

MASTER

Evaluation of practicality of IAF framework at Philips CE

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Department of Mathematics & Computer Science and
Department of Technology Management

*Evaluation of Practicality of
IAF framework at Philips CE*

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Preface

This report is the result of my graduation project, for Masters in Business Information Systems at the Technical University of Eindhoven.

This research project was a predominantly a context oriented project. It was neither organized according to the prescribed theory nor a methodology. This report highlights the results of the project carried out at Philips CE; it reflects the environment of the business and IT.

IT applications are increasingly used by the business processes. With the trends of dynamic business processes, technology changes and the number of application systems supporting them, it becomes necessary for the organizations to achieve transparency between the business and IT architectures.

There are a number of frameworks which promise to support the maintenance of enterprise architectures. IAF (Integrated Architectural Framework) is one of those frameworks.

Philips Corporate IT which is responsible for overall IT strategy, had chosen to adopt IAF framework for all its enterprise architectural related activities for its product divisions including Philips Consumer Electronics.

Philips Consumer Electronics is now in a situation to learn and use the IAF framework in all its IT architectural projects. Also the strategic direction of 'One Philips' is impacting its IT.

In this thesis I demonstrate "How IAF framework could be used practically" by Philips CE.

- IAF framework is used to support the architectural process of one pilot project Customer and Supplier Collaboration.
- The architecture is then analyzed on the basis of IAF framework for the
 - Customer & Supplier Collaboration Project
 - Philips Consumer Electronics (Total)
- Maturity Level Analysis of Philips CE are carried out.
 - Architecture process maturity
 - Architecture project maturity

Acknowledgements

The realization of this project was possible due to the guidance and support of various people; I take this opportunity to thank them all.

First of all I would like to thank my supervisors from Philips CE, Mr. Hans Rietbergen and Mr. Thijs de Vries for supporting and guiding me through the project. This was a pilot project for Philips CE and it was a great process of learning to discover the environment of study. They helped me explore the environment of the company and also provided the insight of processes wherever necessary. Thanks to you for the privilege of including me in the pilot project.

I would like to thank all the BPO's for sharing their information and time for the project. I would like to thank all the colleagues at Philips CE for providing a learning atmosphere for me at Philips CE. I thank Mr. Hans Goedvolk from Capgemini for helping with the IAF principles. Thank you all for your kind help.

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Lastly, I thank my parents Mr. Aradhya Ayyagari and Mrs. Nagamani Ayyagari, for all their support and encouragement for my studies.

I thank Dr. Sharada Sugirtharajah for her support and motivation for my project completion. Of course I thank all my friends and family who supported me and helped me to finish my masters.

Thank you,
Sincerely
J.M.Ayyagari

Management Summary

The management summary provides the outline of the most important steps and deliverables of the project.

Introduction

Philips has recently decided a strategic direction to move towards ‘One Philips’, bringing all its product divisions (PD) including Consumer Electronics, DAP, Lighting, Medical Systems, and Semiconductors under one umbrella. The corporate management wants to face the suppliers’ customers and consumers with a single face rather than as many PD’s. This ‘One Philips’ strategy aims at synergizing the brand and technological core competences, the financial basis, and the shared support functions.

Philips Corporate IT is functionally responsible for the overall Philips IT Strategy, Enterprise Architecture, Policy setting, IT Cost and Investment Tracking, IT Quality, IT Management Development, as well as IT Purchasing. Via the IT Domains Enterprise Communication & Collaboration and Enterprise Computing Infrastructure, Corporate IT is responsible for continuously defining and adapting Philips’ IT Infrastructure to key business requirements.

It had chosen to adopt the IAF (Integrated Architectural Framework) framework to support all enterprise architecture related activities for all its PD’s.

This project has taken place at Philips Consumer Electronics –CIO office, IT Demand Management group. The mission of PCE IT is to facilitate the implementation of PCE strategy by adding value to the business. The integration of major internal and external business processes within PCE, such as Supply Chain Management, business creation, demand creation etc is required to improve. A common approach towards these processes is crucial to achieve business excellence in Philips CE. As a consequence a common standardized IT strategy has been chosen and is being supported by the global operating PCE Information office.

