CHAPTER 7 – RESEARCH OUTCOME AND CONTRIBUTION OF THE RESEARCH

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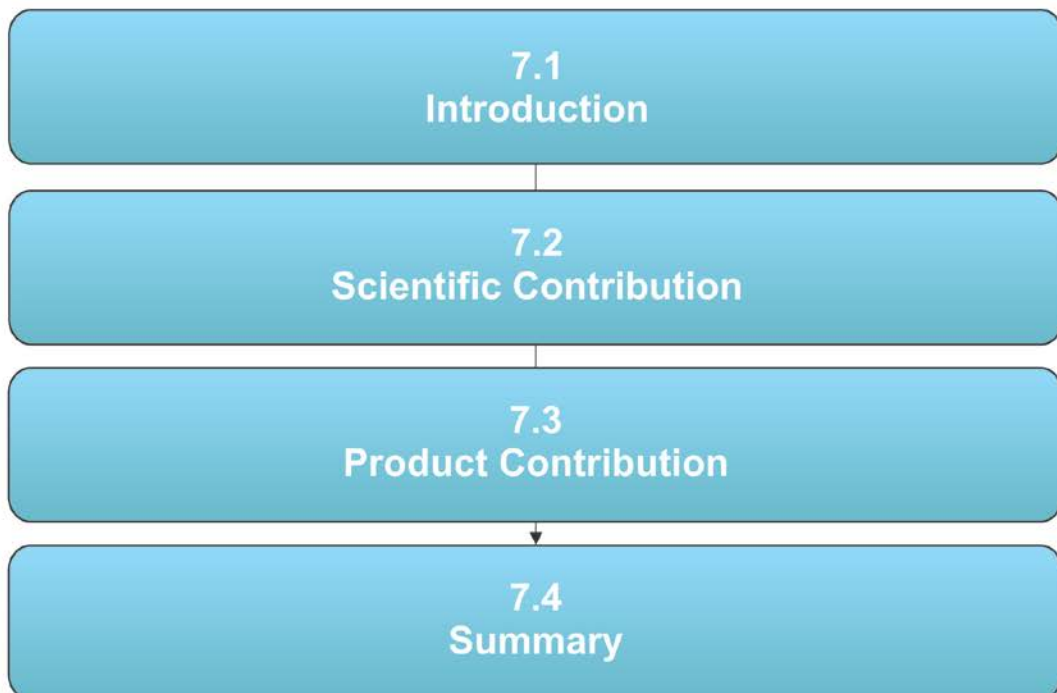
7.1   INTRODUCTION

Enterprises are complex, human-driven institutions. For people to manage and do the work needed to sustain a successful and progressive organisation, they need to conceptualise how the business, IM and IT of an organisation align and integrate (Kappelman, 2010:3). Although the importance of people in EA initiatives is acknowledged by authors (Nadler *et al.*, 1997:186; Ross *et al.*, 2006:204) and some categories of factors that impact on EA have been described in studies (Sage, 2006:1; Siderova *et al.*, 2010:70), no theoretical framework of human factors affecting EA acceptance exists. The main objective for the research was to develop a framework of human factors that could assist organisations in management of enterprise architecture acceptance.

Interest in the research was initially evoked when people working in organisations where EA had been adopted as a strategy mentioned that EA was not universally accepted by all stakeholders (EARF, 2009). EA is a long-term strategy and frequently phased in as part of projects in organisations.

One participant in the exploratory study remarked that a stakeholder in EA is "someone that can pull the plug on you". The stakeholders (executive management) reaping the fruit of EA as a strategy are not necessarily those people portraying a resistance to change to EA as a basic strategy of integrating business, IM and IT in organisations.

Stakeholders involved in and responsible for day-to-day execution of tasks, projects, modelling and outcomes should accept EA and cooperate. As Kappelman (2010c:119) states:

> *EA is about improving the ability of the people in your enterprise to communicate more quickly*
> *and effectively so they can manage and change the enterprise.*

A summary of the interesting results related to the human factors affecting EA acceptance (from the exploratory study) is:

- The need for EA was clear and was stated by respondents from all work levels.
- The term "enterprise architecture" was not universally used and the concept of "EA" was not universally understood and accepted. Different names mentioned for business-IM-IT alignment processes were "business architecture", "strategic change management", "enterprise ETE (emerging technologies for the enterprise) solutioning", "applications implementations methodology", and "SDLC (systems development life-cycle)".
- Managers stated that they share information such as organisational motives, drives and problems with employees but not always victories and successes. Forty-three percent of technicians and workers did not agree that managerial decisions were communicated and explained to them.
- Executives/managers claimed that they acknowledge the EA strategy followed in their organisations and 54% said that they facilitate and manage organisational change. Enterprise architects, analysts/engineers and technicians/workers did not agree with the preceding statement when they stated that business management should take responsibility for EA in organisations.

- Managers indicated that they rely on the support of employees and stakeholders and only 18% of the respondents stated that they do not trust other employees/stakeholders. Twenty-eight percent of technicians/workers, however, stated that they did not trust superiors.

- Forty-three percent of technicians/workers stated that managerial decisions were not communicated and explained to them and that human factors impacting on EA were not addressed and felt that individual human traits are not used to facilitate organisational change.

- All of the technicians/workers respondents stated that they cooperate with other people at work but 71% of them agreed that they work better if they work alone.

- Enterprise architects and analysts/engineers agreed that EA expectations are not realistic. These respondents agreed that employees, stakeholders and managers form an integral part of the organisation's business-IM-IT alignment, but 33% of enterprise architects stated that EA was not acknowledged as a business-IM-IT alignment platform and 50% said that EA responsibilities were not shared across different work levels.

- Eighty-three percent of the enterprise architects agreed that human factors impact on EA and that EA will succeed as an organisational strategy when there is human cooperation across different work levels.

Participants in the study revealed that through step-wise introduction of changing processes and regular updates on progress where EA guidelines were followed, EA was more readily accepted by stakeholders. It was the argument of the research that it is possible to promote acceptance of EA in organisations by identifying human factors impacting on EA acceptance.

