Matching Technology with Enterprise Architecture and Enterprise Architecture Management Tasks Using Task Technology Fit

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Abstract. Advanced modeling is a challenging endeavor and good tool support is of paramount importance to ensure that the modeling objectives are met through the efficient execution of tasks. Tools for advanced modeling should not just support basic task modeling functionality such as easy-to-use interfaces for model creation, but also advanced task functionality such as consistency checks and analysis queries. Enterprise Architecture (EA) is concerned with the alignment of all aspects of an organization. Modeling plays a crucial role in EA and the matching of the correct tool to enable task execution is vital for enterprises engaged with EA. Enterprise Architecture Management (EAM) reflects recent trends that elevate EA toward a strategic management function within organizations. Tool support for EAM would necessarily include the execution of additional and often implicit advanced modeling tasks that support EAM capabilities. In this paper we report on a study that used the Task-Technology Fit (TTF) theory to investigate the extent to which basic and advanced task execution for EAM is supported by technology. We found that four of the six TTF factors fully supported and one partially supported EAM task execution. One factor was inconclusive. This study provided a insight into investigating tool support for EAM related task execution to achieve strategic EAM goals.

Keywords: enterprise architecture task execution, modeling tools, enterprise architecture management, Task-Technology fit.

1 Introduction

The development of tool support for advanced modeling remains a challenging and arduous task. Modeling tool developers are confronted with voluminous sets of requirements of which some are straightforward such as user-friendly interfaces and the syntactic and semantic support for a specific modeling language such as UML or ArchiMate. However, some of the modeling requirements that would in the end determine whether a tool is successful and realizes sufficient adoption are implicit or vague because it supports model *use* for, for instance, management tasks that could include using models for communication across business functions, or doing business alignment analysis and managing business transformation using models.

Enterprise Architecture (EA) models are constructed to depict components of an enterprise from different perspectives in order to, for instance, align all aspects of an organization and support business transformation from an As-Is to a To-Be state [1, 2]. EA was traditionally positioned as an IT capability. Recent trends elevate EA as a strategic management function within organizations called *Enterprise Architecture Management* (EAM) [3, 4]. EAM necessarily include the construction of EA models [5]. In modeling tasks for EAM, implicit and advanced modeling functionality form a substantial part of the tool requirements due to the complexity of EA models as well as the complexity of the EAM scenarios that the models should support. In order to support EAM, a tool (the TEAM tool) was developed using the ADOxx platform [6–8].

In this paper we report on a study that was part of a collaboration project on tool support for EAM. A deliverable of the project was the development of the TEAM tool that was evaluated against initial modeling requirements [7]. During the first stage a need for evaluating advanced modeling functionality was identified, which lead to this study that used the Task-Technology-Fit (TTF) theory as proposed by Goodhue [9] to investigate the extent to which TEAM as technology 'fit' the execution and subsequent completion of tasks associated with basic as well as advanced modelling tasks required by EAM. Basic tasks would include the construction of EA models, CRUD and search functionality. Advanced EAM tasks would include the *use* of EA models inlcuding analysis across layers, governance and management tasks. The main focus of this study was the evaluation of six out of the eight factors of the Task-Technology Fit theory, namely *quality*, *locatability*, *compatibility*, *production timelines*, *systems reliability*, and *ease-of-use*. TTF is a widely adopted theory that specifically focuses on a particular technology that supports the execution of a user task, which in this case refer to EAM tasks. If the task is executed and completed successfully, a higher level of benefits (or increase performance) will be reached. The primary research question under investigation is "*Using the task-technology fit theory, to what extent did the technology (TEAM tool) support the execution of EAM tasks?*".