Philips CE IT Demand Management group is responsible for the project identification, project creation of the IT projects. It is also responsible for the IT portfolio management, the aligning of business process and IT application landscapes across the entire PCE.

Assignment

Philips CE is directed by Philips Corporate IT to use the IAF framework as a tool to support the architectural projects. When the assignment was initiated it was not clear for PCE if there would be any software tools to support the architectural process. After some initial discussions with Corporate IT and software tool support vendors (METIS) of IAF framework, it was decided to first evaluate the IAF framework before committing on the use of specific tools.

Training of IAF framework was given to understand the essential aspects of the architectural process.

Philips CE IT demand management selected the project Customer and Supplier Collaboration as a pilot project for assessing the practicality of the IAF framework.

So the assignment now became two-fold:

- A1. Create the IAF content architecture for aligning the business process and IT applications of Customers & Suppliers for collaboration with Philips CE.
- A2. Explore how to adapt the IAF framework to the architectural projects of Philips CE, This leads to the research objective which is as follows,

“Evaluate the practicality of IAF framework for Organizations such as Philips CE.”

To meet the research objective and the assignment stated above, a number of research questions in three kinds were articulated for the two-fold assignment.

The following research questions were formulated, in order to emphasize the need and the potential benefits for EA at Philips CE

- Q1. Why does PCE need Enterprise Architecture?
- Q2. What is the benefit of pilot project architecture for Philips CE?

The following research questions were addressed for and with the Pilot project (C & S Collaboration):

- Q3. Is Customer & Supplier Collaboration a valid project for piloting of IAF enabled phases?
- Q4. How is the pilot project used for evaluating the practicality of IAF?
- Q5. What are the ways of working with IAF framework?
- Q6. What is the scope of the pilot project on the IAF framework?
- Q7. How is the IAF framework enabled in the pilot project phases for (C & S Collaboration) at Philips CE?

Using the results from the pilot study and assessment approaches from the literature, the following research questions were addressed,

- Q8. How does the architecture (C & S Collaboration) reflect on the IAF framework?
- Q9. What does the assessment of architectures indicate/contribute for Philips CE?
- Q10. What does maturity level analysis assessment show for Philips CE?

The activities in this research have been performed by using a range of research methods and techniques,

- Literature research using articles, and books as the primary sources for having an insight into the theoretical background on the subject.
- Desk research at Philips to obtain the understanding of the environment and insight of the organization. The internal material and available documentation also depict the current situation of Philips which is very useful for the designing the appropriate solution.
- Introductory training of IAF Essentials from IAF Capgemini, gave the knowledge of the framework and an opportunity to discuss the similar initiatives at the other PDs of Philips like DAP, Lighting, Semi Conductors.
- Discussions with IAF consultants, Philips Corporate IT and the architects within Philips CE.
- Structured interviews for business process analysis with the stakeholders for (the BPO's) with help of the IAF framework.
- Guidance by a Senior Consultant of Capgemini IAF Academy on IAF framework principles to validate the model.
- Best Practices approach from the research organizations and research groups to arrive at a competent yard stick to measure the assessment of the procedures.

These activities would result in a set of deliverables at the end of the project, which are explained in the next section.

Deliverables

The main deliverables of this research, and indication to research questions answers, are as follows:

D1. Architectural models of the pilot project Customer & Supplier Collaboration (Q4 & Q6)

D2. Insight and guidelines of IAF framework for Philips CE (Q5, Q7, & Q9)

D3. Synchronizing the IAF content for the architectural processes (Q7)

D4. An illustration of maturity levels of Philips CE and a program to be managed based on the indicators of maturity scale. (Q1, Q2, & Q10)

D5. Recommendations for the weak areas based on assessment of architecture on IAF framework for

a. Pilot project Customer & Supplier Collaboration. (Q3, Q4)

b. Total Philips CE. (Q8 & Q9)

Analysis

The project approach is made based on the insight from the environment of Philips CE and the assignment of IAF for the pilot project.