The framework artefact called WoLAF for EA (Work-Level Acceptance Framework for EA) was presented in Section 6.3. This framework is suggested to assist organisations in the management of EA acceptance. The definition of a framework used is that of a *broad overview, outline or skeleton of interlinked items, which supports a particular approach to a specific objective, and serves as a guide that can be modified as required by adding or deleting items,* as defined in Business Dictionary (2010). A set of criteria useful to the study was found using the literature. Tilson *et al*. (2010:1) propose a set of criteria for a framework used to explain "digital convergence or divergence" as:

- accounting for growing complexity of technological infrastructures;
- accounting for dynamic mutual dependencies among social and technical infrastructures;
- providing some way of breaking up an increasingly interconnected socio-technical world into separate domains that allow meaningful study; and
- using the domains identified to explain the dependencies among social and technical infrastructures.

The first criterion is addressed in my research by expression of support for EA as a strategy to assist organisations with understanding of the complexity of business, IT and IM integration in organisations.

The second criterion is addressed in the literature review chapters (chapters 2 and 3) of the thesis as well as in the objectives and outcomes of the research. Structuration theory and actor-network theory have been identified and implicated as theories concerned with human factors in organisations and were therefore used as reference theories in the study of human factors impacting on EA acceptance (sections 3.5.1, 3.5.2 and

5.2.2.5). Furthermore, the human factors of technology acceptance models (TAM and UTAUT) were referenced in the study (section 5.2.2.6).

The third criterion concerns the investigation and comparison of human factors according to four different domain studies of EA. These were The Zachman Framework for Enterprise Architecture as ontology, TOGAF as a methodology, GERAM as a strategy and an exploratory study to collect primary data at one organisation.

The action suggested in the fourth criterion is performed through a description of the outcomes of the research according to the WoLAF for EA framework. The framework consists of a model with a detailed description of its entities and relationships and a proposed generic method of application related to different work levels.

This chapter focuses firstly on the scientific contribution that my research makes in Section 7.2:

- The Work-level Acceptance Framework for EA Model (WoLAF for EA Model) is presented in Section 7.2.1.
- An explanation extracted from the research of how adoption and acceptance of EA realise in organisations makes a contribution to the theories on adoption and acceptance of EA. This contribution is discussed in Section 7.2.2.
- The theories and frameworks referenced in the research are revisited and the contribution of the research to the theories and frameworks is discussed in Section 7.2.3.

The second contribution of the research is a product contribution, discussed in Section 7.3:

- The WoLAF for EA Method is presented in Section 7.3.1.
- A work-level-related list of human factors and a self-assessment tool are presented in Section 7.3.2 to assist organisations in the identification of human factors impacting on EA acceptance.
- A final contribution of the research is in the format of a list of proposed action steps to assist organisations in the management of human factors impacting on EA acceptance. These action steps are presented in Section 7.3.3

Chapter 7 concludes with a summary in Section 7.4.

7.2   SCIENTIFIC CONTRIBUTION

Oates (2006:4) provides a definition of research and states:

> *Research is the creation of new knowledge, using an appropriate process, to the satisfaction of the users of the research.*

According to Hevner (2012), knowledge contribution using design research can happen in two dimensions: maturity of application domain and maturity of solutions. Gregor and Hevner (2013:345) review four quadrants of research in the knowledge contribution framework (Figure 7.1) and call them "routine design", "improvement", "exaptation" and "invention". The outcome of my research is perceived as the development

of a new solution to a known problem and, therefore, as improvement. Improvement design science research (DSR) has to clearly "represent and communicate" the newly designed artefact (Gregor *et al.*, 2013:346).
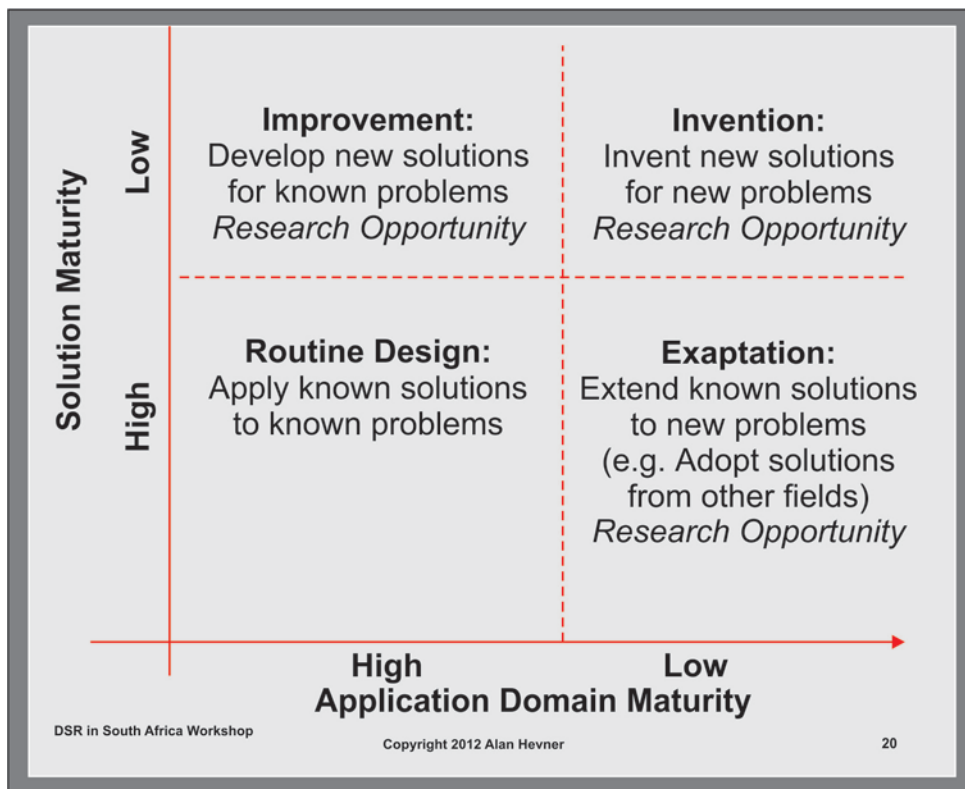

Figure 7.1: **DSR knowledge contribution framework** (Gregor *et al.*, 2013:345; Hevner, 2012)

7.2.1 WoLAF for EA Model

WoLAF for EA consists of a model and a method. The WoLAF for EA Model is a scientific contribution. It shows the relations between human factors affecting EA acceptance, human concerns impacting on EA acceptance and organisational work levels and work roles. The WoLAF for EA Method is a product contribution and provides a way to identify possible human factors that affect EA acceptance (Section 7.3).

