



**ASSESSING ARCHITECTURAL
WORK – Criteria and Metrics for
Evaluating Communication &
Common Language
and Commitment**

AISA Project Report

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Summary

This report describes a part of the work done in the second phase of the AISA project's second year. The aim is to determine a wide selection of possible evaluation criteria and metrics for two of the Enterprise Architecture evaluation targets defined in the previous step of the project, namely 1) Communication and Common Language, and 2) Commitment. These areas can be regarded as prerequisites for the Enterprise Architecture work to succeed. To put it briefly, Enterprise Architecture (EA) can be seen as a collection of all those models necessary for managing and developing an organization.

Evaluation criteria and metrics for both of the evaluation targets were charted based on the literature review and the previous work done in the research project. These initial results were presented, discussed and validated in the workshop participated by seven practitioners and three researchers.

Evaluation of Communication and Common Language was suggested to be conducted with the help of 13 evaluation criteria, including e.g. accuracy, adequacy, comprehensibility, consistency, expertise and timeliness. Evaluation of Commitment was suggested to be conducted with the help of five evaluation criteria, respectively: acceptability, awareness, satisfaction, involvement and participation activeness, and resources (adequacy of resources). For both evaluation targets, a selection of evaluation questions that demonstrate each evaluation criteria was presented. The suggested metrics mainly included on-off measures or focused on identifying the level of satisfaction of a stakeholder.

Communication and common language can be evaluated independently (i.e. not as part of organizational communication studies), but the level of commitment can possibly be derived from the evaluation of the architecture benefits. Basically, if benefits can be demonstrated and the organization has gained value through architecture, commitment has also been reached.

Selection of a few suitable metrics among the set of possible metrics is needed. Furthermore, the selected metrics and the evaluation questions need to be translated into the organization's own terminology. Metrics selection is dependent on the phase of the architecture development, or more specifically, on the level of architecture maturity: simple metrics (e.g. on-off metrics) may be more usable in the beginning of the EA journey, and more detailed metrics (quantitative and qualitative metrics) may be utilized as the EA work is more established.

Especially, the level of commitment is rather easy to define, but the challenge is to find ways to move from a level to the next level. It may be fruitful to ask the stakeholders themselves which actions should be taken to make them accept the EA approach and participate in the EA work more actively.

The set of evaluation questions and metrics presented in this report can be useful for organizations helping them define the few specific metrics for their needs. After having tested the metrics in practice conclusions can be drawn about their suitability and usefulness for evaluating the success of communication and common language, as well as the level of commitment.



Contents

1	INTRODUCTION.....	1
2	BACKGROUND	3
2.1	ENTERPRISE ARCHITECTURE	3
2.2	HIGH-QUALITY ENTERPRISE ARCHITECTURE	3
2.3	CRITICAL SUCCESS FACTORS FOR ENTERPRISE ARCHITECTURE	4
2.4	ENTERPRISE ARCHITECTURE EVALUATION COMPONENTS.....	4
3	EVALUATING COMMUNICATION AND COMMON LANGUAGE	5
3.1	EVALUATION CRITERIA FOR COMMUNICATION AND COMMON LANGUAGE.....	5
3.2	SUB-TARGETS OF COMMUNICATION AND COMMON LANGUAGE.....	7
3.3	METRICS FOR EVALUATING COMMUNICATION AND COMMON LANGUAGE	7
3.3.1	Target: Communication Strategy or Plan	7
3.3.2	Target: Common Language.....	9
3.3.3	Target: Information Received through Architectural Communication	10
3.3.4	Target: Information Sent through Architectural Communication.....	11
3.3.5	Target: Communication Channels	12
3.3.6	Target: Communication Skills.....	14
3.3.7	Target: Communication and Common Language (in its entirety).....	15
3.4	BACKGROUND INFORMATION NEEDED IN A QUESTIONNAIRE.....	18
3.5	SUMMING-UP	19
4	EVALUATING COMMITMENT TO THE ARCHITECTURE APPROACH	20
4.1	EVALUATION CRITERIA FOR COMMITMENT	20
4.2	METRICS FOR EVALUATING COMMITMENT.....	22
4.2.1	Criteria: Awareness	23
4.2.2	Criteria: Acceptability.....	23
4.2.3	Criteria: Satisfaction.....	24
4.2.4	Criteria: Involvement and Participation Activeness	25
4.2.5	Criteria: Resources (adequacy of resources).....	26
4.3	SUMMING-UP	28
5	CONCLUSIONS	29
	REFERENCES.....	30

APPENDIX 1. Brief Descriptions of the Potential Critical Success Factors for EA

APPENDIX 2. Enterprise Architecture Evaluation Components



1 Introduction

This report presents a part of the results of the AISA Project's second phase in the second year. The aim of this phase was to determine a wide selection of evaluation criteria and metrics for four evaluation targets: 1) Communication and Common Language, 2) Commitment, 3) Models and Artefacts, and 4) Architectural Work Benefits (representing the evaluation of the whole Enterprise Architecture program). These targets are essential right from the beginning of the EA development. More evaluation targets are described in (Ylimäki & Niemi 2006).

In this report, the focus is on determining the evaluation criteria and metrics for the first two evaluation targets, i.e. Communication and Common Language, and Commitment. Evaluation criteria and metrics for Models and Artefacts are presented by Hämäläinen (2006), and the evaluation of architectural work benefits is reported by Niemi (2006).

The study consisted of the following steps (Figure 1):

1. **Literature review** of Communication Audit and Commitment studies, as well as EA studies was conducted to define the evaluation criteria for 1) communication and common language and for 2) commitment. Also the previous results of the research project and the workshop data – especially the data gathered in the workshop 3 (FGI 2006a) - were utilized in this task. Additionally, existing metrics for the two areas were charted in this step.
2. **Workshop 4, a focus group interview** (Krueger and Casey 2000) of seven practitioners representing the participating organizations, was arranged in October 12, 2006 in order to review, discuss and validate the literature review results.
3. **An analysis and consolidation of the results** of both the workshop (the focus group interview) and the literature review was carried out.

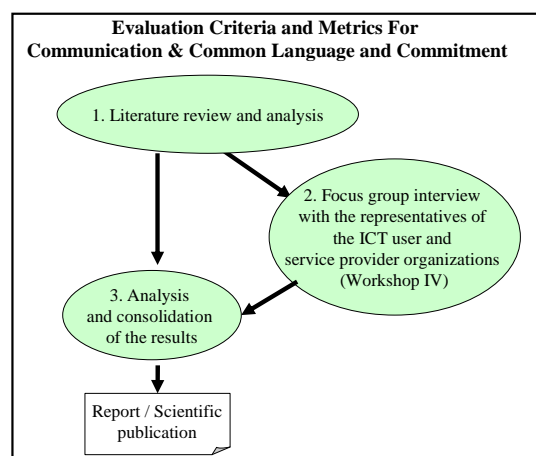


Figure 1. The steps of defining evaluation criteria and metrics for Communication & Common Language and Commitment.



Generally, several sources of evaluation questions and criteria may exist. In this study, specifically, the following sources are applied (based on Fitzpatrick, Sanders, et al. 2004):

1. Questions, concerns and values of stakeholders: This refers to the data gathered in the workshops (conducted as focus group interviews).
2. The use of evaluation models, frameworks, and approaches as heuristics: This refers, for instance, to the existing maturity models for Enterprise Architecture.
3. Models, findings, or salient issues raised in the literature in the field of the program: This refers, for instance, to the previous results of the AISA research project.
4. Professional standards, checklists, guidelines, instruments, or criteria developed or used elsewhere: This refers, for instance, to the Communication Audit and Organizational Commitment studies.
5. Views and knowledge of expert consultants: In this case, this also refers to the interview data gathered in the workshops.
6. The evaluator's own professional judgment: In this case, this refers to the author's own professional judgment.

The remainder of this report is organized as follows. In the next section, we discuss the basic concepts of Enterprise Architecture, high-quality Enterprise Architecture, critical success factors for Enterprise Architecture and the Enterprise Architecture evaluation components. In the proceeding sections, evaluation criteria and metrics for both communication and common language, and commitment are described. The last section summarizes the report.