The need for a proper Enterprise Architecture program is identified by Isikawa diagram (Cause Effect diagram) for Philips CE and the gap analysis describing the situation of Philips CE is analyzed which answers the research question Q1.

The benefits of the Philips CE with the architecture of this pilot project are mentioned which answers the research question Q2.

The validity of C& S Collaboration for a pilot project supported by IAF is analyzed, which answers Q3.

The research question (Q4) – (How is the pilot project used for evaluating the practicality of IAF?) Is answered as follows:

There exists no prescribed methodology before this project, for evaluation of success of frameworks such as IAF. This is achieved in this thesis (research) in two ways: by measuring the architecture made (from pilot project) with support of IAF framework and by the readiness/efforts of the Philips CE to use the framework.

Design

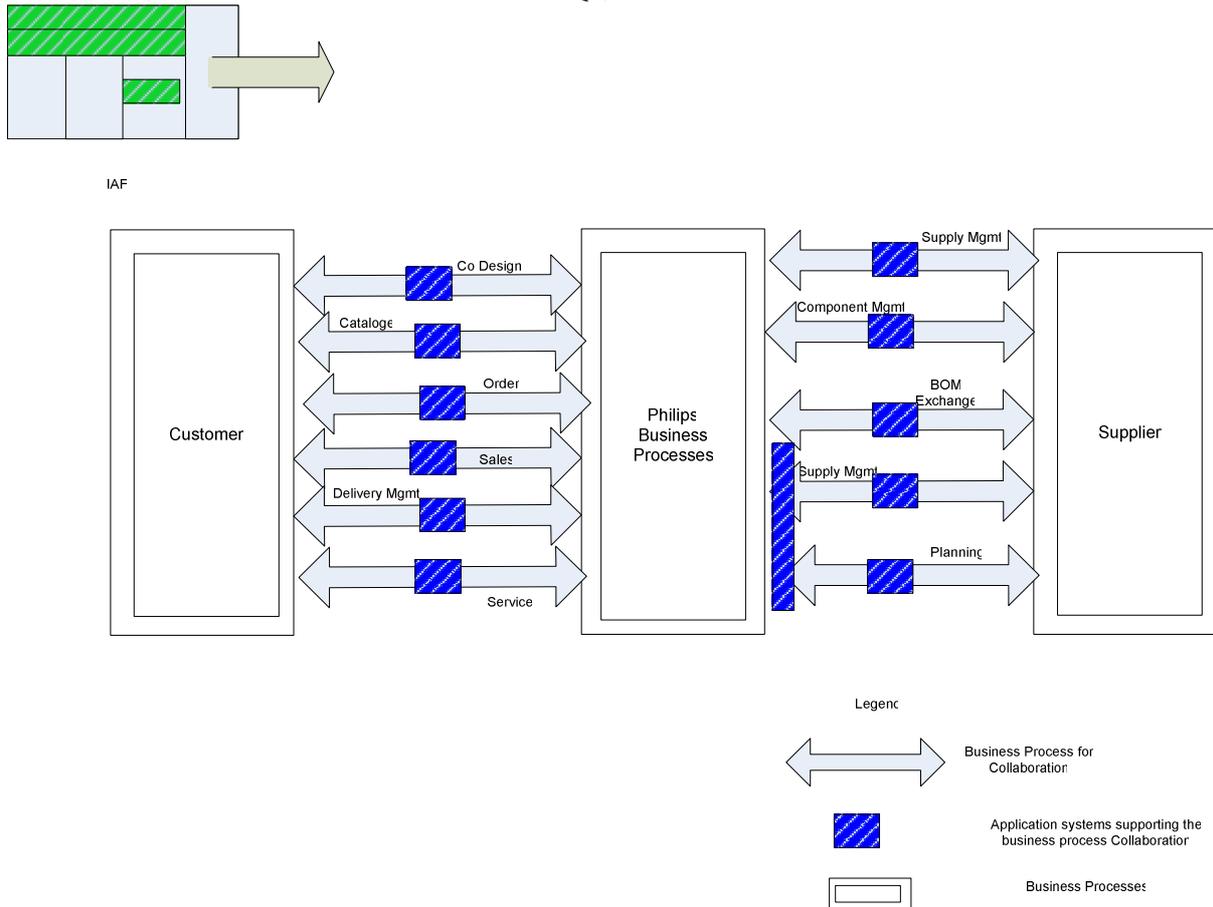
In the design phase of the research questions Q5, Q6, Q7, and Q8 are answered. This does not follow any prescribed methodology but rather a combination of design activities are used to finally arrive at the architectural design of the pilot project C& S Collaboration. These are based on the literature, the IAF methodology, knowledge of IAF professional consultants, architects and BPO's of Philips CE.