Human factors affecting EA acceptance were initially identified in an exploratory study. The literature on technology acceptance models and theories, other related theories and EA was used to extend the initial list of human factors. A comprehensive list of human factors that impact on EA acceptance was presented in Section 5.2.3. The combined list of human factors identified from practice and theory was categorised into EA human concerns (EAHCs) and mapped into work levels (Section 5.5). The WoLAF for EA Model was compiled and presented in Chapter 5 (Figure 7.2).
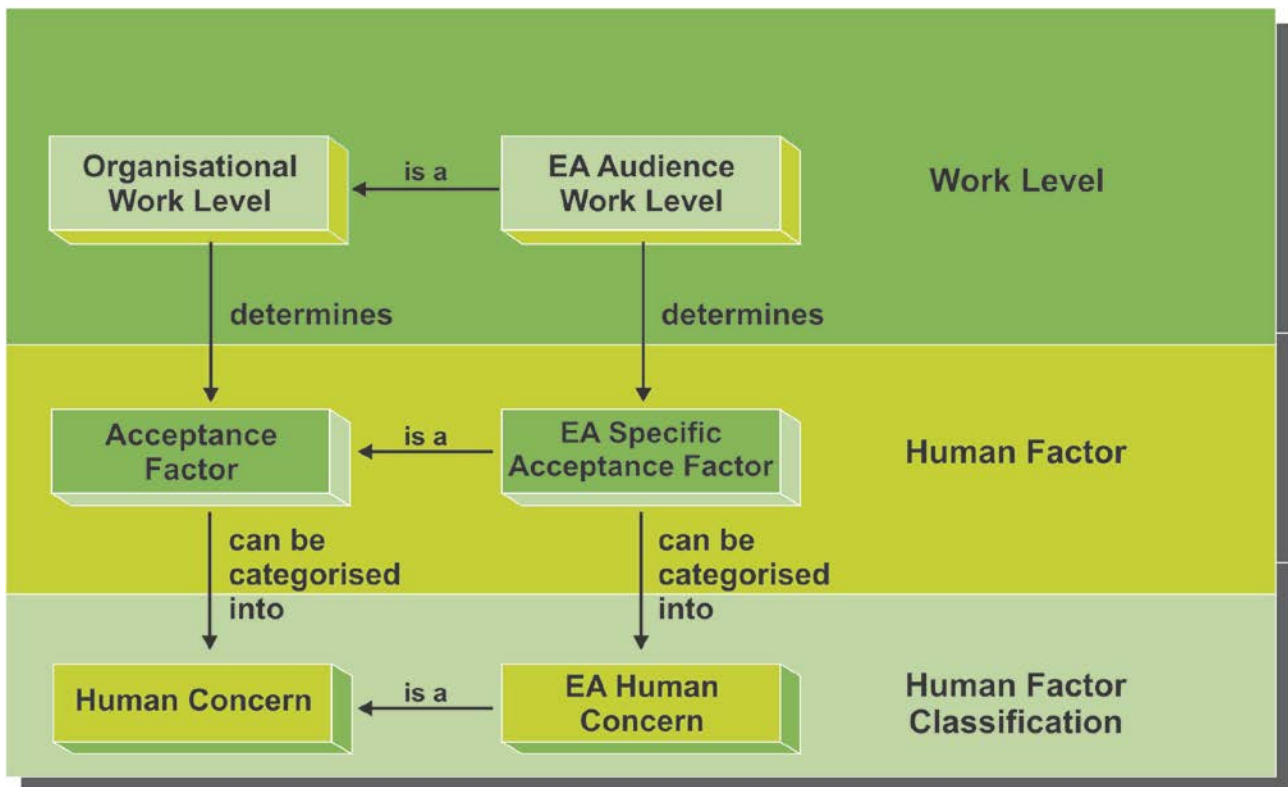
Figure 7.2:   Model explaining WoLAF for EA

The WoLAF for EA Model consists of three model levels: *work level*, *human factor* and *human factor classification* (Section 5.7).

The relationships between the model entities of *organisational work level*, *acceptance factor* and *human concern* are depicted on the WoLAF for EA Model where organisational work level determines the acceptance factors and where acceptance factors can be categorised into human concerns.

On the first model level perspective (work level), the model entity of *EA audience work level* is an *organisational work level* (Section 5.7.1).

The EA audience work level determines the *EA specific acceptance factors* on the human factor model level and an EA specific acceptance factor is an *acceptance factor* (Section 5.7.2).

EA specific human factors can be categorised into *EA human concerns* on the human factor classification model level of the WoLAF for EA Model. An EA human concern is a *human concern* (Section 5.7.3).

The WoLAF for EA Model contributes to the EA body of theory knowledge by presenting a description of how human factors that impact on EA acceptance relate to EA audience work levels and EA human concerns. Furthermore a comprehensive list of human factors, categorised into EA human concerns and presented from an EA audience work level perspective, has not been described and presented in the EA-related literature. The list of human factors classified into human concerns and categorised into EA audience work levels is therefore also a contribution to the EA scientific community (Section 5.5).

7.2.2   Contribution to the Theories on Adoption and Acceptance of Enterprise Architecture

An organisation is mostly managed and driven by people. People are seen as vital components responsible for performing the necessary tasks that define the "business" of an organisation. People are therefore perceived as stakeholders of an organisation. Only when stakeholders working for an organisation believe in and cooperate towards common organisational goals will such an organisation be regarded as successful and growing (Nemeth, 2012). Stakeholders represent all sections of an organisation and are usually assigned specific responsibilities corresponding to their work roles in an organisation (Section 5.6.3).

According to TOGAF (2009:412), stakeholders are people fulfilling key roles in systems. Examples of stakeholders are: individuals, users, developers, managers, teams or organisations. Stakeholders are associated with roles, needs, concerns, views and viewpoints. The whole architecture-development process starts by identifying stakeholders and their needs TOGAF (2009:281). Hoogervorst (2009:57, 73; 2011) compares the "mechanistic" EA view of TOGAF (relative stable organisational conditions, from planning to construct perspective, structured work role hierarchy and vertical communication) with his "organismic" view (handling unstable and changing conditions, a clear design and system view architectural perspective, self-shaping human participation to cope with change, vertical and lateral communication and cooperation). According to Hoogervorst (2009), EA is mostly used prescriptively and not normatively. From their systems view Checkland and Poulter (2006) explain that stakeholders enclose all those people directly affected by systems such as the owners, developers, users and customers, for example, but when it comes to human and environmental issues affected by systems, broader than even organisational normative consideration is required.