We found that four of the evaluated factors (locatability, production timelines, systems reliability and ease-of-use) supported the execution and completion of EAM tasks. Through the use of the existing TEAM modeling tool, one factor (quality) partially supported EAM, whilst the findings pertaining to the compatability factor was inconclusive. The objective of the study was not to replace proper end-user testing of a modelling tool such as TEAM, but specifically focused on the extent to which the technology enhanced the execution and completion of tasks. It should also be noted that that six of the eight measures were considered, omitting both the *authorization* and *relationship with users* measures due to the evaluation scenario for reasons explained later in the paper. The remainder of this paper starts with background on the TTF theory, EAM and TEAM followed by a section on the research method, and sections that present the results and findings, and conclude.

2 Background

2.1 Task-Technology Fit

The Task-Technology-Fit theory as introduced by Goodhue [9] focus on the "degree to which a technology *assists* an individual in performing his or her tasks". In instances where technology provide a higher degree of assistance to perform a task, performance is increased. The theory, in its original form, used elements from the 'Utilization focus' school of thought which focused on 'user attitudes and beliefs' to predict information system utilisation [10]. It subsequently included theory that focused on the extent to which the task requirements 'fit' or meet the needs of the individual to successfully complete a task. The TTF model (Figure 1) represents the two dimensions or main areas that influence the extent to which information technology can be used to increase performance (the so-called task-technology fit), namely *task characteristics* and *technology characteristics*.

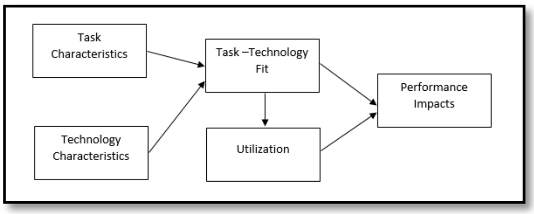

Figure 1 – The TFF model (reproduced from [10]).

Task characteristics refer to the tasks or actions completed by a user in direct response to a particular need or input. For example, in this study, (given a particular case study), part of the business requirements might be to create an architecture vision, in particular a stakeholder viewpoint modelling the stakeholders, their concerns, and the assessment of the concerns. *Task/job characteristics measures* focus on "task equivocality" and "task interdependence". Task equivocality refers to unstructured, infrequent business problems whereas Task interdependence refers to interdepartmental business questions posed across business functions.

The *Technology characteristics* could refer to information systems in general, or to a particular tool or technology. In this study technology refers to the TEAM tool, i.e. the tool used to create an architecture vision.

The *utilisation component* refers to the extent to which the technology is used in completing the task(s). In this study, the user might decide to use the technology, i.e. TEAM tool, only once or repetitively.

The *Task-Technology Fit* dimension focuses on eight factors that could possibly have a performance impact or an impact on the utilization of technology [10]:

- *Quality* refers to data quality characteristics such as the currency of the data available, the maintenance of data and the availability of an adequate level of detail of data;
- *Locatability* focuses on the identification of the location of data, i.e. what the source of data is as well as the metadata, i.e. the meaning of data elements on both a technical and business level;

- *Authorization* refers to the permission required to access certain data elements in order to complete a task or overall job;
- *Compatibility* refers to the ability to combine data from disparate sources;
- *Production timelines* refer to the success of information systems to meet operational timelines;
- *System reliability* (also referred to as 'uptime') evaluates the dependency and consistency of systems by considering the availability of the system.
- The system under evaluation should be *easy to use* and it should be *easy to train* or educate users to use the system;
- The last measure, *the relationship with users*, refers to information systems business functions within an enterprise. This measure focuses on the ability of the business function to understand the business, to support the business, to respond to service request in a timeous manner as per prior agreement and the availability of skilled, knowledgeable human resources to support the business in their needs.

For the purpose of this study, six of the eight measures were considered, omitting both the *authorization* and *relationship with users* measures due to the evaluation scenario. The target population / respondents to the study did not experience any challenges with regards to accessing certain data elements in the TEAM tool (*authorization*) and the *relationship with users* was not applicable as the study was conducted outside a formal information systems enterprise and subsequent business unit.

Lastly, the *performance impact* measures focus on the influence of information systems on individual job productivity as well as the service and support provided by IS systems on job effectiveness. For the purpose of this study this dimension evaluated the performance impact of the TEAM tool on the overall effectiveness and efficiency of the tasks completed by users.

