to use the outcome of my research in an organisational acceptance level and organisational enterprise architecture level, and then in a further study investigate how human factors impact on EA specific tasks within specific work roles.

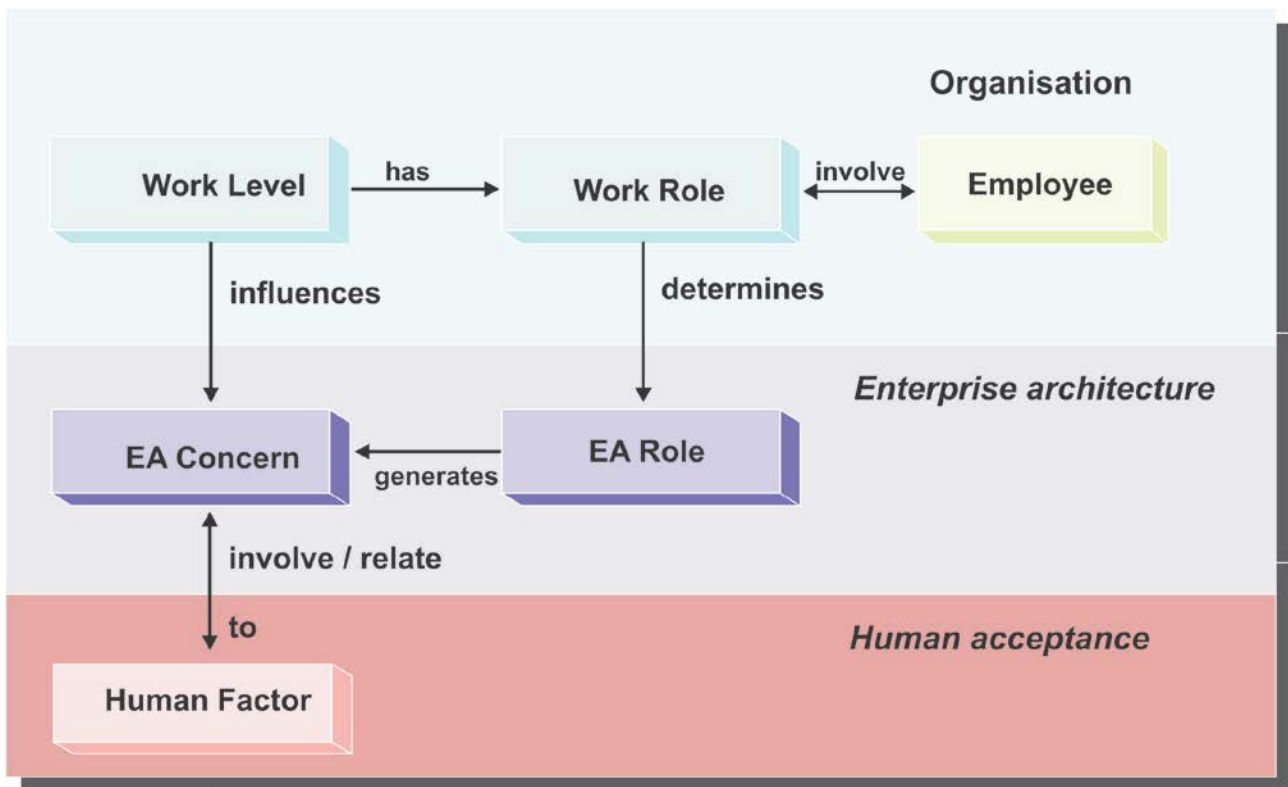


Figure 8.2: Proposed Model for Further Research

8.6 A FINAL WORD

The research outcomes and results discussed in my thesis are proof that the research objectives of the study have been reached. The research is believed to make a valuable contribution to the literature on human involvement in EA and EA acceptance and therefore, also on the EA body of knowledge. EA is a long-term and ongoing endeavour for enterprises. The concept of EA, the extent of EA in enterprises and its value are not always understood by stakeholders. EA spans the global enterprise but because of the complexity of enterprises, EA is phased in into organisational processes over time. The result is that stakeholders of EA do not understand the full consequence and see the “bigger picture”.

The importance of the study on EA acceptance by humans in organisations was confirmed by one of the participants:

A very important study – in light of my interest in EA and the search for de-politicised decision making confirm the importance of EA acceptance by humans in organisations.

Although the need for EA as a strategy is recognised by many people from many organisations, managers, stakeholders and users, in many cases EA is not accepted and EA principles are not followed. Another participant reflected on the current state of EA acceptance:

Everybody acknowledges that EA is an important and needed strategy for enterprises but people are reluctant to get involved and do it.

Enterprises that have adopted EA as an organisational strategy and that are currently involved in EA implementation have to ensure the acceptance and buy-in of stakeholders to experience the full benefit of EA. Not only was my research considered a personal learning curve and growth process but, in addition, the need for and relevance of the study was identified through personal interaction with people from South African organisations involved in EA, as well as international leaders in EA

