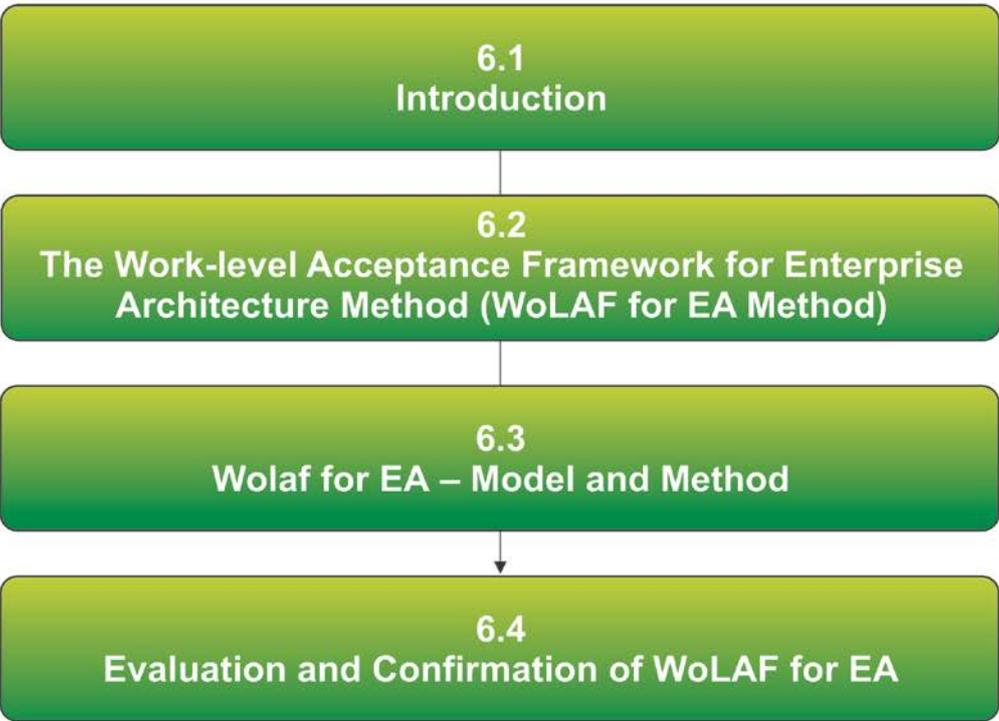


**CHAPTER 6 - DEVELOPMENT OF THE WORK-LEVEL ACCEPTANCE
FRAMEWORK FOR ENTERPRISE ARCHITECTURE**



6.1 INTRODUCTION

The main research objective of the research was:

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

In order to develop the framework of human factors, two research objectives and related sub-objectives were defined.

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

 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 human concerns.*

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

Research objective 1 (RO1) was addressed in Chapter 5. This chapter describes the research processes as it unfolded to address research objective 2 (RO2). Figure 6.1 presents a high-level illustration of the design research process followed.