2.2 Enterprise Architecture and Enterprise Architecture Management

One of the goals of EAM is to provide a high level overview of all aspects and components of an enterprise including the relationships between them [1, 11, 12]. The rationale include that organizations having a holistic view can manage and anticipate the impact of future changes in their business [13]. Such organizations use EA models to understand the various facets or perspectives of their enterprise (such as the business architecture, information architecture, data architecture, applications and technology architecture), supported by capabilities such as people, content, processes and tools, organizations [14]. Several EA frameworks are available, which mostly consist of a common vocabulary, models and taxonomy to establish the EA [15–18]. Most EA frameworks are supported by a variety of modelling tools and environments supporting specific EA languages and tasks such as ArchiMate [19, 20].

EAM is a relatively new development to the EA discipline. In contrast to EA initiatives that were managed from IT departments, EAM proposes that EA is a strategic management practice that establishes, maintains and uses a coherent set of guidelines, architecture principles and governance regimes that provide direction and practical help in the design and development of an enterprise's EA to achieve its vision and mission [3, 21–23]. In order to support EAM and the efficient and effective management of the enterprise, the actual EA *modeling* process is of strategic importance.

EA models represent knowledge and support communication and consensus. EAM tasks would necessarily include tool support to manage EA models including comparison of models across various layers or viewpoints (such as the application and business layers). In this paper we focus on the execution of both basic and advanced EAM modeling tasks in the TEAM tool.

2.3 The TEAM Tool

In order to support EAM modeling, the Open Models Laboratory (OMiLAB, www.omilab.org) developed the TEAM tool. OMiLAB provides an open platform for conceptual modeling and almost 50 different modeling methods have already been successfully conceptualized within OMiLAB [8, 24, 25]. The TEAM tool that supports EAM was implemented as a project within OMiLAB in multiple design science research cycles in which different prototypes of TEAM were released [7]. The initial cycles focused on the development of basic EA and ArchiMate modeling capability. The study reported on in this paper considers the execution of basic as well as advanced modeling tasks, which is only possible once a basic stable version of the TEAM tool is available for modeling. In the next section a short overview of ArchiMate for EAM modeling is provided.

2.4 ArchiMate

ArchiMate is a common EA modeling language that was formalized as an open and independent standard by the Open Group [19, 26].

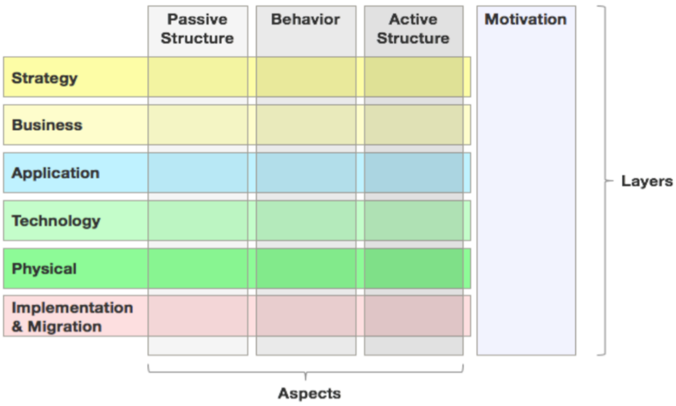

Figure 2: The ArchiMate Framework [19].

The purpose of ArchiMate is to support enterprise architecture modeling given a layered view of an enterprise (the ArchiMate Framework) depicted in Figure 2 [27, 28]. Each layer within the ArchiMate framework provides services to the layers above it. The core layers are the *business*, *application* and *technology* layers, which can be subdivided into further layers as indicated by the colours in Figure 2 [4]. ArchiMate uses a service model and a service is constructed using three aspects as indicated by the columns in Figure 2 namely *Passive Structure*, *Behavior* and *Active Structure* [19]. The latest version of ArchiMate include Views and Viewpoints to support the specific modeling requirements of different stakeholders.