2 Background

In this section, the concepts related to Enterprise Architecture, its quality and assessment are briefly recapitulated. Readers who are familiar to the concepts can move on to the next section.

2.1 Enterprise Architecture

Enterprise Architecture (EA) can be seen as a collection of all those models necessary for managing and developing an organization (Halttunen 2002). It is vital that Enterprise Architecture is derived from the visions and business strategies of an organization (Armour, Kaisler et al. 1999a). More precisely, EA “identifies the main components of the organization, its information systems, the ways in which these components work together in order to achieve defined business objectives, and the way in which the information systems support the business processes of the organization. The components include staff, business processes, technology, information, financial and other resources, etc. Enterprise architecting is the set of processes, tools, and structures necessary to implement an enterprise-wide coherent and consistent IT architecture for supporting the enterprise's business operations. It takes a holistic view of the enterprise's IT resources rather than an application-by-application view.” (Kaisler, Armour et al. 2005)

Generally, Enterprise Architecture can be considered to consist of interrelated architectures or architectural views (FEAF 1999; The Open Group 2002). These views can comprise e.g. business architecture, information architecture, systems/application architecture and technology architecture.

2.2 High-Quality Enterprise Architecture

An Enterprise Architecture, to be successful, needs to be understood, accepted and used in everyday business functions, including also the various activities conducted by the top-management. The success needs also to be measured in order to ensure that desired results are achieved. While there is no widely accepted definition of a high-quality EA, we have suggested (Ylimäki 2005; Ylimäki 2006) that *EA has high quality* if it

- conforms to the agreed and fully understood business requirements,
- fits for the purpose, which is to gain business value through EA, and
- satisfies the different stakeholders’ (e.g. the top management, IT management, architects, developers) expectations in a cost-effective way and understands their current needs as well as the future requirements.

Briefly, different stakeholders profit from the high-quality architecture work and its results. Especially, EA should provide the management a clear view of the top priority projects the organization needs to carry out in the first place. Furthermore, the different views of EA quality presented above implicitly imply that the quality of EA is more than merely the quality of the implemented EA, indicating that it is successfully used. The quality of EA may also refer to the quality of EA documentation, the quality of the EA development process, the quality of EA governance (process), and so forth.



2.3 Critical Success Factors for Enterprise Architecture

Critical success factor (CSF) is a common concept used e.g. in the context of total quality management (Badri, Davis et al. 1995), software architectures (Bredemeyer Consulting 2000) or project management (Clarke 1999). We have suggested (Ylimäki 2005; Ylimäki 2006) that *critical success factors for Enterprise Architecture* are the things that have to be done exceedingly well in order to gain high quality EA which in turn enables the business to reach its business objectives and gain more value.

During the first year of the AISA project the set of potential CSFs for EA (Figure 2) was defined (Ylimäki 2005; see also Ylimäki 2006). A brief description of each potential CSF is given in Appendix 1.

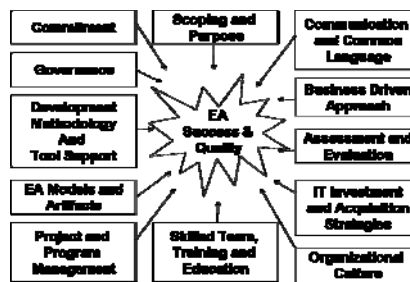


Figure 2. The set of potential CSFs for EA.

2.4 Enterprise Architecture Evaluation Components

Evaluation can be described as “a process of determining merit, worth, or significance” (Lopez, 2000). Evaluation needs to be planned carefully and several building blocks need to be addressed. These building blocks, i.e. evaluation components, are described in Figure 3 (Ylimäki & Niemi 2006, see also Appendix 2).

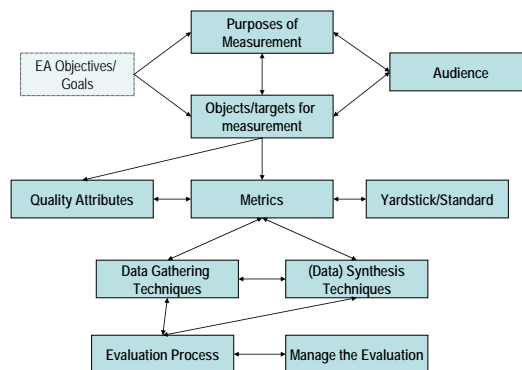


Figure 3. EA Evaluation components.

The CSFs for EA (see Figure 2) can be regarded as the potential evaluation targets to be assessed during the EA evaluation (see Ylimäki & Niemi 2006). In addition, the whole EA program is a potential evaluation target, especially when the benefits of the EA program need to be demonstrated to different stakeholders. In this report, the focus is on determining the evaluation criteria and metrics for two of the evaluation targets: 1) Communication and Common Language, and 2) Commitment. These areas can be regarded as prerequisites for the architectural work.



3 Evaluating Communication and Common Language

In this section, evaluation criteria and metrics for Communication and Common Language will be presented. Communication (and a common language) can be regarded as one of the main factors helping to succeed in the architectural work (Lankhorst 2005; Luftman 2000; META Group Inc. 2000, Rehkopf and Wybolt 2003).

Communication is a field that has been studied for decades. Even communication audit studies – evaluation of organizational communication (both internal and external) – go back to 1970’s and beyond. Communication audits can be carried out in many ways (see e.g. Hargie & Tourish 2000), but the most usual and perhaps the most inexpensive way to evaluate communication is to collect information through a questionnaire. For instance, Downs & Hazen’s Communication Satisfaction Questionnaire (presented e.g. in Downs, 1988) includes 46 questions. The premise of their work is that the quality and amount of communication in our jobs contribute to both our job satisfaction and our productivity. Another example of questionnaires is presented by Hargie & Tourish’s (2000). Their Communication Audit Questionnaire includes 13 sections, each of which many questions or statements.

Based on the above mentioned facts, the definition of evaluation criteria and metrics for architectural communication is to a great extent, an application of communication audit studies. In the following sub-sections, the evaluation criteria for Communication and Common Language, sub-targets of evaluation, as well as metrics for each of the sub-targets are presented. The issues that were especially brought up or stressed in the workshop 4 participated by the practitioners are referred to as (FGI 2006b).

3.1 Evaluation Criteria for Communication and Common Language

The evaluation criteria for Communication and Common Language were mainly derived from the communication audit studies and the previous work done in the AISA Project. The set of 13 evaluation criteria is presented in Table 1. The interviewees agreed with the criteria, but pointed out that in addition to the availability and accessibility of information and systems also the ease of finding the information within the documents and systems is essential (FGI 2006b).

Table 1. The Evaluation Criteria for Communication and Common Language.

Evaluation Criteria	Alternative Criteria	Short Description	References
Acceptability		The definitions of terms in the common vocabulary, as well as the communication strategy/plan, have been approved by the architecture team/the organization.	Author’s professional judgment
Accuracy	Clarity Comprehensibility	The definitions of terms in the common vocabulary (common language) are correct and unambiguous.	(Spitzberg 1988) Also (FGI 2006a)
Adequacy	Appropriateness Relevance	People get the information they need (to perform their tasks); the information	(Downs 1988)



Evaluation Criteria	Alternative Criteria	Short Description	References
	Correctness Usefulness	received through communication is relevant and correct. The information helps people to perform their tasks.	(Spitzberg 1988) (Eriksson 1999) (Ylimäki & Niemi 2006)
Availability	Accessibility	Availability of information, accessibility of the systems storing the information, availability of the information owners. Ease of finding the information within the systems, documents and so forth (FGI 2006b).	(Vos 2003) (Ylimäki & Niemi 2006) (FGI 2006b)
Communication Activeness		The extent the people are participating in different groups, searching for and giving information, participating in conversations, giving and calling for feedback, and involving others to participate in conversations and groups.	(Paajanen 2000)
Comprehensibility	Clarity Transparency	People understand the message (the content) communicated. The message is clear.	(Vos 2003) (Spitzberg 1988)
Consistency	Coherence	The communication provided to different stakeholders is consistent; the message may be the same even though the language (concepts, terms) used may vary depending on the stakeholder group the communication is aimed at.	(Spitzberg 1988) (FGI 2006a)
Credibility	Truth Sincerity Responsiveness	Communication (climate) is trustworthy and open.	(Eriksson 1999) (Vos 2003)
Effectiveness and efficiency		Communication results are achieved with reasonable costs; communication results are compared to the communication costs. Sometimes, effectiveness of communication can be evaluated to the extent the people are satisfied with the communication. → see also Satisfaction	(Vos 2003) (Spitzberg 1988)
Expertise		The stakeholders have proper communication skills.	(Spitzberg 1988)
Extensiveness		The communication reaches all the people (stakeholders) it should reach. Also, the active involvement of stakeholders.	(Vos 2003) (Ylimäki & Niemi 2006)
Satisfaction	Overall Satisfaction	The extent the people are satisfied with the communication (communication climate).	(Paajanen 2000)
Timeliness		People receive the information on time. The information is up-to-date.	(Downs 1988)