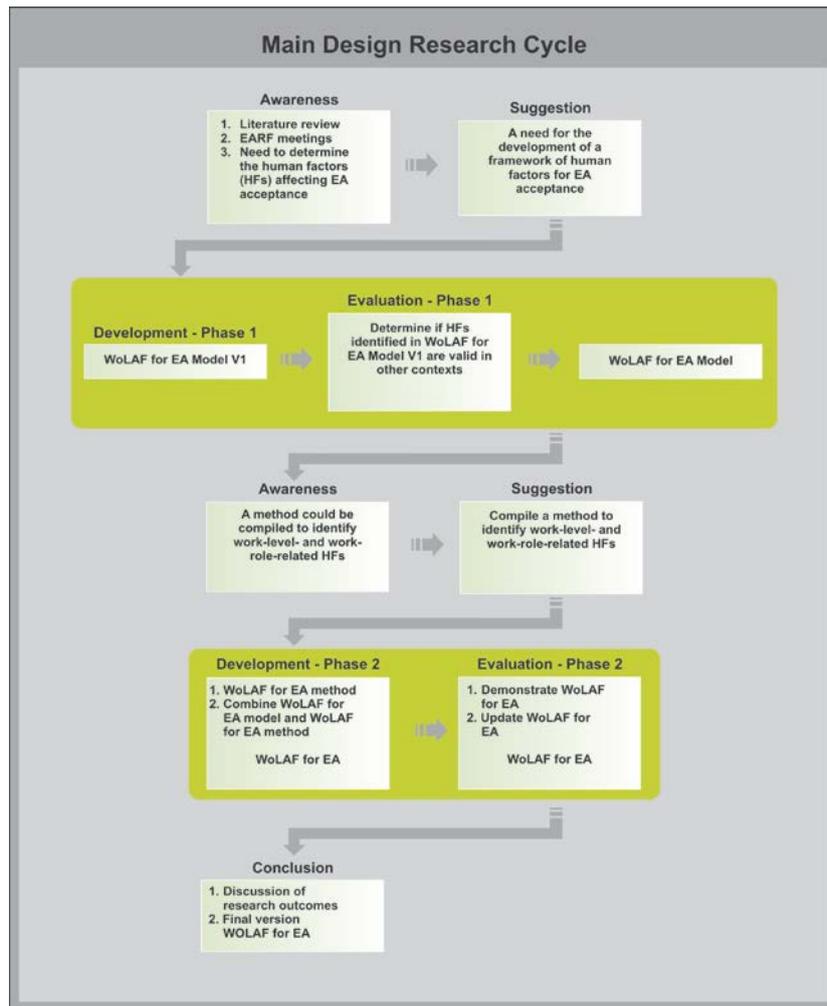


Figure 6.1 Main design research cycle

This chapter refers to Development Phase 2 of the main design research cycle (Figure 6.2).



Figure 6.2: Development Phase 2

The first step of Development Phase 2 describes the development of the method to use the model to assist organisations in the management of EA acceptance. A self-assessment tool is proposed to assist organisations with identification of human factors impacting on EA acceptance.

In a second step the WoLAF for EA model (described in Chapter 5) and the WoLAF for EA method is combined into the WoLAF for EA framework. WoLAF for EA is presented, updated and confirmed as a work-level acceptance framework for EA.

The chapter concludes with a summary.

6.2 THE WORK-LEVEL ACCEPTANCE FRAMEWORK FOR ENTERPRISE ARCHITECTURE METHOD (WOLAF FOR EA METHOD)

Baxter *et al.* (2011:4) request that in socio-technical system design where human, social and organisational factors that impact on work situations are researched and addressed, the outcomes not only be communicated but also be made practical and usable by the suggestion of principles and methods.

In a first development phase of the main design research cycle of the research, WoLAF for EA Model was composed. A first step in the second development phase of the main design research cycle was to develop a method that could apply to the WoLAF for EA model (Figure 5.17 is repeated to simplify reading – Figure 6.3).

The proposal of the WoLAF for EA method is perceived as a normative guide, acknowledging the complexity and diversity of human issues in a working environment.