3 Methodology

As mentioned, this study form part of a larger research collaboration project on advanced modelling tool support for enterprise architecture management. The project consistent of two phases: Phase 1 developed and evaluated the TEAM tool [7, 25]. Phase 2 of which this study forms part, investigated advanced modelling support using TEAM. The research steps for the execution of this study were: 1) identifying a suitable theory for evaluation of advanced nodeling; 2) developing a data collection instrument based on the theory; 3) data collection and 4) data analysis.

We identified the Task-Technology fit theory as a theory that could be used to investigate the capability of TEAM for advanced modelling, and we developed an online questionnaire instrument based on the TTF theory. An interpretive, qualitative approach was followed to gather data from EAM students and scholars who used the TEAM tool during two main engagement sessions (one in Austria and another in South Africa). During the first part of both sessions a speaker on the topic of EAM explained basic terminology and the context of EAM to the audience using the TEAM tool where applicable for demonstration. The latter part of the session offered students the opportunity to perform EAM tasks using TEAM and the ArchiSurance[1] Case study [29]. Due to time constraints, participants were instructed to create the architecture vision based on the case study. Figure 3 depicts the high level architecture vision.

On completion, participants created a high level model to display one of the business goals as identified in the high level architecture vision, namely profitability (see Figure 4a). One of the many actions to increase profitability was to reduce costs depicted in the business models in Figure 4 (a and b). Hands-on support was available to participants during the execution of tasks to create the models in the TEAM tool. On completion, participants had the opportunity to complete the online questionnaire based on the TFF theory. The tasks in the case study included model analysis using meta-specification of model functionality provided by TEAM.

3.1 Online questionnaire based on TTF

The Task-Technology-Fit (TTF) theory [9] has proven to be an extensively used theory for investigating the extent to which technology support the execution of tasks. For using TTF we made a distinction between basic modeling tasks (create, read, update, delete (CRUD) and search) for EA models. EAM use EA models to do strategic management and advanced tasks mostly entail *using* EA models (analysis, governance, management) e.g. doing a cross-comparison of models across different architectural layers to detect inconsistencies or incompleteness. Participants were made aware of the difference between basic and advanced modeling tasks i.e. basics that involved model CRUD and search, and *using* models for EA *management*. Each of the TTF constructs was used to assess the ability to execute basic and advanced modelling tasks according to end-users. The EAM modeling tasks were mapped to the TTF constructs as indicated in Table 1 below.

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[1] ArchiSurance is a fictitious case study developed by the OpenGroup to illustrate the ArchiMate modelling language using the TOGAF framework.