First, the design of working with IAF elements for different projects and the principles of IAF are explained. (Q5)

Second, the synchronization of IAF content with architectural process based on IAF elements abstraction levels and aspect areas is designed. (An illustration of the C& S Collaboration is given as an example for clarity.)

Third, the design of IAF enabled project phases for the pilot project C& S Collaboration, based on (earlier mentioned design steps) resulting in design of the architecture of pilot project C& S Collaboration. (Q6), (Q7)

Lastly, the architectural models are depicted from pilot project C& S Collaboration which reflects the IAF framework elements this answers the Q8, as shown below;



Assessment

Assessment phase consists of two steps: first step is Architecture Analysis, and the second step is the Architecture Maturity Analysis.

To implement the IAF at Philips CE, it is important to look at the success of the architectural results from the pilot project (C & S Collaboration) on the one hand and on the other the hand the Philips CE's maturity levels and its receptiveness towards the new architectural processes with IAF.

- Architecture Analysis on an EA Score card by IFEAD (Information For Enterprise Architecture Development) which is an independent research and information exchange organization.
 1. Assessing the architecture of the pilot project Customer and Supplier Collaboration, from design phase.
 2. Assessing the Total CE architecture based on the input and contribution from IT Demand Management Group of Philips CE.
- Maturity Level Analysis for improving the architectural processes, this is conducted as

follows,

1. Architecture Process Maturity at Philips CE is based on the criteria from NASCIO indicators for EA.
2. Architecture Project Maturity based on the literature.

These assessments result in certain weak areas for improvements for which the recommendations are given in the next phase.

Recommendations

Recommendations for implementing the IAF framework at Philips CE, consisting of the following sub sections, these are based on the results from the assessment phase, which showed certain weak areas. These recommendations rectify the deficiencies and needs of the organizations shown in The Analysis Section (Cause-Effects). They also reflect the two-fold assignment stated above,

- Improving the weak areas of Pilot Project Customer & Supplier Collaboration based on the assessment.(A1)
- Improving the weak areas of Total Philips CE based on the assessment.(A1)
- General recommendations for Architectural processes at Philips CE for IAF.(A2)
- Guidelines for future IAF framework projects. (A2)
- Recommendations of Program Management based on Maturity Analysis. (A2)

Conclusion

The conclusions of the research emphasise in three aspects, which are stated below,

- Practicality of IAF framework for Philips CE.

The results of pilot project C & S Collaboration indicate that IAF successfully contributed to support the architectural models. Recommendations for implementing the IAF for future projects were provided. This makes the IAF framework practical for Philips CE for future architectural projects.

- Contribution of the research objective.

Evaluating practicality of a framework is not a prescribed methodology before this research. Practicality is achieved by actually doing and using the IAF framework for creating the architectures, assessing the architectures and providing maturity analysis for improvising the efforts by the organizations.

- Further directions of the research.

1. How can IAF Framework be improved with architectural projects?

In this research it was obvious that Philips CE was making efforts to suit to the IAF framework and make it practical for the architectural projects.