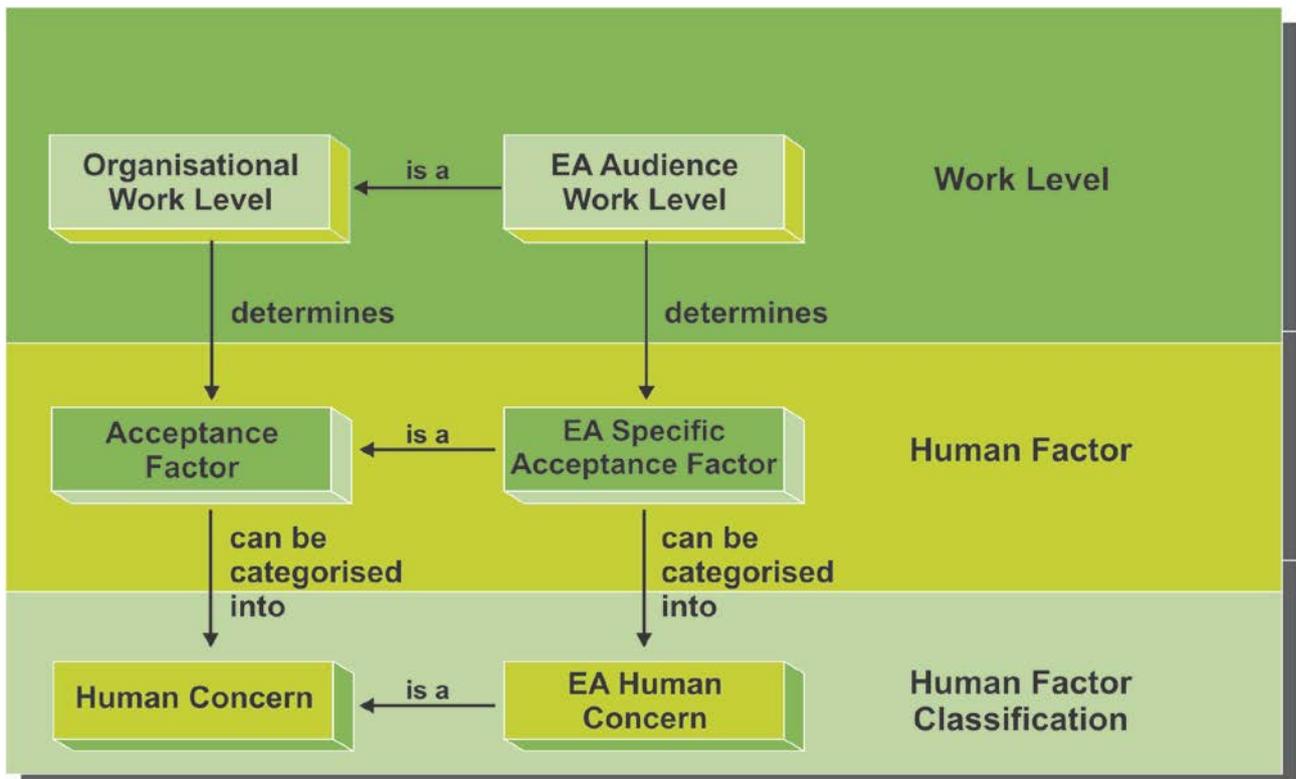


Figure 6.3 Model explaining WoLAF for EA

The proposed method to use the WoLAF for EA model implies the following basic beliefs:

- EA is a description concerned with integration of business goals, IM and IT, to enable people to understand complexity of enterprises and to assist in management of change (Section 2.2).
- As a result of the costs involve and the long-term return on investment (ROI), adoption of EA happens at the executive level of enterprises or organisations (Section 3.4.1).
- People naturally resist change and therefore have to be part of the whole process of change (sections 3.3.1 and 5.2.2.2).
- Work roles in organisations and sections of organisations assume a hierarchical structure but the power of people in modern systems such as an organisation is distributed (Section 5.6.3.2).
- Processes of design in organisations are politically perceived by stakeholders and therefore not always accepted (Section 3.7).
- Although people participate in new strategies, a personal agenda is often present but is not always communicated.
- Technology is an enabler of business, a means to an end and not a resource.

Referencing the model in Figure 6.3, management of human factors affecting EA acceptance is possible in two ways:

1. from the perspective of EA audience work levels (including several work roles); and
2. from the perspective of individuals representing different EA audience work levels.

6.2.1 Method: Work-level Perspective

The proposed method for applying WoLAF for EA at organisational work levels is composed of the following proposed guidelines:

1. Assess and identify work level areas where human factors related to EA acceptance are responsible for problem(s).

Starting from the work level, possible ways of identifying EA human-related concerns are (Schwalbe, 2014:528):

- The long-term organisational vision of EA results in people representing a work level not perceiving outcomes of EA related tasks and deliverables as urgent and therefore EA related outcomes are not delivered according to EA project schedule or on time. From the exploratory study's responses it was also evident that EA tasks (for example modelling and documenting) were neglected when more important tasks and problems needed urgent attention.
- EA specific task performance demands are not met at specific work levels.
- EA project cost implications and organisational cost implications as a result of information not being available (usually needed by executives and managers).

- Do a level-group EA task-related SWOT analysis to allow stakeholders to declare their EA strengths, weaknesses, opportunities and threads. Shared meaning leads to valuable information about group activities (Scott *et al.*, 1994:57).
 - Perform EA team-building exercises to identify non-participating stakeholders.
2. Identify stakeholder(s) in work levels involved in EA acceptance-related problems in the organisation.
 3. Perform a group survey to determine human factors hindering EA acceptance and implementation.
 - Choose an appropriate work-level-related questionnaire from the self-assessment tool presented in Section 6.3.
 - Distribute the questionnaire to stakeholders representing the work level where EA related execution of tasks have not been satisfactory.
 - Analyse the results of the questionnaires.
 4. Use the results gathered from the questionnaires to categorise human factors according to the six EAHCs identified for the research (Section 5.3).
 5. Based on the outcome of which of the six categories of EAHCs were used to classify the human factors identified, as well as the number of human factors representative of a EAHCs category, the concern(s) responsible for the EA acceptance problem are identified.
 6. Take action to address specific EA human concerns. The WoLAF for EA Model provides an indication of work levels and entities where problems might occur:
 - *Organisation specific.* Employees in work roles that form part of work levels. Organisational-culture specific human factors were discussed in sections 3.3 and 3.3.2.
 - *EA management specific.* Employees in work roles perform EA tasks and therefore are actors in EA roles. Organisational- and management specific human factors were discussed in sections 2.6 and 3.3.
 - *Interpersonal specific.* The human factors level of the WoLAF for EA Model is concerned with specific human factors impacting on EA work situations in organisations. Human factors impacting on EA acceptance have been identified and described from practice and from literature with reference to models and theories such as TAM, ANT and ST.