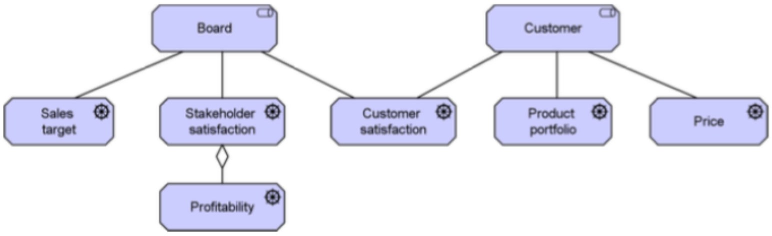

Figure 3 – ArchiSurance – high level architecture vision model

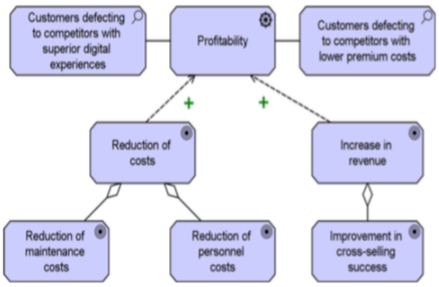

Figure 4a – ArchiSurance – high level profitability business goal model

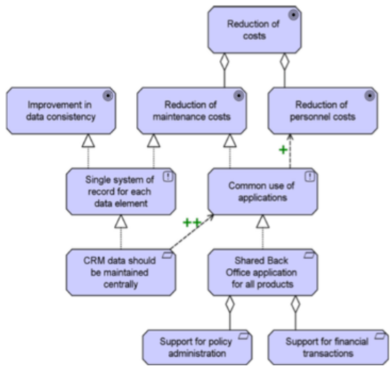

Figure 4b – ArchiSurance – EA model displaying the reduction of costs goal

Table 1: Mapping of tasks to TTF constructs

Dimensions	**Factor name**	**Sub item**
Technology dimension	Quality	Currency • Ability to create model according to EA modeling needs. • Ability to create model according to EAM needs. • Create and maintain models that are up to date.
		Right model • Availability of elements to perform EA modeling tasks. • Availability of elements to perform EA modeling management tasks.
		Right level of detail • Performing EA modeling maintenance. • Create models on the appropriate level of detail for EA. • Create models on the appropriate level of detail necessary for EAM.
	Locatability	Meaning • Storing and retrieving EA views for EAM. • Availability of meta-data of EA models.
	Compatibility	• Create models that are consistent irrespective of the technology used. • Comparison and consolidation of models.

	Production timelines	• Create/maintain production timelines and schedules for EA projects. • Create EA models on time. • Produce information for managing EA.
	Systems reliability	• Platform available during task execution.
	Easy of use/training	• TEAM is easy to learn. • TEAM is easy to use for EAM. • Training is available.
Task/job characteristics	Task equivocality	• Ability to create models for ill-defined modeling tasks • Complete ad-hoc, non-routine modeling tasks. • Create models responding to new questions.
	Task interdependence	• View/create models for more than 1 business function.
Performance impact measures	Performance impact of EAM tools.	• The TEAM tool supports me in the execution of my tasks to increase job performance.

Although questions pertaining to the task characteristic and performance impact measures were included in the questionnaire, the main focus remained on the six factors of the task/technology dimension as it could be directly linked to the EAM task requirements. A Likert scale was used as measurement scale. Available options ranged from strongly agree over undecided to strongly disagree. The questionnaire was deployed online via the online questionnaire software QuestionPro [30].

3.2 Data Collection

Using the developed instrument, we collected data during two different contact sessions. The online questionnaire consisted of three parts focusing on evaluating the basic and advanced modeling tasks using the TEAM modeling tool: *Part 1* explained the objective of the questionnaire, namely "to investigate the extent to which the TEAM modeling platform assist or support enterprise architecture modeling and management tasks using the task-technology fit theory". Even though the audience were mostly familiar with EA and EAM, the key technological terminology such as enterprise architecture, enterprise architecture models and enterprise architecture management were clarified. *Part 2* collected biographical information from participants such as country, current job title, and designation. *Part 3* contained questions focusing on each of the two dimensions as specified in the TFF model namely task and technology as well as the subsequent six factors namely *Quality, Locatability, Compatibility, Ease of use/training, Production timelines* and *Systems reliability*.

Data from the two contact sessions were analyzed using the online analytical capability of the questionnaire tool QuestionPro [30].

4 Results and Discussion

The first contact session was conducted during the Next-generation Enterprise modeling (NEMO) summer school in 2018 (Session A). The session was attended by a diverse audience from all over the world including senior level students from more than ten countries. The positions held included Masters and Doctoral students, Software Developers, Researcher, Enterprise Architect, Software developer, Entrepreneur, General Manager and Electrical Engineer. 81.25% of the respondents had less than 2 years' experience in the area of EA including any EA tool; 12,5% had between 2 to 5 years' experience, whilst only 6.25% had more than 10 years' experience. All the respondents had less than 2 years' experience with the TEAM tool. A total of 18 respondents completing the questionnaire after a short tutorial and practical hands-on session where they had opportunity to use the tool.

The second contact session was conducted in South Africa. All the participants were residing in South Africa. Two participants were students and two EA consultants/solution architects, the remainder were associated with an academic environment. 37.5% of respondents have between 5 and 10 years' experience in the area of EA and EAM, whilst 62,5% have experience in using a particular EA *platform*. None of the participants used the TEAM modeling tool before. A total of 8 participants completed the online questionnaire (referred to as Session B).