3.2 Sub-targets of Communication and Common Language

Since communication is such a large area, sub-targets needed to be defined in order to be able to determine more precise metrics. Similar to definition of the evaluation criteria for Communication, sub-targets of Communication were also derived from the communication audit studies and the previous work done in the research project (such as CSFs for EA). The set of six sub-targets is presented in Figure 4 together with the corresponding evaluation criteria for each sub-target. Evaluation needs of Communication and Common Language are related e.g. to the architectural concepts (i.e. the common language), the communications plan and strategy, and the success of architecture related communication (see also Ylimäki & Niemi 2006). It should be noticed that some of the evaluation criteria are related to Communication and Common Language in its entirety.

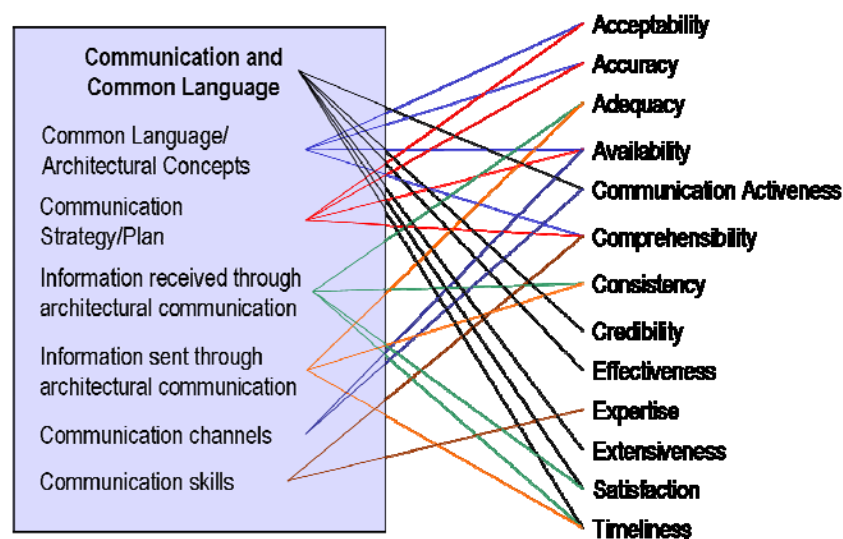


Figure 4. Sub-targets of Communication and Common Language and Corresponding Evaluation Criteria.

3.3 Metrics for Evaluating Communication and Common Language

In this section, suggestions for metrics for each of the sub-targets are represented in table format. In each table, evaluation criteria, evaluation questions (metrics), metric types and possible values are presented, as well as the main references.

3.3.1 Target: Communication Strategy or Plan

In table 2, the metrics for Communication Strategy or Plan are presented. Basically, all development efforts should have a communications plan. However, in the workshop 4 (FGI 2006b), it was brought up that only a few organizations are currently at a point where a communication strategy or plan for EA exists. The main reason for this is that the organizations are usually in the beginning of their EA development, and they consider it useless at that point to do thorough communication planning, because there is not yet enough EA content to communicate about. However, the



interviewees stated that communicational issues must be kept in mind right from the beginning of the EA development (FGI 2006b).

Actually, in the beginning of the EA journey, the communication plan might be called as an EA marketing plan, which provides “a single resource that outlines a marketing strategy and plan to address specific goals of the EA Program Manager (EA PM) that will help to improve the profile and acceptance of the EA and EA program. It should assist the EA PM in developing a focused, methodical, and consistent communications approach that clearly articulates the mission, vision, values, and benefits of an EA and EA Program to leadership and staff personnel. The goal of the plan should be to provide a framework and a plan of action that will enable the EA PM to develop and execute EA marketing and communication strategies.” (Brooks 2006)

Table 2. The Metrics for Communication Strategy of Plan.

Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
Availability	Does an architectural communications strategy/plan exist?	On-off; yes/no	(Ylimäki 2005; 2006)
Availability	Is the communications strategy/plan available to the key stakeholders (e.g. in a file system or in intranet)? If not, why?	On-off; yes/no	Author's professional judgment
Acceptability	Has the communications strategy/plan been approved by the organization?	On-off; yes/no	Author's professional judgment
Comprehensibility	Has the communications strategy/plan been communicated to the key stakeholders? If not, why?	On-off; yes/no Percentage (of stakeholders informed)	Author's professional judgment
Comprehensibility Also: Effectiveness	Time spent for communicating the communications strategy/plan to the stakeholders?	Time; minutes/hours/days /weeks	Author's professional judgment
Comprehensibility	How has the time needed for communicating the strategy/plan to stakeholders changed over the last quarter/6 months/year?	Trend, e.g. stayed the same, gone up, gone down Percentage	Adapted from (Downs 1988)
Accuracy	Is the communication strategy/plan up-to-date?	On-off; yes/no Update frequency	Author's professional judgment



3.3.2 Target: Common Language

In table 3, the suggestions for metrics for common language are presented. In the workshop 4 (FGI 2006b), it was stated that the architecture terminology should, among other things, be simple enough to provide clear and understandable language for effective architecture communication. EA development usually requires co-operation between various organizations (including the organization whose EA is under development, its partners, ICT vendors, consultants and so forth). There is a challenge of establishing a common language, since each of these organizations, and more generally each line of business, has its own specific terminology.

Table 3. The Metrics for Common Language.

Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
Availability	Are the architectural concepts defined and documented? Specifically, has the concept of EA been defined (what does EA mean in the organization)?	On-off; yes/no	(Ylimäki & Niemi 2006)
Availability	Are the architectural concepts available to the stakeholders (e.g. in a file system or in intranet)? If not, why?	On-off; yes/no	Author's professional judgment
Acceptability	Are the architectural concepts approved by the architecture team/the organization? If not, why?	On-off; yes/no	(Ylimäki & Niemi 2006)
Acceptability Comprehensibility	How satisfied are you with the common architectural vocabulary? Are the concepts and terms simple enough, clear and understandable (FGI 2006)? → See also the next two evaluation questions; they measure the clarity and understandability as well. Note: Architectural vocabulary can include architecture, IT, and business related terminology.	Likert scale, e.g. very dissatisfied, dissatisfied, somewhat dissatisfied, indifferent, somewhat satisfied, satisfied, very satisfied	Adapted from (Downs 1988)
Accuracy Comprehensibility Also: Effectiveness	Time spent for concept clarification in the beginning of a meeting/project etc.?	Time; minutes/hours	Based on (FGI 2006a)
Accuracy Comprehensibility Also: Effectiveness	How has the time needed for concept clarification changed over the last quarter/6 months/year?	Trend; e.g. stayed the same, gone up, gone down Percentage?	Adapted from (Downs 1988)



3.3.3 Target: Information Received through Architectural Communication

In table 4, the metrics for information received through architectural communication are presented. These metrics measure especially the adequacy, consistency and timeliness of the architecture information from the information receiver's point of view. Typically, these metrics are applicable when the EA development has advanced from the initializing phase, and there is actually something to communicate about, i.e. architecture content exists. In the workshop 4 (FGI 2006b), it was brought up that the real challenge is to communicate to the right stakeholders in an appropriate way, in an appropriate language. The metrics in table 4, especially, can demonstrate how this challenge has been addressed in the organization and how satisfied the different stakeholders are with the architecture related information they receive.

Table 4. The Metrics for the Information Received through Architectural Communication.

Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
Adequacy	<p>How satisfied are you with the amount and/or quality of information about</p> <ul style="list-style-type: none"> - architectural communication strategy or plan - architectural terminology (common language), especially the definition of EA in the organization - the scope of the EA program in the organization - the EA objectives and policies - the progress of the EA program - the EA initiatives/projects - the EA content (models and other documents) - EA guidance - the business information essential for the EA development? <p>Or: Comparison between the amount of information you get now and the amount of information you need to receive.</p>	Likert scale, e.g. very dissatisfied, dissatisfied, somewhat dissatisfied, indifferent, somewhat satisfied, satisfied, very satisfied	<p>(Hargie & Tourish 2000) (Downs 1988) Also (FGI 2006b)</p>
Adequacy	What other architecture related information you would need to perform your tasks?	Free text	Based on (FGI 2006a)
Satisfaction and effectiveness and efficiency	How satisfied you are with the amount and quality of business information essential for the EA development received from the management/business? (= downward communication)	Likert scale, e.g. very dissatisfied, dissatisfied, somewhat dissatisfied, indifferent, somewhat satisfied, satisfied, very satisfied	<p>Based on (FGI 2006a) see also (Downs 1988)</p>
Consistency	To what extent do you get inconsistent	Likert scale, e.g.	Based on



Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
	or conflicting architecture related information? Different stakeholders can be specified to collect more detailed information.	Very little, little, Sometimes, often, always Or: daily, weekly, a couple of times a month, a couple of times a year, never	(FGI 2006a) see also (Spitzberg 1988)
Timeliness Also: Effectiveness	Extent to which you receive on time the architecture related information needed to do your job.	Likert scale 1-7, e.g. very dissatisfied - very satisfied	(Downs 1988) (FGI 2006b)
Timeliness	Extent to which you receive architecture related information on time from different sources (stakeholders), such as staff who are accountable directly to me, immediate work colleagues, colleagues in other departments, architecture team, immediate line manager, middle managers, senior managers	Likert scale; e.g. Never on time, rarely on time, sometimes on time, mostly on time, always on time	(Hargie and Tourish 2000)

3.3.4 Target: Information Sent through Architectural Communication

In table 5, the metrics for information sent through architectural communication are presented. These metrics measure, especially the adequacy and timeliness of the architecture information passed on to other stakeholders, as well as the level of upward communication (communication towards the management). These metrics are also typically applicable after the EA development has advanced from the initializing phase.

Table 5. The Metrics for Information Sent through Architectural Communication.

Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
Adequacy	How satisfied you are with the amount and/or quality of information you send to others about <ul style="list-style-type: none"> - architectural communication strategy/plan - architectural terminology (common language), especially the definition of EA in the organization - the scope of the EA program in the organization - the EA objectives and policies - the progress of the EA program - the EA initiatives/projects 	Likert scale, e.g. very dissatisfied, dissatisfied, somewhat dissatisfied, indifferent, somewhat satisfied, satisfied, very satisfied	(Hargie and Tourish 2000) (Downs 1988)



Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
	<ul style="list-style-type: none"> - the EA content (models and other documents) - EA guidance - the business information essential for the EA development? <p>Or: Comparison between the amount of information you send now and the amount of information you need to send.</p>		
Adequacy	What other architecture related information would you need to send to others? To whom?	Free text	Author's professional judgment
Satisfaction Effectiveness and efficiency	How satisfied are you with the amount and quality of information you send to management/business? (= upward communication)	Likert scale, e.g. very dissatisfied, dissatisfied, somewhat dissatisfied, indifferent, somewhat satisfied, satisfied, very satisfied	Based on (FGI 2006a) See also (Downs 1988)
Timeliness Also: Effectiveness	Extent to which you send architecture related information on time to different sources (stakeholders), such as staff who are accountable directly to me, immediate work colleagues, colleagues in other departments, architecture team, immediate line manager, middle managers, senior managers.	Likert scale; e.g. Never on time, rarely on time, sometimes on time, mostly on time, always on time	(Hargie and Tourish 2000)

3.3.5 Target: Communication Channels

In table 6, the metrics for communication channels are presented. These metrics measure especially the availability of different channels in addition to the usage frequency of these channels. In the workshop 4 (FGI 2006b), it was brought up that in addition to the adequacy of channels, they should also be easily available as should be the information accessed through these channels.

Table 6. The Metrics for Communication Channels.

Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
Availability	Which communication channels you use in your work (in general)?	“Checkbox”; e.g. <ul style="list-style-type: none"> - Face-to-face contact 	(Hargie and Tourish 2000)
	Which channels are used in architectural communication (in general)?	<ul style="list-style-type: none"> - telephone calls - written communication (memos, letters) 	(Paajanen 2000)



Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
	Which channels do you use in architectural communication?	<ul style="list-style-type: none"> - notice boards - internal architecture related publications - internal architecture related audio-visual material - e-mail - intranet - meetings - briefings - grapevine 	
Availability	<p>Are these channels adequate for architectural communication?</p> <p>Are these channels easily available (FGI 2006b)?</p> <p>Is the information easily available through these channels (FGI 2006b)?</p> <p>Each channel can be evaluated separately.</p>	Likert scale, e.g. adequate, indifferent, inadequate	<p>(Paajanen 2000)</p> <p>(FGI 2006b)</p>
Availability	Which other communication channels would you like to use for architectural communication?	Free text	(Paajanen 2000)
Communication activeness	<p>How actively are you using the following channels for architecture related communication:</p> <ul style="list-style-type: none"> - face-to-face contact - telephone calls - written communication (memos, letters, etc.) - notice boards - internal architecture related publications - internal architecture related audio-visual material - e-mail - intranet (architecture website etc.) - meetings - briefings - grapevine? 	<p>Likert scale, e.g. Very little, little, Sometimes, often, always</p> <p>Or: daily, weekly, a couple of times a month, a couple of times a year, never</p>	Adapted from (Paajanen 2000)



3.3.6 Target: Communication Skills

In table 7, the metrics for communication skills are presented. In the workshop 4 (FGI 2006b), it was pointed out that the understandability and clarity of communication is especially essential (see the last row of table 7). Also the ability of architects to communicate the location of information in addition to the information content itself was considered important.

Even though communication skills are regarded as an important asset of an architect, as well as of any IT specialist, hardly any studies focusing on the level of these skills have been conducted. One of the most recent studies conducted by Intel reveals major communication challenges, especially between the top management and the information management (see e.g. Karvonen 2006).

Table 7. The Metrics for Communication Skills.

Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
Expertise	How satisfied are you with the communication skills of - yourself - your co-workers - the architecture team - the management? More specified questions can be formulated (see e.g. Spitzberg 1988).	Likert scale, e.g. very dissatisfied, dissatisfied, somewhat dissatisfied, indifferent, somewhat satisfied, satisfied, very satisfied	Adopted from (Spitzberg 1988)
Expertise	How much training have you had to improve your communication skills during the last 6 months/year etc.? More specified questions can be formulated to illustrate the usability of the training; such as - How satisfied you are with the communication training you have had? - How useful has the training been?	Likert scale, e.g. No training at all, little training (attended one seminar/workshop/course), some training (attended a few.), extensive training (attended a large number of ...)	(Hargie and Tourish 2000)
Comprehensibility	How understandable and clear is the communication/information provided by the architecture team?	Likert scale, e.g. very dissatisfied, dissatisfied, somewhat dissatisfied, indifferent, somewhat satisfied, satisfied, very satisfied	(Ylimäki & Niemi 2006) (FGI 2006b)



3.3.7 Target: Communication and Common Language (in its entirety)

In table 8, the metrics related to the communication and common language in its entirety are presented. Especially, these metrics measure the communication activeness in general, and the credibility and effectiveness of communication. In the workshop 4 (FGI 2006b), especially the existence of feedback was pointed out. Feedback needs to be a two-way road: the architecture team provides architecture guidance for instance to the IT developers and the IT developers should provide feedback to the architecture team, especially in the cases of not being able to follow the architecture guidelines or policies. In these cases, the architecture may need to be changed or modified.

Horizontal communication, i.e. communication between departments, business areas, subsidiaries and so forth, was also considered to be evaluated by the interviewees. However, this should not be evaluated in the conjunction with architectural communication specifically, but in the conjunction with the communication evaluation in general in the organization (FGI 2006b).