6.2.2 Method: Work-role Perspective

Starting from a work role level, the proposed method for applying WoLAF for EA in organisations is composed of the following guidelines:

1. Assess and identify EA work role where human factors related to EA acceptance are responsible for problem(s).

Possible ways of identifying EA work-role human-related concerns are:

- A starting point in identifying work-role- and stakeholder issues is to organise one-to-one conversations with employees involved in EA initiatives to identify EA stakeholder and work-role related problems. According to Scott (1994:55), actions of an individual is a result of the subjective meaning that individuals attach to their own behaviour and in a social environment their subjective meaning also includes an analysis of the behaviour of other people.
 - EA work tasks of individual stakeholders are not completed on time causing delays of other tasks dependent of EA task feedback.
 - According to Scott (1994:60), organisations have representational (a collection of logical knowledge claims), constitutive (people and their capabilities) and normative rules (organisational defined prescription – roles, routines, actions) that govern them. In times of growth or change (when EA is used as an essential strategy), peers and line managers would be able to assist in identifying stakeholder behaviour problems.
2. Identify stakeholders in their EA work role or EA project role affiliation where EA acceptance is regarded as responsible for problems in the organisation.
 3. Perform an individual work-role-related survey to determine human factors impacting on EA acceptance and EA task performance.
 - Choose a work-level-related questionnaire (use the self-assessment human factor identification instrument – Section 6.3).
 - Distribute the questionnaire to stakeholders in work roles where EA related execution of tasks have not been satisfactory.
 - Analyse results of questionnaires.
 4. Use the data gathered and categorise human factors according to the six EAHCs identified for the research (Section 5.3).
 5. Based on the outcome and categorisation into specific EAHCs, the EA human concern(s) responsible for the EA-acceptance problem(s) are identified.
 6. Take action to address the EA-specific human concern(s). WoLAF for EA provides an indication of levels and entities where human issues relating to EA might occur:
 - *Organisation specific.* Employees in work roles that form part of work levels. Organisational- and organisational culture specific human factors were discussed in sections 3.3 and 3.3.2.
 - *EA management specific.* Employees in work roles perform EA tasks and therefore are actors in EA roles. Organisational- and management specific human factors were discussed in sections 2.6 and 3.3.

- *Interpersonal specific.* The human factor level of the WoLAF for EA Model is concerned with specific human factors impacting on EA work situations in organisations. Human factors impacting on EA acceptance have been identified and described from practice and from literature with reference to models and theories such as TAM, ANT and ST.
- *Stakeholder specific.* Skills frameworks describe work skills for different work roles in organisations and professions. For example, the Skills Framework for the Information Age (www.sfia.org.uk) provides guidelines of skills and responsibilities related to work roles important for EA: strategy and architecture, business change, solution development and implementation, service management, procurement and management support and client interface. These guidelines could either be used to appoint the right person in the right work role or to provide training to stakeholders to ensure that they obtain the necessary skills.

6.3 WoLAF FOR EA – MODEL AND METHOD

WoLAF for EA was developed in two phases (Figure 6.4). The WoLAF for EA model was developed in a first design research phase (Development Phase 1 of the main design research cycle) and the WoLAF for EA method in a follow-up development phase (Development Phase 2 of the main design research cycle).

The framework consists of the WoLAF for EA model and the WoLAF for EA method and is illustrated in Figure 6.5.