4.1 Task-Technology Fit characteristics

Quality (Currency):

Session A: Respondents had diverse opinions when asked if there were EA modeling platforms available that meet their modeling needs. 26% of respondents agreed, 32% were undecided whilst 37% disagreed. A small minority indicated that the question was not applicable (5%). When asked if the TEAM tool offered the necessary functionality to fulfil their EA modeling needs, all respondents agreed. In terms of the EA *management* capability respondents felt that there is no EAM tool available to utilise (31%), whilst 32% were undecided 32% disagreed and 5% felt that the question was not applicable. However, all the respondents agreed that the TEAM modeling tool could assist them in future in achieving EAM task requirements.

Session B: Almost half of the respondents indicated that there are currently EA modeling platforms available to meet their modeling as well as EAM needs. 33% of respondents felt that the TEAM tool can also be used and is up to date and offers all the functionality required to perform EAM tasks.

Quality (right model):

Session A: The majority of the respondents (47%) indicated that the TEAM modeling tool has the capability to carry out their EA modeling tasks. A total of 10.5% of respondents indicated that the question was not applicable whilst another 10.5% were 'undecided'. 31,7% of respondents indicated that the TEAM tool did not provide all the capability required. The majority of participants (52.5%) furthermore indicated that current modeling platforms are missing critical EA modeling functionality that would be useful in completing their tasks. 32% of respondents were undecided, while 5% disagreed that the EA modeling tools will be useful. 10.5% felt that the question was not applicable.

From an EA *management* perspective, 37% respondents indicated that the TEAM modeling tool provides capability when engaging in EAM tasks, 31.5% of respondents were undecided whilst 10.5% felt that the question was not applicable. 21% indicated that the TEAM modeling tool did not provide them with useful and applicable capability to complete EAM tasks. 53% of respondents indicated that current modeling platforms available to them are missing critical EAM functionality that would be useful in completing their jobs; 26% were undecided; 11% indicated that the question was not applicable whilst 10% disagreed.

Session B: 25% of respondents indicated that the TEAM modeling tool offers the necessary capability to carry out EA modeling tasks and fulfil their functional needs to perform EA management. Despite the (negative) responses, 50% of respondents felt that they could not decide if the current modeling platforms are missing critical capability (including EA management) for them to complete their EA related tasks.

Quality (right level of detail):

Session A: The maintenance of EA models are an advanced EA management task requirement. The majority of respondents agreed that the TEAM modeling tool allowed them to maintain their EA models (52.5%) whilst 37% of respondents were indecisive. Only 5% disagreed whilst another 5% felt that the question was not applicable. Respondents further indicated (49%) that the TEAM modeling tool allowed for the maintenance of respondent's enterprise models on the correct level of detail – another important advanced EAM requirement. The number of indecisive respondents were 32% whilst a bigger number of participants felt that the question was not applicable (10.5%) or was in disagreement (5%). Focusing on the ability of the TEAM modeling tool to support detailed management tasks, the majority of respondents agreed that the platform support the capability (42%) whilst 10.5% disagreed; 37% disagreed and another 10.5% felt that the question was not applicable to the tool.

Session B: Between 37.5% of respondents felt that the TEAM modeling tool allows them to maintain their EA models on an appropriate level to support their EA tasks including their EA management tasks.

Locatability:

Session A: 77% of respondents indicated that they could easily find and view models that are maintained in the TEAM modeling tool whilst 67% indicated that it was easy to locate the appropriate layer inside the tool without any prior experience with the tool.

Session B: 25% of respondents felt that it was easy for them to find and maintain their EA models even if they have not used the TEAM modeling tool before.

Locatability (meaning):

Session A: When using EA modeling tools, the majority of respondents (72%) could easily store and obtain the exact definition, properties or attributes of their current EA models. This was also the case when using the TEAM modeling tool (77% of respondents agreed).