Table 8. The Metrics for Communication and Common Language in its entirety.

Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
Communication activeness	How actively are you participating to <ul style="list-style-type: none"> - architecture related discussions - architecture development - architecture related briefings, etc.? 	Likert scale, e.g. Very little, little, Sometimes, often, always Or: daily, weekly, a couple of times a month, a couple of times a year, never	(Paajanen 2000)
Communication activeness	How actively do you provide architecture related feedback to <ul style="list-style-type: none"> - the architecture team - the management - your co-workers? 	Likert scale, e.g. Very little, little, Sometimes, often, always Or: daily, weekly, a couple of times a month, a couple of times a year, never	(Paajanen 2000) (FGI 2006b)
Communication activeness	How actively do you search for architecture related information?	Likert scale, e.g. Very little, little, Sometimes, often, always Or: daily, weekly, a couple of times a month, a couple of times a year, never	(Paajanen 2000)
Communication	From which sources do you search	Checkbox; list of	Author's



Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
activeness Also: Availability	for architecture related information (persons, systems etc.)? How satisfied are you with these sources?	choices can be provided Likert scale	own professional judgment
Credibility	How satisfied are you with the openness and sincerity of architectural communication?	Likert scale, e.g. very dissatisfied, dissatisfied, somewhat dissatisfied, indifferent, somewhat satisfied, satisfied, very satisfied	Adapted from (Eriksson 1999) and (Vos 2003)
Credibility	How much you trust each stakeholder in architectural communication (in terms of working together)? Note: A list of stakeholders can be provided.	Likert scale, e.g. Never, Sometimes, often, always?	(Hargie and Tourish 2000)
Effectiveness and efficiency?	What do you think are currently the greatest challenges or development needs in the architectural communication?	Free text	(Hargie and Tourish 2000) (Paajanen 2000)
Effectiveness and efficiency?	Changes in the architectural communication related to e.g. <ul style="list-style-type: none"> - possibilities of communicating with different stakeholders - communication channels available - time resources for communication - flexibility of communication - organization structure - your physical location compared to other stakeholders - attitude towards architectural communication - your communication skills - other stakeholders' communication skills - other, what? 	Likert scale, e.g. got worse, indifferent, got better	(Paajanen 2000)
Effectiveness and efficiency	Name an architecture related communication development or improvement effort that has been successful in your opinion.	Free text	(Paajanen 2000)
Effectiveness and efficiency	Name an architecture related communication development or	Free text	(Paajanen 2000)



Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
	improvement effort that has NOT been successful in your opinion.		
Effectiveness and efficiency	How many architecture related communication challenges identified have been responded to?	Number Percentage (nn % of identified challenges have been responded to)	Based on (Ylimäki & Niemi 2006)
Effectiveness?	Has the success and effectiveness of architectural communication been evaluated?	On-off; yes/no Evaluation frequency?	(Hargie and Tourish 2000) (Downs 1988)
Effectiveness	Communication costs during the last quarter/6 months/year? How have the communication costs changed during the last quarter/6 months/year?	Euros (e.g. based on the hours used in communication) Percentage (change)	Adapted from (Tukiainen 2000)
Extensiveness	The extent to which the architectural communication has reached all the key stakeholders.	Percentage of stakeholders that have been reached by architectural communication	(Ylimäki & Niemi 2006)
Extensiveness	How actively have you been involved in architectural communication e.g. by a colleague or the architecture team? Further details can be collected by specifying a list of stakeholders.	Likert scale, e.g. Very little, little, Sometimes, often, always Or: daily, weekly, a couple of times a month, a couple of times a year, never	Adapted from (Vos 2003)
Satisfaction Also: Effectiveness	How satisfied are you with the architectural communication in general?	Likert scale, e.g. very dissatisfied, dissatisfied, somewhat dissatisfied, indifferent, somewhat satisfied, satisfied, very satisfied	Adapted from (Downs 1988)
Satisfaction Also: Effectiveness	In the past quarter/6 months/year, what has happened to your level of satisfaction of the architectural communication?	3-scale: stayed the same, gone up, gone down Percentage?	Adapted from (Downs 1988)
Satisfaction Also:	How would you change architectural communication to make you more satisfied?	Free text	Adapted from (Downs 1988)



Evaluation Criteria	Evaluation Question / Metrics	Metric Type & Possible Values	References
Effectiveness			1988) (FGI 2006b)
Satisfaction Also: Effectiveness	How satisfied are you with the communication between the departments/business areas/subsidiaries etc.? (= horizontal communication)	Likert scale; e.g. very dissatisfied, dissatisfied, somewhat dissatisfied, indifferent, somewhat satisfied, satisfied, very satisfied	Adapted from (Downs 1988) (FGI 2006b)

3.4 Background Information Needed in a Questionnaire

Most of the evaluation questions or metrics for Communication and Common Language measure the satisfaction level of a stakeholder. Typically, the satisfaction level of the stakeholders is assessed by collecting information through a questionnaire. To be able to analyze the collected data, some background information will also be needed. This information may include the following (adapted from Hargie and Tourish 2000; Paajanen 2000):

- Gender: female/male
- Age: e.g. under 20 years old, 21-30 years old, 31-40 years old, 41-50 years old, over 50 years
- Do you work full-time/part-time/temporary full-time/temporary part-time/job-share?
- How long have you been employed in the organization: less than a year/1-5 years/5-10 years/11-15 years/more than 15 years?
- How long have you held your present position: less than a year/1-5 years/5-10 years/11-15 years/more than 15 years?
- What is your present level of managerial responsibility: I don't supervise anyone/first-line manager/middle manager/senior manager/other, what?
- Where are you employed (department)? A list of departments can be provided.
- What professional group do you belong to? A list of the various professional groups found within the organization can be provided.

It should be noticed that the choices for answering the background questions need to be modified according to the organization's terminology.



3.5 Summing-up

Evaluation of Communication and Common Language was suggested to be conducted with the help of

- 6 sub-targets in addition to the Communication and Common Language as an evaluation target in its entirety, and
- 13 evaluation criteria in total.

A wide selection of evaluation questions and metrics were presented to stimulate and help the definition of the organization specific questions and metrics. The problem with the evaluation of Communication and Common language is that the suggested metrics are to a large extent relative, or subjective, trying to identify the level of satisfaction of a stakeholder. In addition, some on-off measures are included.

Based on the workshop 4 (FGI 2006b) the following conclusions on the evaluation of Communication and Common Language can be drawn.

For the most part, the Finnish companies are still initializing their EA efforts, and not so many architecture descriptions, models, or other artefacts exist. Hence, the evaluation of communication and common language is not considered to have the first priority. After the EA development advances from the initializing phase and EA processes and practice become more established, communication and common language can be evaluated more accurately.

On the other hand, this report presents a large variety of metrics from which the organization can choose a few metrics that are the most suitable ones for its purposes, according to its needs. It should also be noticed that the metrics and evaluation questions presented in this report are still rather general in nature, and as such, they probably cannot be utilized in an organization. They rather demonstrate the characteristics of the evaluation target to be measured. Hence, they need to be modified, or translated into the language and terminology used in the organization.

Finally, it seems rational that evaluation of communication and common language are related to the phase of the EA development in the organization or, more specifically, to the EA maturity level of the organization. In different phases or maturity levels, different metrics are used. Most typically, simple metrics are needed in the initializing phase, and more advanced metrics (e.g. quantitative metrics) can be adopted in later phases.



4 Evaluating Commitment to the Architecture Approach

The importance of gaining commitment to the EA approach and development can be put as follows: “Without a shared sense of purpose and mission, effective governance structure, and executive leadership and commitment, enterprise architecture will only have a minimal impact” (Nelson 2004). Commitment can be described as “a psychological state of attachment that defines the relationship between a person and an entity” (Abrahamsson & Jokela 2000). Moreover, the relationship can be analyzed in terms of depth, focus and terms (see Figure 5).