For the purpose of the research it was necessary to distinguish between people directly involved in organisational business, IM and IT and external users or people indirectly affected by organisational decisions and processes. Avison and Fitzgerald (merged) list stakeholders as chief information officer (CIO), IT-, IM- and project managers, business and systems analysts and programmers. Users may reside anywhere in an organisation and may include end users, business users, business management and business strategy management, for example. External users are, for example, customers or potential customers, information users, trusted external users, shareholders, owners and sponsors and society as a whole (Avison *et al.*, 2006:308).

People often seem to speak and act according to what they perceive the "correct behaviour" should be in their working environment. Walsham (2001:17) writes that employees often "accept" new directions and technology because they feel that their jobs are at stake. Korzaan and Morris (2009:7) state that the working environment can be constructed to suit human characteristics; for example, allowing independent and creative individuals to choose their own way of doing their work as opposed to others who would like to be given specific instructions on how to do tasks. The importance of human participation, involvement, and input in organisational design and operation is widely acknowledged (Ballangee, 2010b:147; Robbins, 2004:647; Ross *et al.*, 2006; Schein, 2004:437; Zacarias *et al.*, 2007:840; Zacarias *et al.*, 2010:441). Enterprises are described as socio-technical or socio-economical entities (Checkland, 1999:311; Dankova, 2009:102; Dietz *et al.*, 2011:1; Vernadat, 1996). An example of this acknowledgement is given by Vernadat

(1996) when he defines a manufacturing enterprise as a "set of communicating processes" executed either by humans or technology. Vernadat (1996) states that it is the work of organisational process designers to explicitly describe interaction between business processes, people and IT. Process designers should then establish how these relationships should be managed. According to Kwon and Zmud (1987:232), organisational innovation happens in three stages, which are initiation, adoption and implementation.

It was found in my research that although the quest or need for EA may come from IM or IT stakeholders, adoption of EA as an organisational strategy happens at an executive or management level, often on the basis of recommendations by enterprise architects or IM- and IT division managers (Table 5.1).

Managers and project leaders understand business definitions, directives and specific business goals. Supported by architects it is their responsibility to communicate the need for architecture to strategic leaders (executive level) and negotiate for adoption of EA as a new direction and strategy. The decision for adoption is thus taken at strategic and managerial work-role levels. Executive leaders and managers adopt strategies such as EA to support the organisation in establishing business goals, making decisions, successfully managing business processes and finding solutions to problems (De Villiers, 2010; Needham, 2011). Adoption of EA as a perceived driver of change is costly and, therefore, adoption of EA as an organisational strategy happens at executive organisational level (De Villiers, 2010).

Adoption of EA is a process that happens in the EA audience work levels of executive/manager and architects (top two rows of Figure 6.7, repeated in Figure 7.4) usually on recommendation of the enterprise architect, business analysts or IM specialists.

Acceptance of EA, on the other hand, is a more complicated and socio-technical process that is human-factor related and influenced. Kwon and Zmud (1987:232) confirm this statement when they state that organisations should make an effort to insure that new technologies are accepted and that the organisation receives the return on investment. An example of their representation of Lewin's change model (1952:459) shows that adaptation of new technologies forms part of change but that acceptance, satisfied use and eventual incorporation depend on human factors (Figure 7.3).
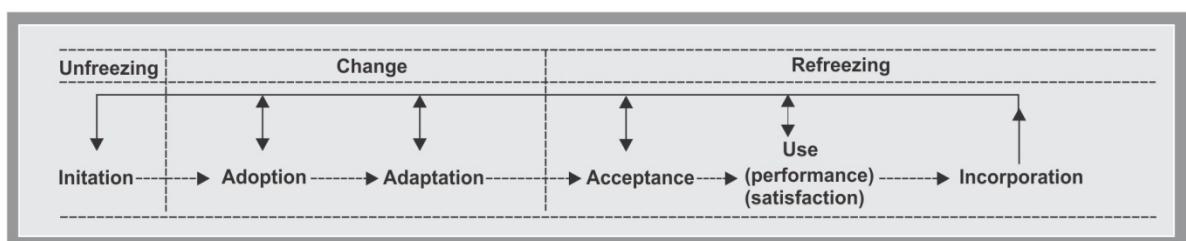

Figure 7.3: **A six-phase view of the IS implementation process** (Kwon *et al.*, 1987:233)

The focus of my study was on human acceptance of EA by stakeholders and users internal to an organisation. The implication of the research is that human behaviour and human factors can influence acceptance of EA in organisations. Acknowledgement of human ability and management of human factors in organisations will not result only in acceptance of new strategies but also in dynamic creativity.

Using The Zachman Framework for Enterprise Architecture (Zachman, 2008a; Zachman, 2011a) as a guideline, this research focused on humans involved in organisational business, information and technology processes as stakeholders and users representing all perspective work levels of abstraction from the higher abstract contextual- and conceptual organisational levels (executives, managers, business planners and owners) to the more functional and operational levels (physical and technical implementers and users).

EA acceptance was investigated at four work-level perspectives. Referring to the The Zachman Framework for Enterprise Architecture's "Who" classification of responsibility instantiations (Figure 2.2), the occurrence of EA adoption and acceptance at each perspective work-role level is shown in Figure 7.4.

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 7.4: Adoption and acceptance of EA reviewed

From the data collected during the exploratory study it was evident that work levels and work roles influence adoption and acceptance of EA.

The need for adoption of EA is often identified at the third (architects) or fourth (analysts/engineers) perspective audience work levels as seen in Figure 7.4. Adoption of EA happens as a result of business process, IM and IT alignment needs. Although often initiated and driven from an enterprise architectural or IT work-level, the process of introducing "new" strategies such as EA into organisations usually starts at executive level (top-down) with the adoption of the "new" idea.

Zachman (2012) states that the issue of complexity in organisations and EA's possibility to resolve the issue is raised by IT people for a good reason: IT departments transcribe what the enterprise "business" is thinking. And IT people have the drafting skills necessary to build the models and engineer or reengineer the enterprise. Enterprise architects act as designers of EA in organisations. Their main task is to understand the structure, business, technology and stakeholders of an enterprise and to provide guidance in two directions: towards strategic and management level upwards and towards technology and operational levels downwards (Zachman, 2012).

In my research, work-role-related human factors affecting EA acceptance in large enterprises had been identified and it was evident that acceptance of EA should happen bottom up according to the perspective of work levels adopted and adjusted from The Zachman Framework for Enterprise Architecture (Figure 7.4).