But it is also possible that the IAF framework needs improvements when the architectural process reaches a fairly good maturity levels on the AMM levels.

2. Guidelines for selection procedure for IT solutions

The requirements of IT solutions from the business sometimes can not be realized immediately. Solutions could be built for longer term to align the business & IT solutions. Based on what criteria can the choice be made to arrive at prioritization of optimum IT solutions?

3. Transformational Change Plan

When can the transformational change plan be made with timeframe and a roadmap? Is it dependent on the business case? Or dependent on the characteristics of the nature of the need: is it a problem, an opportunity or a solution? What is the impact of this on the IT project portfolio management?

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1 Introduction

This chapter briefly introduces the company and the environment in which the project was carried out. The environment explains the cause of the problem and the constraints of the solutions. The initial assignment is described and the overall approach of the research project is presented.

1.1 Company Description

This section first introduces Philips as a company, Corporate IT and Philips CE. It then proceeds with the status regarding the Integrated Architectural Framework (IAF) to arrive at the challenge of introducing IAF, and the problem of this study. This project was carried out at the IT Demand Management group of Philips Consumer Electronics

1.1.1 Philips and Strategic direction of ‘One Philips’

Royal Philips Electronics (or Philips) was established in 1891 as a lamp factory. Today it is Europe’s largest and one of the world’s biggest electronic companies. It has a multinational workforce of over 170.000 employees with sales and services in more than 150 countries. Its products range from TVs, audio products, X-ray machines, chips, to light bulbs.

Philips is active in about 60 businesses, which are divided into 5 product divisions:

- Consumer Electronics,
- Domestic Appliances and Personal care,
- Lighting,
- Medical Systems,
- Semiconductors.

Gerard Kleisterlee, president and CEO of Philips, had announced the strategic direction of ‘One Philips’. This ‘One Philips’ program aims at bringing together all the product divisions (PD’s) within the company. They are clubbed together under three categories namely health care, life style and technology. The idea is to share a common ground that underpins the brand, the technological core competences, the financial basis, the shared support functions between the cross PD’s. (For e.g. Philips CE using the components of Philips SC)

In the category of lifestyle, the domestic appliances, consumer electronics and lamps are included. Each of these three sectors is increasingly seeing that consumers are not so much interested in the product itself, but in the experience it offers. Having a common website for its consumer products from different PD’s would enable them to work more fruitfully to generate more sales and serve customers better.

As a consequence of this shift there is a huge impact on the business models and IT platforms. Hence Corporate Management wants to face the Suppliers, Customers, and Consumers with a single face rather than as many PD’s. . [CEO Presentation].

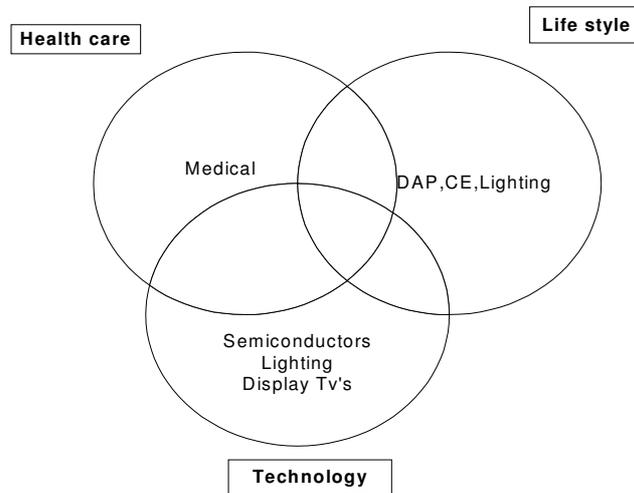


Figure 1 One Philips

1.1.2 Corporate IT

Corporate IT is functionally responsible for the overall Philips IT Strategy, Enterprise Architecture, Policy setting, IT Cost, Investment Tracking, IT Quality, IT Management Development, as well as IT Purchasing. Via the IT Domains Enterprise Communication & Collaboration and Enterprise Computing Infrastructure, Corporate IT is responsible for continuously defining and adapting Philips' IT Infrastructure to key business requirements.