Session B: Metadata, such as the definition of properties or attributes of enterprise architecture models related to respondents EA modeling tasks were easy to store and maintain whilst keeping all the elements in a place that is easy to find.

Compatibility:

Session A: Almost an equal number of respondents agreed (42%) or were indecisive (44%) when asked to compare models or detect inconsistencies between two different EA layers or views using TEAM. 31% of respondents indicated that they find it difficult to compare or consolidate two models from two different EA layers or views and (55.5%) were indecisive.

Session B: 37% of respondents indicated that they could not decide if models from different EA layers inside the TEAM modelling tool are inconsistent and 37% of respondents indiacted that it was difficult to compare models from different layers.

Production timelines:

Session A: An equal number of respondents (41%) agreed and were indecisive when asked if the TEAM modeling tool could assist in completing tasks to meet EA production schedules whilst advanced requirement support to complete EA managerial activities (such as decision making support and project migration schedules) scored slightly higher (47%). The remainder of the respondents were indecisive.

Session B: The respondents "more or less agree" that the TEAM modeling tool assist with the EA production schedules such as information delivery and decision support to relevant stakeholders.

Systems reliability:

Session A: Although the majority of the respondents were undecided when asked if the TEAM modeling tool is susceptible to crashes (65%) the respondents indicated that they could count on the tool being available when needed (59%).

Session B: The majority of respondents felt that TEAM tool is reliable and did not experience software "crashes" or problems. 37% of respondents indicated that they could not decide if they agree with the statement that the TEAM tool is available when needed.

Ease of use (of software)

Session A: The majority of respondents (69%) indicated that TEAM is easy to learn and use. When asked if the tool was convenient and easy to use 57% of respondents felt that they agree with that statement whilst 31% were indecisive, 6% disagreed and 6% felt that the questions was not applicable.

Session B: 25% of respondents felt that TEAM was easy to learn and convenient.

Ease of use (training)

Session A: 31.25% of respondents indicated not enough training to support them in using TEAM, 37.5 % were indecisive whilst 31.25% indicated that sufficient training opportunities exist.

Session B: 50% of the respondents could not decide if there were enough training offered in order to understand and access the TEAM modeling tool.

4.2 Task/job characteristic measures

Task equivocality

Session A: Half of the respondents indicated that they currently work on ill-defined, ad-hoc and non-routine business and/or modeling tasks whilst 37 % were indecisive. 12.5 % of respondents indicated that the question was not applicable.

Session B: Very few respondents indicated that they are working on ill-defined, ad-hoc, non-routine business and/or modeling tasks.

Task interdependence

Session A: 43.75 % of respondents indicated that they frequently deal with more than one business function whilst 37.5% is indecisive and 18.75% indicated that the question was not applicable. 43,75% indicated that they were indecisive when asked if they work with more than one EA layer or view at a time whilst 37.5% indicated that they indeed work with multiple layers.

Session B: Very few respondents work on modeling tasks that involve more than one business function or more than one EA layer or view.

4.3 Performance impact measures

Performance impact of enterprise architecture tools

Session A: 43,75% of respondents indicated that the current EA environment has a big, positive impact on their effectiveness and productivity in their jobs, whilst 3.75% were indecisive and 18.75% indicated that the question was not applicable. 43.75% of respondents indicated that they were indecisive when asked if they felt that EA modeling platforms are an important and valuable aid to them in performing their jobs; 37,5% felt that EA modeling platforms are important whilst 18.75% indicated that the question in not applicable.

Session B: 25% of respondents indicated that EA modeling platforms play an important part and act as valuable aid to them in performing tasks, whilst three respondents indicated that the EA environment has a positive impact on their effectiveness and job productivity.

5 Findings

From a *quality (currency)* perspective respondents were divided when asked if appropriate EAM tools exist. Respondents from the session in Austria (involving a more diverse group of participants) were more prone to consider using TEAM to perform EAM tasks, whilst the South African group was more skeptical.