To confirm the importance of EA acceptance of different stakeholders, Figure 7.5 provides a graphical indication of the ratio of stakeholder involvement in EA in organisations (only a few architects, more managers and leaders and mostly stakeholders, workers and technicians). Figure 7.5 also depicts where EA acceptance is needed mostly – the bottom layer of analysts/engineers and technicians/workers. The research emphasised that EA is needed in enterprises, will become an essential strategy in future as complexity increases and more flexibility is required, and that management of EA acceptance is possible.

The contribution of the research is a work-level-related acceptance framework for EA (WoLAF for EA) to assist organisations in identification and management of human factors that impact on EA acceptance. It was the argument of the research that if these human factors are recognised, addressed and managed, acceptance of EA as a strategy can be promoted in complex enterprises.
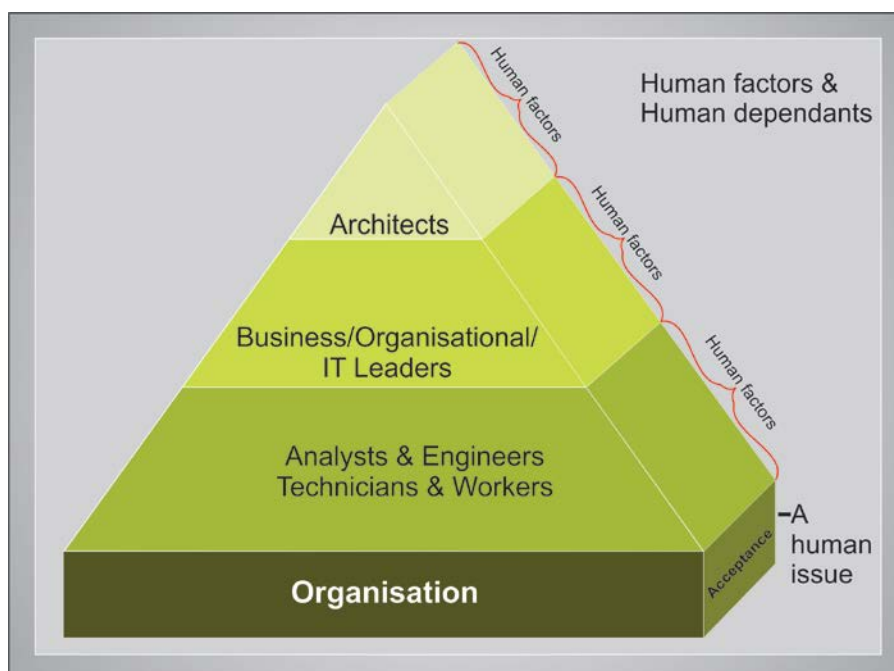

Figure 7.5:   The human work role distribution as perceived through an EA lens

7.2.3 Contribution to Other Theories

Models, theories and frameworks were used in the research as guidelines and sources of information on how humans are involved in organisational business, IM and IT operations. More specifically the human factors of models, theories and frameworks were used to make associations and extend the list human factors identified in the research. In sections 7.2.4.1 to 7.2.4.4 the models and theories are revisited and suggestions are made of how the models and theories can be reinforced by the list of human factors identified in the research (Table 5.11).

7.2.3.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

The unified theory of acceptance and use of technology (UTAUT) identified performance and effort expectancy, social influence, voluntariness of use, age, gender and experience as factors that impacted on technology acceptance. The list of human factors identified in my research to impact on EA acceptance is more comprehensive and specifically useful in one issue mentioned as a factor in UTAUT: facilitating conditions that impact on human technology acceptance. WoLAF for EA was developed for organisations to identify human factors hindering EA acceptance. WoLAF for EA could be used to identify human factors impacting on EA acceptance in relation to an individual in a work role or to identify human factors impacting on EA in relation to more people representing a work level.

7.2.3.2 Actor-network Theory (ANT)

Actor-network theory (ANT) has been referenced in an organisational context for the purpose of my research (Section 3.5.1). In the description of ANT, actors (human, non-human or both) and their actions are "formed" as a consequence of the relations in which they occur and their performance is defined in, by and through those relations (Law, 1999:4). Law (1999:8) however argues that initially ANT did not define the similarities and differences between relations and as a result the use of ANT in research (simply using ANT as a label, tag or reference) has become almost too simplistic, not apprehending the notion of complexity.

Latour (1999:15) debates the use of the words "actor", "network", "theory" and "actor-network": a network today has a different meaning (information exchange) than its original meaning in ANT (a series of transformations); the "actor-network" connection is a *constant movement between micro- and macro levels* - either framed interaction at a micro-level (as between actors) or it can imply the sum of local entities or a total of different agencies at a macro-level; "theory" simply indicates that researchers learn from actors about their work, and how and why they do what they do. Latour (1999:19) explains that contrary to the believes of some social researchers, ANT is not just another theory *trying to explain the behaviour of people*.

This explanation of Latour (1999:19) guided the research when human factors were initially identified in an exploratory study. The aim was to learn from EA stakeholders about the what, how and why of their work. From an EA viewpoint, ANT has been described in Section 5.2.2.1 where an enterprise, architecture and IT solutions were referenced as examples of actor networks. EA in an organisation is an integrated and supposedly transparent representation of all aligned interests with a purpose to support the business of the organisation. Relations in and between organisations, humans, systems, strategies and technology are

complex and not transparent, evident, simple or fixed. ANT has not been used as a foundation or a "theory" or basis for the research but only to guide the research and refer to human factors that were identified by ANT studies (Table 5.10).

WOLAF for EA was designed to support the management of EA acceptance in organizations. Human factors that were listed by ANT and proved to influence actors in a social environment such as an enterprise, were human use of technology and information, human fit in organisations, human tacit knowledge, culture, politics and moral issues. The list of human factors identified in my research to influence EA acceptance can enhance human factors listed by the ANT. WoLAF for EA can be used to identify human (actor) factors in relation to a work role or work level situation in an EA in organizational context where performance is affected by non-compliance to the use of a new strategy or a resistance to change.