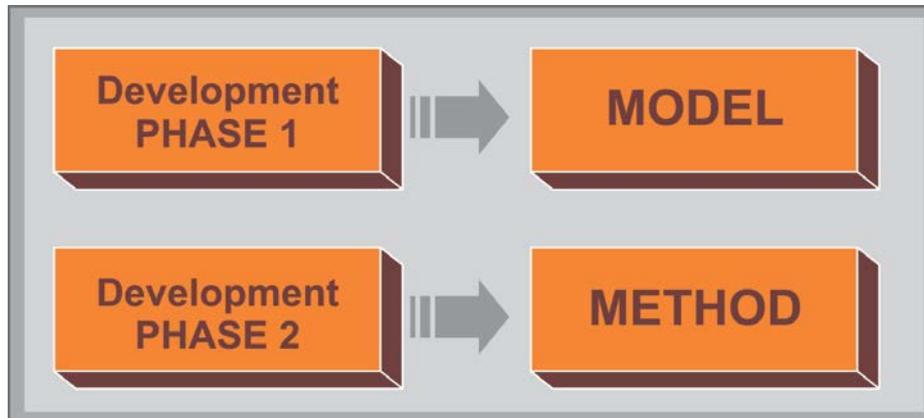
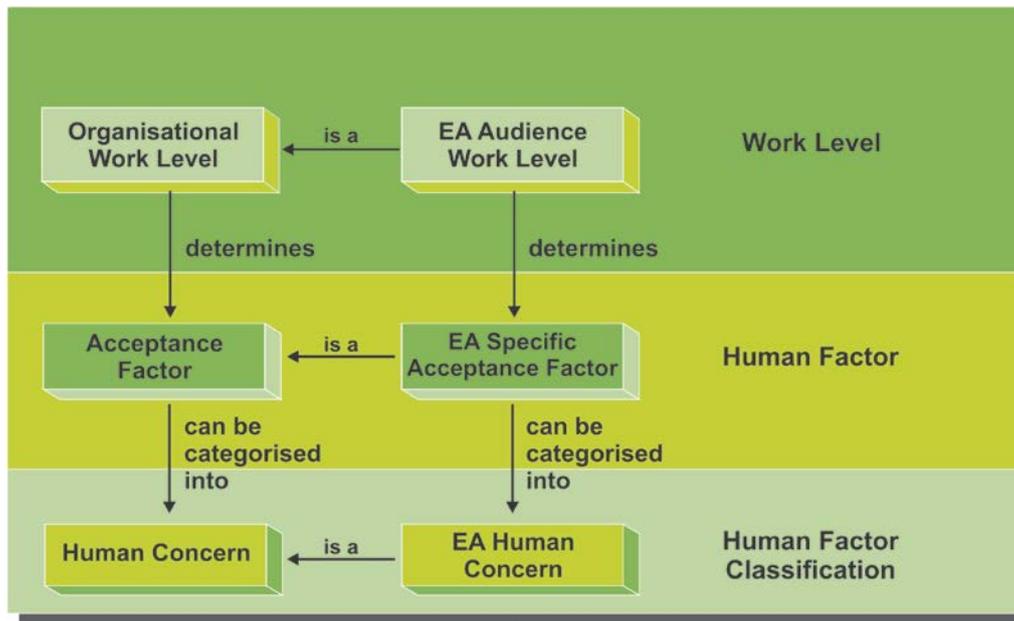


Figure 6.4: Development phases of WoLAF for EA

In the process of addressing the main research question the focus of the research was, firstly, to identify human factors affecting EA acceptance in organisations and, secondly, to find a way of using the identified human factors to assist organisations in management of human factors to promote acceptance of EA as an organisational strategy. The research was based on the design science research paradigm and used the concepts of design research to develop the WoLAF for EA artefact (Vaishnavi *et al.*, 2013).

The WoLAF for EA framework consists of a model and a method, which can both assist organisations with management of the human factors responsible for hindering the full benefit and added value of using EA as a strategy to integrate business, IM and IT processes.



The proposed method for applying WoLAF for EA at organisational work levels is composed of the following proposed guidelines:

- a) Assess and identify work level areas where human factors related to EA acceptance are responsible for problem(s).
- b) Identify stakeholders in work levels involved in EA acceptance-related problems in the organisation.
- c) Perform a group survey to determine human factors hindering EA acceptance and implementation.
 - Choose an appropriate work-level-related questionnaire from the self-assessment tool presented in Section 6.3.
 - Distribute the questionnaire to stakeholders representing the work level where EA related execution of tasks have not been satisfactory.
 - Analyse the results of the questionnaires.
- d) Use the results gathered from the questionnaires to categorise human factors according to the six EAHCs identified for the research (Section 5.3).
- e) Based on the outcome of which of the six categories of EAHCs were used to classify the human factors identified as well as the number of human factors representative of a EAHCs category, the concern(s) responsible for the EA acceptance problem are identified.
- f) Take action to address specific EA human concerns. The WoLAF for EA Model provides an indication of levels and entities where problems might occur:
 - *Organisation specific.* Employees in work roles that form part of work levels.
 - *EA management specific.* Employees in work roles perform EA tasks and therefore are actors in EA roles.
 - *Interpersonal specific.* The human factor level of the WoLAF for EA Model is concerned with specific human factors impacting on EA work situations in organisations.