Focusing on the *quality (right model)* respondents indicated that TEAM did provide them with all the modeling task capability, however a substantial percentage of respondents disagreed (31%) but could not indicate the reason for their statement due to the nature of the questionnaire. Respondents further indicated that EA modeling tools would be useful in completing their jobs. The majority of respondents indicated that TEAM provides the capability to carry out advanced EAM tasks. However, the majority of the Austria respondents felt that current modeling platforms are missing critical EAM functionality that would be useful in their jobs whilst South African participants were indecisive. From an advanced EAM requirement the majority of the participants agreed that TEAM allows them to not only maintain their EA models but also at the appropriate level of detail to support their enterprise (quality - right level of detail dimension). The platform furthermore allows them to maintain their EA models at an appropriate level of detail to support their enterprise architecture *management* tasks.

Focusing on the *Locatablity* perspective, respondents from Austria agreed that the TEAM modeling tool allows them to easily view and maintain their EA models even if they have not used the platform before. This was also the case when respondents were asked to what extend TEAM provided for the definition of metadata about their existing EA models such as properties and attributes (locatability – meaning dimension).

Focusing on the *Compatibility* perspective there was no clear, undisputed feedback from respondents when asked if two different EA layers or views were inconsistent when compared or consolidated due to the inherent underlying definitions of the models or architecture layers. ArchiMate enforces these EA model definitions and the need for tool support to assist with the advanced task of model consolidation was thus emphasized.

Focusing on *production timelines* there was a strong indication from respondents that the TEAM modeling tool supports the advanced requirements. These include the capability to meet the needs of stakeholders in terms of decision-making, information delivery schedules as well as project migration schedules.

Focusing on the systems *reliability* factor, TEAM was perceived as being stable with high availability even though it was not used extensively used for long periods.

The ease of use dimension focused on how easy it was to use TEAM as well as the availability of training material to support the acquisition of knowledge to use the tool. The majority of respondents indicated that it was easy and convenient to use TEAM. Respondents furthermore felt that although not enough training was conducted when using TEAM, more training opportunities were made available. Unfortunately, respondents from South Africa disagreed that the system was easy to use possibly due to the limited level of exposure of participants to TEAM. Participants from Austria attended an extensive summer school focusing on the topic of EAM whilst participants from South Africa only attended a half-day seminar.

With regards to *task/job measures*, the majority of respondents indicated that they currently work on ill defined, ad-hoc and non-routine business and/or modeling tasks (task equivocality). They furthermore work frequently with more than one business function although fewer respondents worked with multiple enterprise architecture layers at a time (task interdependence).

With regards to *performance impact meas*ures, the majority of respondents indicated that the current enterprise architecture environment and subsequent tools available to them has a big, positive impact on their task execution effectiveness and productivity in their jobs. This is not surprising if considered their specialised work area. However, this offers new research opportunities to identify the true impact of technology on the effectiveness and subsequent performance impact of successfully executed EA and EAM tasks.

6 Conclusion

In this paper we report on a study that used the Task-Technology Fit (TTF) theory as proposed by Goodhue [9] to investigate the extent to which the TEAM tool assisted in the execution of EAM tasks. TTF was suitable for the study as it assists with understanding how technology supports the execution of a user task, which in this case included advanced tasks such as required by EAM. The main focus was the eight TTF characteristics, of which six factors were evaluated (quality, locatability, compatibility, production timelines, systems reliability, ease of use). The research question under investigation was "*Using the task-technology fit theory, to what extent did the technology (TEAM tool) support the execution of EAM tasks?*".

The results indicate that, through the use of the TEAM tool, the quality factor partially supported EAM whilst the findings pertaining to the compatibility factor was inconclusive. The remainder of the factors (locatability, production timelines, systems reliability and ease of use) evaluated by the participants when executing EAM tasks using TEAM indicates that TEAM readily supports these tasks.

This study provides a starting point for evaluating the task execution support of the TEAM modeling tool to perform EAM tasks. Further research will focus on extending the research to investigate in-depth analysis of the impact of successful EAM task execution on both individual and organizational performance.

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