7.2.3.3   Structuration Theory (ST)

Structuration theory (ST) describes a duality of structure where structure (with incorporated rules and resources) has an influence on humans in the social environment and humans representing the social environment continuously restructure their environment. Human action and interaction in a social environment, for example an enterprise, are therefore complex and at the same time dynamic issues. Giddens (1981:163) explains that humans constantly apply knowledge, skills and capabilities in their social environments and although their "actions" are sometimes restricted by consequences of social actions, they are the ones that know what they do, how they do it and why they do it. ST lists how communication, power and sanction as human factors important for interaction relate to signification, domination and legitimation in structures of which an enterprise could be one (Section 3.5.2).

ST was of particular interest in my research where human factors impacting on EA acceptance is described from the viewpoint of different work levels. The WoLAF for EA Model reviews the influence of human factors impacting on EA acceptance from the perspective of the individual representative of an EA audience work level in an organisation. The list of human factors proposed to influence EA acceptance from a work-level-related viewpoint can be used, or adjusted and used, to extend the factors of communication, power and sanction in ST. Communication was identified in my research as one of six human concerns (6EAHCs) used as a classification scheme to group human factors. Figure 7.6 shows how the other human EAHCs, used and described in my research in Section 5.3, can be used to extend the interaction dimension of the duality of structure (Giddens, 1984:29).
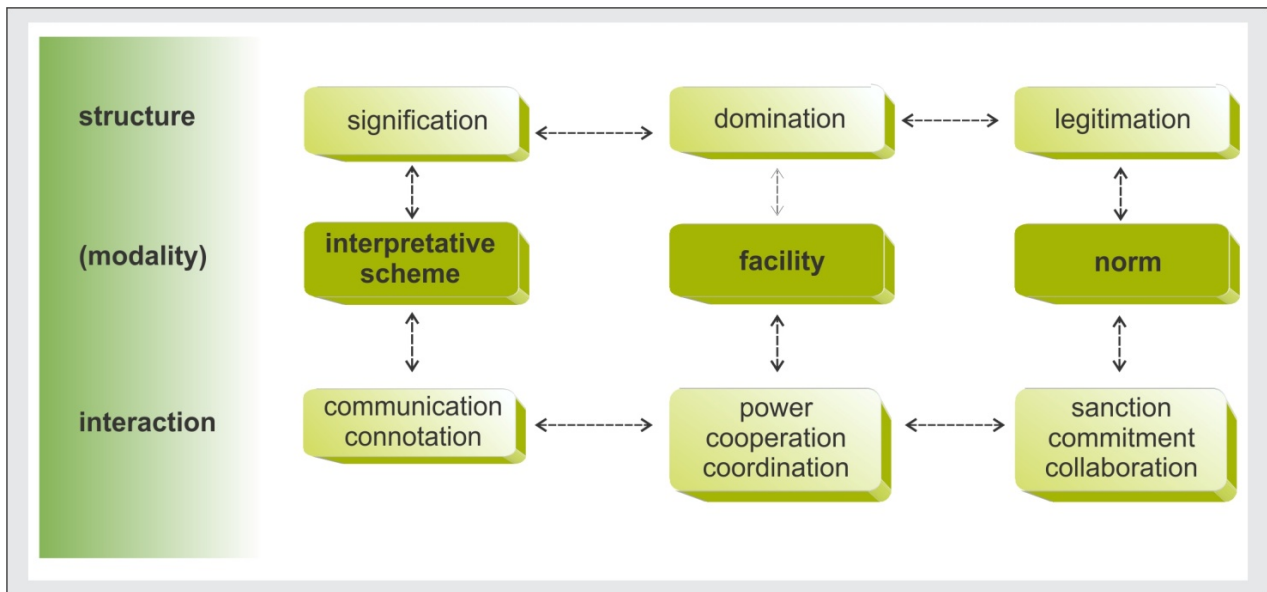
Figure 7.6: **The dimensions of the duality of structure** (Giddens, 1984:29)

7.2.3.4   EA Frameworks

Although the three EA frameworks used for the purpose of the research acknowledge the importance of human involvement in EA, specific human factors impacting on EA acceptance are not addressed in these frameworks. Of the three frameworks referenced, the Zachman literature on EA is the most representative of human factors and EA involvement (Section 5.2.2.5.1). TOGAF addresses characteristics of an enterprise architect and lists categories of human skills as generic, business, EA, programme, project, technical, IT and logical environment (Section 5.2.2.5.2). GERAM refers to human involvement in EA and proposes that enterprises address human roles, skills, competencies, capabilities, responsibilities, experience and tasks when EA is adopted as an organisational strategy (Section 5.2.2.5.3). WoLAF for EA is proposed as an additional framework to be added to literature on EA frameworks and specifically in the human factors context. The list of human factors can add value to existing EA frameworks and assist organisations that use EA frameworks with management of EA acceptance.

7.3   PRODUCT CONTRIBUTION

The product contribution of the research is twofold: the WoLAF for EA Method is presented and a tool in the form of a questionnaire is proposed.

7.3.1   Work-Level Acceptance Framework for Enterprise Architecture Method

The WoLAF for EA method was developed in a second development phase of the research and discussed in Section 6.2. Referencing the model in Figure 7.2, 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.

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

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

h) Identify stakeholders in work levels involved in EA acceptance-related problems in the organisation.

i) 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.

j) Use the results gathered from the questionnaires to categorise human factors according to the six EAHCs identified for the research (Section 5.3).

k) 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.

l) 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:

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

f) Identify stakeholders in their EA work role or EA project role affiliation where EA acceptance is regarded as responsible for problems in the organisation.

g) 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.

h) 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.

7.3.2 Work-Level Acceptance Framework for Enterprise Architecture – a Self-Assessment Tool Proposed

The human factors identified in the research were used as a guideline to compile a self-assessment tool. The work-level-related self-assessment tool can be used to assess which human factors impact on EA acceptance in organisations.

The following rating scale applies to the questionnaires (Y=Yes, N=No, S=To some extent and NA=Not Applicable).

7.3.2.1 Work Level – Executive/Manager

Executives and managers may be found to have the management of responsibilities at each work level described in the research; for example, the IT technical manager of an organisation being involved in planning, designing and execution of enterprise, business, IS, IM, IT and data-related tasks (Section 5.5.1).