Starting from a work role within a work level, the proposed method for applying WoLAF for EA in organisations is composed of the following guidelines:

- a) Assess and identify EA work role where human factors related to EA acceptance are responsible for problem(s).
- b) Identify stakeholders in their EA work role or EA project role affiliation where EA acceptance is regarded as responsible for problems in the organisation.
- c) Perform an individual work-role-related survey (use self-assessment human factor identification instrument – Section 6.3) to determine human factors impacting on EA acceptance and EA task performance.
 - Analyse results of questionnaires.
 - Use information to categorise human factors according to six EAHCs identified for the research.
 - Determine EA human concern(s) responsible for EA-acceptance problem.
- d) Take action to address the EA-specific human concern(s). WoLAF for EA provides an indication of levels and entities where human issues relating to EA might occur:
 - *Organisation specific.* Employees in work roles that form part of work levels.
 - *EA management specific.* Employees in work roles perform EA tasks and therefore are actors in EA roles.
 - *Interpersonal specific.* The human factor level of the WoLAF for EA Model is concerned with specific human factors impacting on EA work situations in organisations.
 - *Stakeholder specific.* Skills frameworks describe work skills for different work roles in organisations and professions.

Figure 6.5: WoLAF for EA (Model and Method)

The composition of the WoLAF for EA Model was described in Section 5.7. EA acceptance is a determining factor in knowledge of EA, degree of involvement in EA in context and successful implementation of EA as an organisational strategy.

The entities of the model were depicted according to the perspective model level which they apply to, namely “Work Level”, “Human Factor” and “Human Factor Classification”:

- From an organisational EA audience work level viewpoint, human factors impacting on EA acceptance may originate from a single employee involved in a work role representative of an EA audience work level.
- From a human factor model level perspective, the EA audience work level determines how an employee or a group of employees are involved in EA and what EA specific acceptance factors are generated or at stake. Employees are presentative of an EA audience work level (for example managers/executives) where a specific work level influences an EA human concern (for example, communication between different representatives of work levels – see Section 5.6.3.7).
- From a human factor classification model level perspective, the model shows that human factors can be categorised into EA human concerns.

The WoLAF for EA method was developed in a second development phase of the main design research cycle (Development Phase 2). The proposed method makes provision for identifying EA audience work level (group) related human factors or individual work role related human factors (Section 6.2) to assist organisations in the management of EA acceptance.

6.4 EVALUATION AND CONFIRMATION OF WOLAF FOR EA

WoLAF for EA was presented to experts and EA stakeholders in an evaluation phase of Development Phase 2 of the main design research cycle. The process followed for the evaluation of WoLAF for EA is addressed in this section.

The aim of the evaluation of WoLAF for EA was firstly to determine if stakeholders understand and agree with WoLAF for EA, agree with the statements on adoption and acceptance of EA findings secondly and thirdly could add to the work-level-related human factors identified in the research. The evaluation phase consisted of two activities: firstly WoLAF for EA and some of the components of WoLAF for EA were presented to stakeholders in organisations, and data was collected with the use of semi-structured interviews as a data-gathering technique; secondly, the qualitative data gathered during the interviews were analysed and used to update WoLAF for EA.

6.4.1 Data Gathering

Semi-structured interviews were conducted with nine participants, who represented six different organisational contexts; the contexts of education, banking, mining, oil refinery, manufacturing and business consulting. Participants representing the four different work levels of executive/manager, enterprise architect, analyst/engineer and technician/worker were selected. The list included:

- one IT support services manager representing an educational institution;
- one IM/IT change manager as well as a technician in SAP database maintenance at a manufacturing organisation;
- two enterprise architects, one in the banking industry and one in the mining industry;
- three independent business consultants involved in business and systems analysis, business intelligence (BI) and EA; and
- one project manager representing a manufacturing enterprise.

The main objective of the research stated to participants was:

To develop a framework of human factors that will assist organisations in the management of EA acceptance.

It was decided to initiate discussions by presenting participants with Figure 6.6 and explaining the work-levels identified as relevant to the research. The argument of the research explained to participants was that EA as an organisational strategy – a long-term and high-cost expenditure process - in organisations is adopted at strategic level. EA, however, needs to be accepted “bottom-up” when using a work-level perspective to consider the effect of EA. The procedure followed by the researcher during the interviews was to provide a short background overview of the research and then to present WoLAF for EA. The model and method contained in the framework were explained to participants and the need for gathering the human factors that impact on EA acceptance in different organisations (meaning different contexts) expressed. The researcher explained that human factors had been categorised into specific EAHCs to assist organisations in management of such concerns.

Notes were taken of five participants’ comments and in three of these interviews audio recordings were made. In three of the interviews participants did not provide any significant comments on WoLAF for EA. Examples of notes taken and transcribed recordings are provided in Appendix C on the CD provided with the thesis.