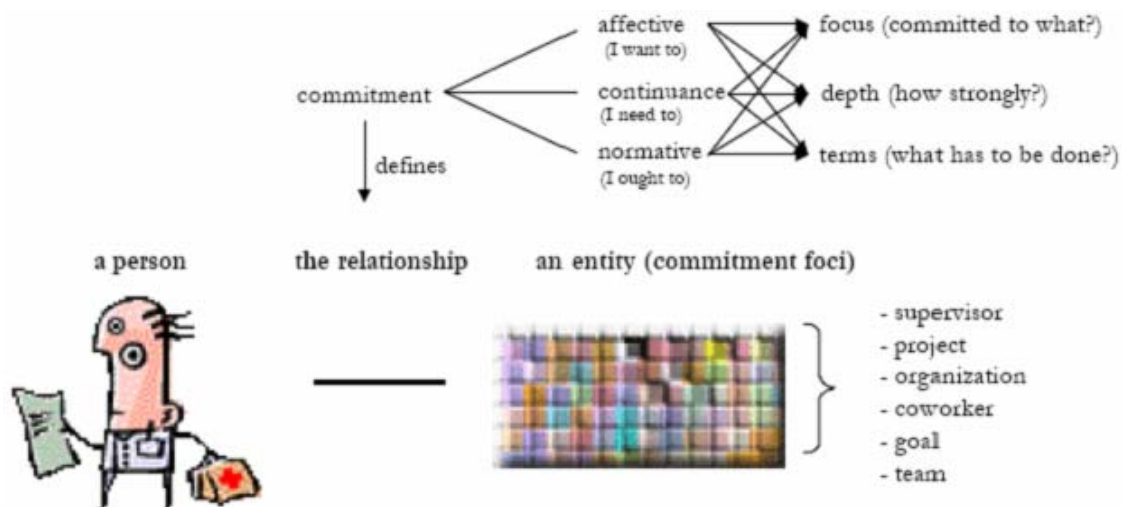


Figure 5. Concept of Commitment (as described in Abrahamsson & Jokela 2000).

4.1 Evaluation Criteria for Commitment

The process of building commitment can be described as a linear model as depicted in the example in Figure 6. Software Engineering Institute (SEI) has introduced a slightly modified version including seven stages of commitment: contact, awareness, understanding, trial use, adoption, institutionalization, and internalization (described e.g. in Carter 2001). These degrees of commitment to change were applied to the commitment to architecture approach, and five evaluation criteria for commitment were defined: awareness, acceptability, satisfaction, involvement and participation activeness, and resources (adequacy of resources) (Table 9). The interviewees (FGI 2006b) especially pointed out the importance of feedback as part of the involvement and participation activeness (see Table 9). It should be noticed, that while speaking of commitment to architecture approach, it is considered to also include commitment to the development efforts the EA generates.

In the workshop 4 (FGI 2006b), it was stressed that if the top management has provided resources for the architecture development, it may have already gone through the lower levels of commitment, at least the levels of awareness and acceptance. Furthermore, the top management’s satisfaction will increase if the benefits of EA can be demonstrated.



It was also pointed out that in the beginning of the EA development, gaining the management’s commitment is more essential than the organizational buy-in (FGI 2006b). Furthermore, feeling the presence of commitment, for instance in the form of allocated time, participations to workshops, management-by-walking-around or simply in the form of doing one’s homework, is crucial. Depending on the organization ‘management’ may refer either to the top-management, the CFO or other managers near to the architecture team. This also indicates that commitment of the stakeholder groups is connected with the phase of the EA development (or the EA maturity level), i.e. the number of committed stakeholder groups should increase as the maturity advances.

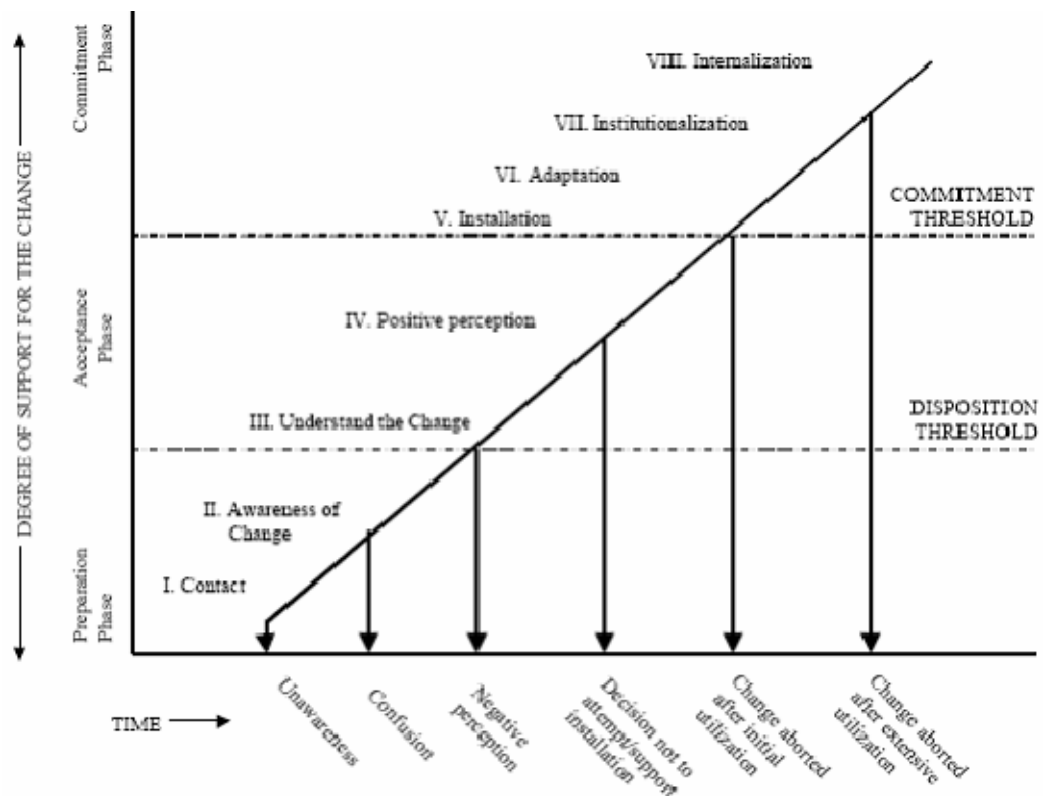


Figure 6. Model of commitment to change (as described in Abrahamsson & Jokela 2000).

Table 9. Evaluation Criteria for Commitment.

Evaluation Criteria	Alternative Criteria	Short Description	References
Awareness		The extent to which the stakeholders - have been informed and know about the EA/architecture approach the organization has adopted - have been informed and know about the purpose of the EA approach, as well as about the EA objectives - identify themselves as EA stakeholders, and even act as such.	(Abrahamsson and Jokela 2000) (Carter 2001) (FGI 2006a)
Acceptability	Comprehen-	The extent to which the stakeholders	(Abrahamsson



4.2.1 Criteria: Awareness

In table 10, possible metrics for evaluating the level of awareness of the EA approach are presented. In the workshop 4 (FGI 2006b), it was stressed that in the very beginning of the EA development, it may be unnecessary for the top-management to know about (to be aware of) the EA. It may be more important to start working with the closest colleagues and first sell the idea of EA to your closest superior. After the EA work starts to “make sense” to the architecture team, it is time to go and start selling the EA approach to the top management.

Table 10. Metrics for Evaluating the Level of Awareness.

Evaluation Question / Metrics	Metric Type / Possible Values	References
Have you heard/have you been informed about the <u>EA/architecture approach</u> adopted in the organization?	On-off: yes/no	Based on (FGI 2006a)
If you have heard about the EA/architecture approach, how satisfied you are with the amount and quality of information you have received?	Likert scale 1-7 (very dissatisfied – very satisfied)	Adopted from (Hargie and Tourish 2000) and (Downs 1988)
Have you heard/have you been informed about the <u>purpose of the EA approach and the EA objectives</u> ?	On-off: yes/no	Based on (FGI 2006a)
If you have heard about the purpose of EA and the EA objectives, how satisfied you are with the amount and quality of information you have received?	Likert scale 1-7 (very dissatisfied – very satisfied)	Adopted from (Hargie and Tourish 2000) and (Downs 1988)

4.2.2 Criteria: Acceptability

In table 11, the possible metrics for evaluating the level of acceptability of the EA approach are presented. In the workshop 4 (FGI 2006b), no specific comments were made on the presented metrics. Instead, it was pointed out that the question of finding the appropriate ways and practices to move from a level to the next level is more interesting. Furthermore, it was suggested that, actually, this is the kind of question that could be asked from the stakeholders themselves: how would they want to increase their level of commitment to the architecture approach. The answers thus provide information about their expectations with regard to the EA work. It may help the architecture team to focus on issues that *truly are important* to the stakeholders instead of issues the architects *think are important to them*.