Human factors impacting on EA acceptance for the executive/manager work level are dependent on the type of organisation, the context of work and the work-role description. A self-assessment can be performed by stakeholders of this work level, indicating specific EA concerns hindering acceptance of EA as a strategy. The following questions are relevant for the work level of executive/manager:

I normally perform and/or achieve the following:		
1	Facilitate and manage transformation and culture change (engineering)	
2	Interact with all stakeholders, address their needs, and share motives, problems and small victories	
3	Promote a commonly understood business and EA language	
4	Continuous communication of business goals and issues	
5	Implicating all stakeholders in business/IM/IT matters and foster engagement	
6	Provide support for EA knowledge sharing and EA training	
7	Establish a future architecture vision and definition	
8	Understanding long-term ROI	
9	Sharing long-term organisational vision	
10	Managing risk (risk management) and financing – address remuneration of effort expectation	
11	Personal strength and leadership	
12	Establishing group dynamics	
13	EA involvement and EA decision making	
14	Acknowledge and accept stakeholder ideas, input and effort	
15	Accepting ownership of business/IM/IT alignment	
16	Acknowledging short-term achievements in confirmation of long-term procedures	
17	Following 'as-is' and 'to-be' roadmap	
18	Maintaining realistic expectations of EA	
19	Optimise and standardise procedures, equipment and services when needed	
20	Acknowledging maturity level differences	
21	Understand and deal with global issues	
22	Showing patience for EA initiatives	
23	Demonstrate perseverance for EA initiatives	
24	Being open-minded for EA stakeholder ideas, initiatives and tasks	
25	Taking ethical and honest action, showing integrity	
26	Request early and continuous updates of EA tasks and results	
27	Share knowledge with architects	
28	Communication skills: accurate reflection of intentions, allow information flow, allow decisions to filter through	
29	Understand benefits and competitive advantage – perceived usefulness of EA	
30	Perform EA validity checks	
31	Demonstrate leadership and teamwork skills	
32	Coordinate diversity and change	
33	Promote a business and technology human inclusive view	
34	Understand and perform EA governance	

7.3.2.2   Work Level –Architects

Enterprise architects are used as an example of architects to illustrate the concept. Enterprise architects are usually people with knowledge in all areas of IT including a qualification in EA; for example, certification in TOGAF or the Zachman Framework for Enterprise Architecture. Self-assessment can be performed by stakeholders at this work level, indicating specific EA concerns. The following questions are relevant for the work level of enterprise architect:

	I normally perform and/or achieve the following:	
1	Explain perceived EA benefits, share progress and competitive advantages of EA	
2	Interact with all stakeholders, address their needs and share motives, problems and small victories	
3	Defining EA and facilitating use of a commonly understood business and EA language	
4	Communication: request early and continuous updates of EA tasks and results	
5	Establish a future EA vision and definition	
6	Continuously acting as mediator between business and IT stakeholders	
7	Promote realistic EA expectations	
8	Optimise and standardise – procedures, equipment and services	
9	Knowledge sharing	
10	Coordinate diversity and change	
11	Understanding organisational culture and principles	
12	Showing dedication and providing guidance rather than EA governance	
13	Possessing personal strength, leadership and teamwork skills	
14	Follow 'as-is' and 'to-be' roadmap	
15	Accepting and acknowledging stakeholder effort, input and involvement	
16	Understanding metamodels applicable to EA	
17	Conceptualising business/IM/IT alignment	
18	Analytical thinking and at the same time practical implementation	
19	Showing passion for EA, demonstrating support for EA, EA advisory role	
20	Accepting the EA challenge	
21	Fostering stakeholder engagement with EA – decision making by management should reflect in execution of EA tasks by stakeholders or teams	
22	Identify reusable information	
23	Resolving conflict	
24	Possessing and showing perseverance in EA initiatives	
25	Understand that EA stakeholder team dynamics cultivate creativity and synergy	
26	Promote a business and technology human inclusive view	
27	Sharing EA knowledge and information	
28	Understand and share long term EA vision and showing patience	
29	Define EA concepts	
30	Taking into account maturity-level differences	
31	Being open-minded and accepting input and innovative ideas from stakeholders	
32	Facilitating transformation and change	
33	Continuous EA validity checks	
34	Provide and accept advice and training if needed	
35	Obtaining professional EA skills	
36	Dedication to the EA initiative	

7.3.2.3 Work Level – Analyst/Engineer

Self-assessment can be performed by stakeholders at this work level, indicating specific EA concerns. The following questions are relevant for the work level of analyst/engineer:

	I normally perform and/or achieve the following:	
1	Facilitating stakeholder cooperation and understanding of EA initiatives	
2	Interact with all stakeholders, address their needs, share motives, problems and small victories	
3	Sharing knowledge with architects	
4	Define, understand and use EA concepts	
5	Accepting responsibility for EA-related tasks	

6	Understand EA metamodels	
7	Continuous sharing of IM/IS/IT benefits and results	
8	Understanding long-term EA vision	
9	Optimisation of procedures, equipment and/or services	
10	Facilitate EA focus of business/IM/IT alignment – architectural modelling and implementation	
11	Strong support role vision	
12	Establishing group dynamics and a team spirit	
13	Facilitating stakeholder involvement	
14	Sharing information	
15	Accept responsibility and accountability for EA tasks	
16	Understanding and acknowledging stakeholder and user requirements and concerns	
17	Following 'as-is' and 'to-be' roadmap	
18	Having realistic expectations of EA	
19	Being open-minded for stakeholder ideas and input	
20	Acknowledging EA maturity level differences	
21	Using a commonly understood business and EA language	
22	Enabling information exchange and preservation	
23	Acknowledge human input and effort	
24	Facilitate transformation and change	
25	Adapt and adjust EA initiatives when needed	
26	Promote a business and technology human inclusive view	
27	Promote EA knowledge sharing and EA training	
28	Solutions architecture with a purpose - based on design objectives	
29	Create collaboration opportunities and educate employees	
30	Understand enterprise culture, vision and principles	
31	Accept the EA challenge	
32	Positive attitude, focused and passion for EA	

7.3.2.4   Work Level – Technicians/Workers

Self-assessment can be performed by stakeholders at this work level, indicating specific EA concerns. The following questions are relevant for the work level of technician/worker:

I normally perform and/or achieve the following:		
1	Sharing information with architects	
2	Communication with all stakeholders	
3	Using a common business and EA language	
4	Being accountable for EA tasks	
5	Cooperating with all stakeholders in business/IM/IT matters	
6	Providing support to EA stakeholders	
7	Enabling the exchange, preserving and reusing of information	
8	Understanding long-term ROI	
9	Sharing of some knowledge and skills	
10	Accepting responsibility and accountability for EA tasks	
11	Understanding optimisation and standardisation of resources and services	
12	Cooperating to establish group dynamics - teamwork	
13	Accept input from stakeholders	
14	Understanding the balance between needs, quality of work and expenditure	
15	Understanding organisational business culture, vision and principles	
16	Understanding and acknowledging short-term achievements in confirmation of long-term strategies	
17	Following 'as-is' and 'to-be' roadmap	