6.4.2 Presenting the Results

Specific comments to emphasise that human factors affect EA acceptance and to confirm the human factors recorded in the research were:

- *EA is a long-term strategy* and costly investment for an organisation.
- Organisational projects often demand “quick” IT and/or IM services and/or responses, meaning that short-term goals and cost- and time restrictions over-shadow long-term objectives. It is not easy for some stakeholders to picture the long-term benefits of EA as a strategy and therefore stakeholder buy-in is addressed by breaking down EA processes into smaller, doable projects and tasks to make EA more tangible. *Visible short-term results of EA governance lead to better understanding of the long-term EA strategy.*

Who	Roles Allocated Work Managed	Organisation Performance Group Accountability	Work Levels Defined	Adoption of EA	Acceptance of EA
Strategists (thought leaders) as theorists	Scope, vision, identify, plan in context	Overall high level abstraction	Executive/ Manager	↓	
Executive leaders as owners	Business definition, decision, concepts language	High level abstraction			
Architect (methodologists) as designers	Understand business logic and physical and technical implementation	High level abstraction	Architects	↕	↕
Engineers (technologists) as builders	Physical specifications	Technology/ business abstraction	Analyst/ Engineer		↑
Technicians (specialists) as implementers	Assemble, configure	Technology/ abstraction	Technician/ Worker		↑
Workers (professionals) as participants	Instantiate, do work	Operations abstraction			

Figure 6.6: Adoption and acceptance of EA

- *Understanding of concepts and EA language* is a contextual and organisational issue that needs to be addressed for stakeholders to accept EA.
- *It is important to ‘speak’ the same language.* It is possible to use the word “architecture” in different contexts and although the original meaning of the word as such refers to the art and science of “design of buildings”, people started to attach descriptive nouns to the word “architecture” to emphasise a different “design” connotation for example in IT architecture and EA.
- There is a need for alignment of main organisational- or business objectives of an organisation and EA expectations.
- When EA stakeholder acceptance in organisations is under discussion, it is necessary to first establish and understand the organisational objectives, goals and direction. *EA is viewed differently according to different organisational goals*; for example, it should be determined whether the driving force of an organisation is less expenditure/more profit, business growth or organisational growth and expenditure (section 2.6.1 and 3.3.2).
- From a business perspective, organisational decisions are driven by specific outcomes, with good reason, as stated above – *organisational change happens, something that is not always communicated to all stakeholders.*
- It is necessary for executives and managers to understand that business decisions affect stakeholders and should be communicated and recorded.

- Documentation and EA go hand in hand.
- Rate of change and demand are responsible for agile processing. Documentation of processes, knowledge, skills and decisions does not happen at the time or soon after organisational projects or business processes, resulting in loss of valuable information. *EA acceptance leads to better cooperation and documentation.*
- Organisational culture influences EA acceptance.
- If EA is adopted as an organisational strategy, implementation of EA governance to achieve better process control, reach short-term goals, produce acceptable output or raise production levels is often not a problem. *It is with stakeholder involvement and governance towards reaching goals or the path of production (who is involved? why are we doing it? and how are we doing it?) that human factors play a distinctive role.*
- Every organisation has its own unique behavioural character and style of operation.
- It is necessary to *understand organisational synergy* to enable management of EA acceptance.

From data gathered during semi-structured interviews to confirm the WoLAF for EA framework, some points raised by participants were used to do adjustments to WoLAF for EA and rethink arguments:

- In Figure 6.6, the arrows indicating adoption and acceptance of EA at different work levels had to be adjusted according to the work levels accepted for the research. It was stressed by two participants that the assumption made in the research that adoption of EA happens only at executive/manager work level had to be reviewed. In sections 3.4.1, 5.4.2 and 5.4.3 the argument that adoption of EA happens at executive/management work level as a result of strategic decision making and financial impact was derived from the literature and the exploratory study performed in the research. The assumption is thus defended by the statement that once EA is adopted by executive/management work level, it is mandated as an organisational strategy and accepted as such by the top two work levels (Figure 6.7). The research was concerned with acceptance of all stakeholders and more specifically representing the bottom two work levels.
- Another participant stressed that due to diversity in the workplace, management is not always aware of day-to-day practices performed by workers. The IT divisions of organisations in particular have to deal with extensive diversity. *If you want something done – ask the workers but make sure that you attend to their needs too.* It was agreed by participants that acceptance of EA should happen bottom up and that it is not as yet the case in organisations with EA practices.