Table 11. Metrics for Evaluating the Level of Acceptability.

Evaluation Question / Metrics	Metric Type / Possible Values	References
How is your attitude towards the EA/architecture approach: to what extent do you <u>accept</u> the architecture approach (i.e. consider it to be a positive and useful development)?	Likert scale 1-5 (e.g. very positive - very negative)	Adapted from (Motola 2006)
To what extent do you <u>understand</u> the justification/reasons for adopting the EA/architecture approach in the organization?	Likert scale, which scale?	Author's professional judgment
To what extent do you <u>support</u> the architecture approach?	Likert scale, which scale?	Author's professional judgment
To what extent do you consider the EA/architecture approach to be important/useful/essential to the success of - the entire organization - your department - your team - your personal work tasks?	Likert scale 1-5 (e.g. not at all important - very important)	Adapted from (Motola 2006)

4.2.3 Criteria: Satisfaction

In table 12, the possible metrics for evaluating the level of satisfaction to the EA approach are presented. In the workshop 4 (FGI 2006b) it was brought up that, especially the extent of utilization of various architecture outcome might be worth knowing. Additionally, it was stated that satisfaction level of different stakeholders may vary a lot; for instance, the management may be satisfied with the EA results showing decreased costs, while employees dealing with e.g. customer services may be less satisfied with the growing amount of work. This indicates the need of both the “hard measures” (quantitative measures) and the “soft measures” (qualitative measures demonstrating opinions and attitudes) to provide more wide perspective to the EA evaluation.

Table 12. Metrics for Evaluating the Level of Satisfaction.

Evaluation Question / Metrics	Metric Type / Possible Values	References
How satisfied are you with the EA approach and its results?	Likert scale 1-7 (e.g. very dissatisfied - very satisfied)	Adapted from (Ross and Weill 2005)
To what extent you <u>utilize</u> architecture guidelines/architecture documentation/architecture guidance given by architects as a normal part of you work tasks?	Likert scale 1-5 (e.g. Very little, little, Sometimes, often, always. OR: daily, weekly, a couple of times a month, a couple of times a year, never)	Based on (FGI 2006a)



Evaluation Question / Metrics	Metric Type / Possible Values	References
How has your guidelines/documentation/architecture guidance utilization changed during the last quarter/6 months/year?	Scale: stayed the same, gone up, gone down Percentage?	Author's professional judgment
What kind of improvement is needed to make you utilize the architecture guidelines, documentation or architecture guidance given by architects more often?	Free text	Based on (FGI 2006b)

4.2.4 Criteria: Involvement and Participation Activeness

In table 13, the possible metrics for evaluating the involvement and participation activeness of the EA stakeholders are presented. In the workshop 4 (FGI 2006b), the importance of receiving feedback from the organization members was stressed also in this context: Architecture plans, descriptions, and so forth are not perfect at once, but they need to be iterated and modified according to the feedback. Lack of feedback may result in incorrect decisions and flawed architecture. Moreover, based on the discussion, an evaluation question was added (see the last row of the table 13) to find out the stakeholders' ideas on actions that would make them participate in the architecture development, discussions, and so forth more often.

Table 13. Metrics for the Evaluating the Level of Involvement and Participation Activeness.

Evaluation Question / Metrics	Metric Type / Possible Values	References
Does the EA governance team include executive-level representatives from each line of business?	On-off: yes/no	(GAO 2003)
Do they have the authority to commit resources and enforce decisions within their respective organizational units?		
How satisfied are you with the extent you participate in <ul style="list-style-type: none"> - architecture development - architectural work development (process development) - architecture management and guidance - architecture implementation projects - architecture related discussions - architecture related briefings - architecture related training - other, what? 	Likert scale 1-7 (e.g. very dissatisfied – very satisfied)	Adapted from (Paajanen 2000)
How many times have you participated in architecture related <u>briefings</u> during the last quarter/6 months/year?	Likert scale 1-4 (e.g. no briefings at all – attended a large number of briefings)	Adapted from (Hargie and Tourish 2000)



Evaluation Question / Metrics	Metric Type / Possible Values	References
How actively are you participating to architecture related discussions/briefings/etc.?	Likert scale (e.g. Very little, little, Sometimes, often, always)	Adapted from (Paajanen 2000)
How many times have you participated in architecture related training during the last quarter/6 months/year? A further question can be added to specify the training attended.	Likert scale 1-4 (e.g. No training at all – extensive training (attended a large number of ...))	Adapted from (Hargie and Tourish 2000)
How actively do you provide architecture related <u>feedback</u> to <ul style="list-style-type: none"> - the architecture team - the management - your co-workers? (See also the evaluation of communication and common language, section 3.)	Likert scale 1-5 (e.g. Very little, little, Sometimes, often, always. OR: daily, weekly, a couple of times a month, a couple of times a year, never)	Adapted from (Paajanen 2000) Also (FGI 2006b)
What kinds of actions are needed to make you participate in the architecture development, discussions, etc. more often?	Free text	Based on (FGI 2006b)

4.2.5 Criteria: Resources (adequacy of resources)

In table 14, the possible metrics for evaluating the adequacy of resources provided to the EA work are presented. In the workshop 4 (FGI 2006b), it was brought up that if a budget for EA exists, top-management commitment has been gained. EA must be considered a continuous process, and thus resources must be assigned for it. However, the architecture team's ability to focus only to the EA work is not that self-evident; the management may prioritize the ad-hoc problem-solving work aiming at short-term solutions ("extinguishing the fires") over the long-span EA development aiming at more persistent solutions.

Table 14. Metrics for Evaluating the Adequacy of Resources.

Evaluation Question / Metrics	Metric Type / Possible Values	References
Does a budget for EA exist?	On-off: yes/no	Based on (FGI 2006a) See also (Motola 2006)
How much funding is directed to the EA development and management/to the entire EA program?	Euros % of IT budget	Based on (FGI 2006a)
How has the EA budget changed during the last quarter/6 months/year?	Stayed the same, gone up, gone down Percentage	Author's professional judgment



Evaluation Question / Metrics	Metric Type / Possible Values	References
Does a schedule for EA development exist?	On-off: yes/no	Based on (FGI 2006a)
How has the schedule for the EA development changed during the last quarter/6 months/year? What kinds of changes are done? Why?	Stayed the same, gone up, gone down Percentage	Author's professional judgment
Has an architecture team (architects) been assigned?	On-off: yes/no	Based on (FGI 2006a)
Have the architecture team member's responsibilities and authorities been defined?	On-off: yes/no	Based on (FGI 2006a)
Has the architecture ownership been defined?	On-off: yes/no	(GAO 2003)
How many persons does the architecture (development/management) team include?	Number	Author's professional judgment
Does a chief architect exist (responsible for ensuring the integrity of the EA development process and the content of the EA products)?	On-off: yes/no	Adopted from (Passori & Schafer 2004) (GAO 2003)
How has the number of architects/persons in the architecture team changed during the last quarter/6 months/year?	Stayed the same, gone up, gone down Percentage	Author's professional judgment
Is the architecture team capable of focusing only to EA/architectural work? Note: Different types of architecture related work (e.g. development, management, guidance, implementation, or training) can be further specified.	On-off: Yes/no Percentage of work hours spent on architectural work	Based on (FGI 2006a)
How has the architecture team's time spent on architectural work changed during the last quarter/6 months/year?	Stayed the same, gone up, gone down Percentage	Author's professional judgment



4.3 Summing-up

Evaluation of Commitment was suggested to be conducted with the help of five evaluation criteria. A selection of evaluation questions that demonstrate each evaluation criteria was presented to stimulate the definition of the organization specific evaluation questions/metrics. Similar to the evaluation of Communication, evaluation of commitment mainly includes on-off measures and focuses on identifying the level of satisfaction of a stakeholder (i.e. deals with subjective metrics).