18	Having trust in organisational strategies and other stakeholders	
19	Following standardised EA procedures	
20	Accepting organisational decisions, transformation, culture change and participating in EA initiatives	
21	Being loyal to organisation and other stakeholders	
22	Showing patience	
23	Having perseverance	
24	Accept and provide training	
25	Carrying out ethical and honest action	
26	Having a positive attitude	
27	Work satisfaction	
28	Understand EA concepts	
29	Adapting and adjusting to EA initiative when needed	
30	Staying focused	
31	Acknowledging and accepting user- and stakeholder needs and requirements	
32	Being open-minded about EA initiatives	
33	Provide feedback and frequent EA results	
34	Understand the need for interaction and EA networking	
35	Practising technology from a human inclusive viewpoint	
36	Reasonable requests for technical resources	
37	Accepting authority and sharing organisational values	
38	Being self-efficient and showing work efficacy	
39	Understand EA work role importance	
40	Facilitate architectural modelling and EA implementation	

7.3.3 Proposed Other Possible Action Steps

The WoLAF for EA generic method and the self-assessment tool can be used in organisations to identify human factors impacting on EA acceptance. Examples of possible appropriate action steps to address human factors impacting on EA acceptance are.

- Use skills and competency guidelines to identify which work-role-specific human factors are proposed for EA-related work roles. Work levels identified and used in the research represent a generic perspective. Work roles, in contrast, are contextually bound and a job description usually acts as an indication of work role responsibilities. The skills framework for the information age (www.sfia.org.uk) provides guidelines for business, IM and IT competency and skills according to seven responsibility levels: follow, assist, apply, enable, ensure/advise, initiate/influence, set strategy/inspire/mobilise. Each level is described according to autonomy, influence, complexity and business skills.

- Occupational assessment instruments can be used to measure capability, competence, personality, preference and leadership of stakeholders for EA work role suitability (EARF, 2009).

- When individuals understand their own and other people's thinking styles they learn how to work together and present information to other people in a way that promotes better working relationships and collaboration. The Hermann Brain Dominance Instrument (HBDI®) is an assessment tool that can be used to assist EA stakeholders with understanding of their own and other stakeholders' thinking styles (HBDI, 2012).

- The Cognitive Process Profile (CPP) is a technology based assessment of how people use their cognitive processes and abilities to solve problems. CPP can be used to assist organisations to find the right person for the right EA work role (CPP, 2014).

- The DISC® Behavioural Model was originally described by Marston (1928). The DISC profile is a self-assessment test for behavioural preferences that places people in categories or intersections of categories of dominance, influence, conscientiousness and steadiness. The four categories are listed in four quadrants with axes of task-people and initiate-respond that intersect (Figure 7.7). Dominant people will focus on tasks and own goals – they ask "what" should be done and initiate work. People in the influence quadrant would initiate challenging and new ways of doing work but get other people to do the work. Influential people ask "who" will do the work. Steady people focus on detail and consensus in the workplace. Steady people ask "who", "why", "what" and "when". Conscientious people are task focused, logical and can see the bigger picture. They ask "why" and "how" (UARM, 2013). Self-knowledge of behavioural preference can lead to self-management. In interaction with other people it is often good to know how you and your behaviour are perceived by others. People learn to adapt to different behavioural styles of other people in the workplace if they understand their behaviour styles which in turn can lead to better cooperation in organisations (DISC, 2013).
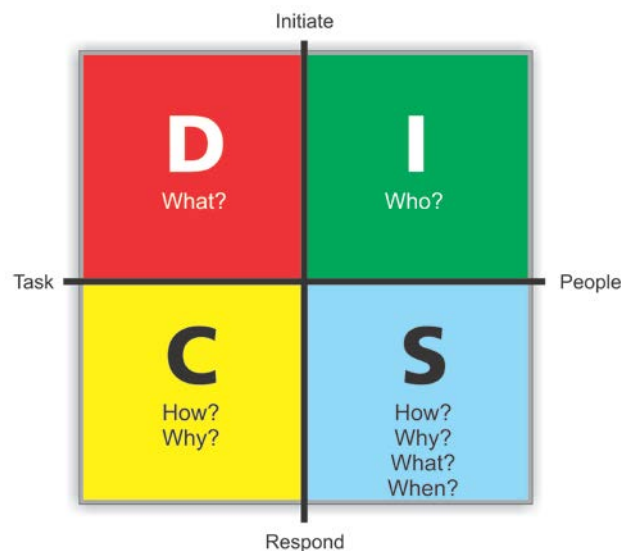

Figure 7.7: **The DISC® Behavioural Model** (Marston, 1928)

- Create an easy-to-use knowledge network platform to enable stakeholders to share their knowledge and skills (Bassellier *et al.*, 2004:689).
- Organise a workshop to explain the organisational need for interpersonal communication and present stakeholders with information about how to master interpersonal communication skills (Covey, 1989:269; UARM, 2013).

7.4   SUMMARY

The outcome and main contribution of the research was presented in Chapter 7, the framework called WoLAF for EA:

WoLAF for EA consists of a model and a method to assist organisations in promotion and management of EA acceptance. The WoLAF for EA Model was developed through four

cycles of design research followed by the development of The WoLAF for EA Method. This chapter provided a reflection on the artefact that was composed.

Chapter 7 was also used to present a proposed useful product to assist organisations in identifying human factors that impact on enterprise architecture acceptance:

> Human factors identified in the research, categorised into human concerns and mapped to work levels were used to compose a self-assessment tool in the format of a work-level-related questionnaire to identify human factors impacting on EA acceptance at four different work levels.

> Possible implementations of the research in an organisational environment were presented.

Furthermore, scientific contributions to the EA body of knowledge were presented in Chapter 7:

> Useful information on adoption and acceptance of EA in organisations derived from the research was presented.

> Contributions to the EA body of knowledge were discussed and suggestions were made of how theories and frameworks such as UTAUT, ANT, ST and EA frameworks could be enhanced or extended by WoLAF for EA.

Chapter 8 presents the conclusion of this thesis.