Who	Roles Allocated Work Managed	Organisation Performance Group Accountability	Work Levels Defined	Adoption of EA	Acceptance of EA
Strategists (thought leaders) as theorists	Scope, vision, identify, plan in context	Overall high level abstraction	Executive/ Manager	↑ ↓ ↑ ↓	↑ ↓ ↑ ↓
Executive leaders as owners	Business definition, decision, concepts language	High level abstraction			
Architect (methodologists) as designers	Understand business logic and physical and technical implementation	High level abstraction	Architects	↑ ↓ ↑ ↓	↑ ↓ ↑ ↓
Engineers (technologists) as builders	Physical specifications	Technology/ business abstraction	Analyst/ Engineer		↑
Technicians (specialists) as implementers	Assemble, configure	Technology/ abstraction	Technician/ Worker		↑
Workers (professionals) as participants	Instantiate, do work	Operations abstraction			

Figure 6.7: Adoption and acceptance of EA reviewed

- One participant pointed out that although stakeholders who represent the two lower EA audience work levels of analyst/engineer and technician/worker would cooperate in EA initiatives, it is often necessary for architects as mediators to identify communication gaps between business owners and IT/IM stakeholders (Figure 6.8). Architects also have to explain the need for IT/IM initiatives and some IT/IM capabilities to stakeholders representing the top work level of executive/manager to bridge gaps and establish collaboration. With reference to Zachman’s classifications of What, How, Where, Who, When and Why (2010b:61), it is often explained to business stakeholders driving organisational outcomes and understanding the What and Where of business initiatives that stakeholders, responsible for doing the work, need to be informed about the Why of business initiatives and driven outcomes. It is also just as important for IT/IM stakeholders who understand technical restrictions and delays to communicate the When and Why to stakeholders from business work levels. Management of human factors could assist in establishing cooperation and collaboration in organisational EA related tasks.



Figure 6.8: Business, architect and IM/IT stakeholders in work levels

- The project manager commented on how often the reason that projects run late or fail is due to human factors. Managers need various different communication skills, interpersonal skills and management skills to address stakeholder engagement in projects – a statement that is confirmed by Schwalbe (2014:516). This participant, with knowledge of and work experience in all the different work levels identified for my research, completed the self-assessment tool for all work levels and provided feedback (see Appendix C on CD provided with the thesis). It was pointed out by this participant that the measurement of some human factors would pose a challenge to managers and an organisation. The importance of acceptance of EA and the length of time involved in organisational culture change and trust building were highlighted.

6.4.3 Conclusion

Participants were unanimous in agreeing that human factors impact on EA acceptance in organisations and that stakeholder acknowledgement of EA and the management of human factors remain a challenge for organisations. One participant representing a mining organisation with world-wide interests stated:

Although people from organisations in many countries world-wide agree that EA is important for management of complexity and change in large organisations, acceptance of EA as a strategy does not happen and practical implementation of EA are not universally performed.

People see EA as more work, taking up more time. The demand for production or problem solving is high – there is no time for detailed documentation. Valuable information and knowledge are lost.

Business drives differ from organisation to organisation (Section 2.6.1). Whatever the case may be - less expenditure, more profit, business growth, organisational expenditure, or something else - with EA in place to understand the 'as-is' state of the organisation and to assist in constituting a 'to-be' challenge, business procedures, processes and the impact of change can be managed. Humans are responsible to maintain EA in

organisations. Stakeholders of organisations can be classified into work levels according to their involvement in the business of an organisation, IT/IM involvement or involvement as architect (Table 5.14 and Figure 6.8).

Human factors in both categories of cooperation and collaboration presented in all the work levels have been reviewed to ensure that communication is included. The importance of stakeholder communication when it comes to business strategy is stressed by Simons (2010:100):

There is only one route to success: You must engage in ongoing, face-to-face debate by the people around you about emerging data, unspoken assumptions, difficult choices, and ultimately, action plans.

WoLAF for EA was updated and confirmed as a valuable means to assist organisations in identification of human factors impacting on EA acceptance. The list of human factors may not be complete or may differ in the context of the organisation in which the list is applied. It is however possible to update (add, delete or change) human factors in the light of the context of the organisation.

Chapter 6 was used to explain Development Phase 2 of the main design research cycle of the research:

1. A method (WoLAF for EA Method) to apply the WoLAF for EA model in organisations was described. Research objective 2 (RO2 - *to propose a method to use the model to assist organisations for management of EA acceptance.*) was addressed.
2. The second step of Development Phase 2 comprised the composition of the WoLAF for EA model (described in Chapter 5) and the WoLAF for EA method (described in Chapter 6) into the WoLAF for EA framework.
3. In an evaluation phase (Development Phase 2 of the main design research cycle of the research), WoLAF for EA was presented.
4. All the recommendations were analysed and addressed.
5. WoLAF for EA was confirmed.

Implications and contributions of the research are presented in Chapter 7.