Based on the workshop 4 (FGI 2006b), the following conclusions on the evaluation of commitment can be drawn.

In the beginning of the EA journey, the management's (referring to the top management, CFO, superiors, etc.) commitment to the EA approach is more crucial than the organizational buy-in. This indicates that similar to the evaluation of communication, commitment is also related to the phase of the EA development in the organization or, more specifically, to the EA maturity level of the organization. Thus, the number of committed stakeholder groups should increase as the maturity advances.

In addition to the evaluation of the level of commitment, it would be interesting to find effective ways to move from a level to the next level: which steps are needed to get awareness and acceptability, and move onwards to the levels of satisfaction and active involvement. One possibility of getting answers to this particular question is to ask it from the stakeholders themselves.

A different view to the evaluation of commitment was also presented: Maybe the commitment does not need to be evaluated as a separate target at all. When the EA benefits, and also the success of communication practices, are assessed, it is possible to draw some conclusions about the level of commitment as well. If any benefits cannot be demonstrated, it is likely that no commitment exists either in the organization, or the level of commitment does not increase from the level of awareness. Additionally, if the EA budget exists, it proves the commitment of the management.

If commitment is, however, measured separately, the presented set of evaluation questions and metrics provide a starting point for organization-specific metrics selection. It should again be noticed, that they possibly do not suit the organization as such, but need to be modified and translated into the organization's own terminology.

Finally, as mentioned in the context of the evaluating communication and common language, the satisfaction level of the stakeholders is most typically studied by collecting information with the help of a questionnaire, and similar background information will be needed in the context of evaluating commitment as well (see section 3.4).



5 Conclusions

In this report, we presented the study which aimed at determining evaluation criteria and metrics for 1) Communication and Common Language, and 2) Commitment. Literature review gave us a set of candidate evaluation questions and criteria for these areas, and the literature review results were discussed and validated in the workshop 4 participated by the seven representatives of the co-operating organizations.

The main conclusions of this study are as follows:

Communication and common language, as well as commitment are important to the success of EA work. Therefore, the success in these areas needs to be evaluated. Communication and common language can be evaluated independently (i.e. not merely as part of wider organizational communication studies), but the level of commitment can possibly be derived from the evaluation of the architecture benefits. Basically, if benefits can be demonstrated and the organization has gained value through architecture, commitment has also been reached.

Selection of a few most suitable metrics is needed, as well as the translation of metrics and the evaluation questions into the organization's own terminology. Metrics selection is dependent on the phase of the architecture development, or more specifically, on the level of architecture maturity: simple metrics (e.g. on-off metrics) may be more usable in the beginning of the EA journey, and more detailed metrics (quantitative and qualitative metrics) may be utilized as the EA work is more established. Also the usability and ease of gathering the data required affect the metrics selection.

Especially, the level of commitment is rather easy to define, but the challenge is to find practical ways to move from a level to the next level. One solution to this problem was presented: It may be fruitful to ask the stakeholders themselves which actions should be taken to make them accept the EA approach and participate in the EA work more actively.

The set of evaluation questions and metrics presented in this report can be useful for organizations helping them define the few specific metrics for their needs. After having tested the metrics in practice conclusions can be drawn about their suitability and usefulness for evaluating the success of communication and common language, as well as the level of commitment.



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Appendix 1. Brief Descriptions of the Potential Critical Success Factors for EA.

CSF	Description/Content
Scoping and Purpose	Includes the definition of architecture (EA/SA) in the organization, the key stakeholder groups, the mission, goals and direction of EA, the purpose of EA and how wide organizationally, how deep and detailed, and how fast should the EA be developed in the organization.
Business Driven Approach	Includes the business linkage of architecture (EA) development, business-IT alignment, the business requirements, as well as the requirements set by the various stakeholders, and the equivalency between the requirements and architecture.
Communication and Common Language	Deals with the definition of architectural concepts (the common vocabulary), the definition of communications plan and strategy, and the success of architecture related communication.
Commitment	Refers to the commitment and involvement of the top-management in the architectural work, as well as the organizational buy-in.
Governance	Relates to issues such as governance (and guidance) structures, roles, responsibilities, processes and activities, change management processes (both the organizational and the architectural changes), and risk management processes.
IT Investment and Acquisition Strategies	Deals with the relationship (and dependency) between architectures or architectural work as well as with the IT investment and acquisition strategies of the organization.
Development Methodology and Tool Support	Deals with issues such as the definition and usage of the architecture frameworks, development methods and tools in architecture development and management.
EA Models and Artifacts	Deals with issues such as developing a documentation plan, collecting and analyzing the business requirements, ensuring that all necessary views are modeled providing a coherent and concise picture of the enterprise (current and future models), and developing a transition plan.
Assessment and Evaluation	Deals with the definition of issues, such as, architecture evaluation targets, architecture evaluation purposes and audience, architecture evaluation process and criteria (metrics), data gathering and analysis techniques.
Skilled Team, Training and Education	Refers to issues such as the capabilities and skills of the architecture team, the architecture/business training of architects, as well as other stakeholders.
Organizational Culture	Deals with issues such as the organization's readiness to develop and utilize EA, attitudes towards architecture approach, attitudes towards changes in general, and the organizational changes the architecture development may lead to.
Project Management	Deals with issues such as the coordination between various (architecture) projects, utilization of project milestones and checkpoints for architectural evaluation or guidance, taking advantage of lessons learned and best practices as well as being on budget and schedule.



Appendix 2. Enterprise Architecture Evaluation Components.

Component	Description
Purpose	The purpose of the evaluation: <ul style="list-style-type: none"> - Why are we doing the program? - Why are we doing the evaluation? - What's the point? What do we want to accomplish?
Target	The object under evaluation (to delimit the factors to be considered): <ul style="list-style-type: none"> - What are we going to evaluate (the whole program, just a particular component, or some components)?
Audience	Potential users of the evaluation information/results: <ul style="list-style-type: none"> - Who will use the evaluation (results)? - How will they use it? - What they want to know? What questions will the evaluation seek to answer?
Quality Attributes and Metrics	The characteristics of the target that are to be evaluated <ul style="list-style-type: none"> - What information will help answer the questions? - What information do you need to answer the questions?
Yardstick or Standard	The ideal target against which the real target is to be compared.
Data Gathering Techniques	The techniques needed to obtain data to analyze each criterion/indicator: <ul style="list-style-type: none"> - What sources of information will be used? - What data collection method(s) will be used? - What instruments (e.g. recording sheet, questionnaire, video or audio tape) will be used? - When will the data be collected (e.g. before and after the program, at one time, at various times, continuously, over time)? - Will a sample be used? - Who will collect the data? - What is the schedule for data collection?
Synthesis Techniques (Data Analysis Techniques)	Techniques used to judge each criterion and, in general, to judge the target, obtaining the results of evaluation: <ul style="list-style-type: none"> - How will the data be organized or tabulated? - What, if any, statistical techniques will be used? - How will narrative data be analyzed? - Who will organize and analyze the data? - How will the information be interpreted and by whom? - How will the evaluation be communicated and shared? To whom?
Evaluation Process	Series of activities and tasks by means of which an evaluation is performed: <ul style="list-style-type: none"> - What steps are needed? E.g. planning or preparation (evaluation design), examination (data gathering), decision making (synthesis, analysis, documentation) - When will the steps be conducted? - How long will it take to conduct each step, to collect the data needed? - Who conducts the steps? Who collects the data? - How will the results be documented, reported, communicated? - Who will receive the report? Will it answer their questions?
Manage the	Responsibilities, budget and timeline. Risks.



9.2.2007

Component	Description
evaluation	<ul style="list-style-type: none">- What resources do you need?- Whose time and how much of it is available to work on evaluation?- How much may the evaluation work cost?- What kind of expertise is needed to conduct the evaluation?- When is the evaluation (information) needed? (the flexibility is needed; evaluation should be adjusted so that it is completed when it will have the maximum impact)- What threats will damage the integrity of the data and the conclusions we want to draw?- Do you foresee any barriers or obstacles?