The following are the three domains of Corporate IT, and their functions

- The Enterprise Communication & Collaboration- (EC&C) domain is an integral component of Corporate IT and involves many aspects of the way employees perform their work. E.g. Lotus Notes emailing.
- The Enterprise Computing Infrastructure (ECI) domain is a core element of the Philips Enterprise-wide IT Infrastructure. E.g. Firewall.
- Strategy & Architecture - Enterprise Architecture in Corporate IT can be linked to the preparation of plans, the design and the overview of construction of Information Technology related projects. E.g. IT alignment.

1.1.3 Philips Consumer Electronics

Philips CE (PCE) is among the world's top three consumer electronics companies, with a range of products based on the company's world-leading digital technology competencies, and are designed to enhance consumers' everyday lives - at home, at work or on the move.

The product range of Philips Consumer Electronics is as follows,

- TV products (Flat, Plasma),
- CRT,
- Video products such as HiB, DVD, DVD+RW, VCR, TV-VCR,
- Audio product (system, products, portables)
- Computer Monitors (LCD & CRT)

- Consumer communications-Mobile phones, Cordless digital phones
- Set top boxes
- Accessories (Headphones, Recordable media)

The Business Groups of Philips CE are,

- Connected Displays,
- Home Entertainment Networks,
- Mobile Information.

The business regions of Philips CE are

- Asia Pacific (AP)
- Europe
- Latin America
- North America. [Philips,1]

1.1.4 Philips CE IT-CIO office & IT Demand Management Group

The mission of PCE IT is to facilitate the implementation of the PCE strategy by adding value by improvements and integration of major internal and external oriented business processes within PCE, for example, Supply Chain Management, business creation, and demand creation. A common approach towards these processes is crucial to achieve business excellence in PCE as a consequence; common standardized IT strategy has continually being supported by the global operating PCE Information office.

IT in Philips CE covers the information systems and related services to support the key processes in Supply Chain Management (SCM), e-businesses and in associated disciplines. CIO office relies heavily on its SCM.

IT within the CE is governed by the Global CE IT Board, which consists of,

- The CE CIO, chairman of the IT Board,
- The CIO's of the Business Groups (BGs) and of the Global Sales & Services (GS&S) Region organizations.

The IT demand management of PCE is responsible for the identification and creation of IT projects. It is also responsible for the IT portfolio management, the aligning of business process and IT application landscapes across the entire PCE.

The ambition of the Information Office is to drive excellence within the IT Demand Management Group by

- Cost-effective IT support for PCE by value additions and cost reductions
- IT enabling support with new business models, shifting from internal to external focused business processes.
- Establishing a competitive level of operational excellence measured by improvements in customer service and timely service delivery according to Service Level Agreements.

(Please refer to the organizational chart in appendix 1)

1.2 Context for the assignment: Implementing the IAF framework at Philips

This project was carried out at IT Demand Management group of Philips CE-CIO office. Philips Corporate IT has incorporated the principles of IAF, for IT Architecture and planning. An initiative of the IAF is then directed to Philips CE and all other product divisions.

Philips CE earlier had an initial assignment of investigating the practicality of the IAF framework and on how to incorporate IAF into its Enterprise Architectural efforts.

The IT Demand Management group of Philips CE, which is responsible for project identification and project creations at the moment, is defining the IT strategy and busy making of with IT portfolio project lists for Philips CE.

During the early project phases, the Philips CE –CIO IT Demand Management Department decided to first pilot a project based on the IAF framework to know how feasible the framework is to develop IT architecture, for Philips CE.

The IT demand management along with CIO and PITAB (Philips IT Architectural Board) members selected the Customer Supplier Collaboration as a pilot project. This pilot project is selected to serve as an initial trial on implementing of the IAF content for architectural projects at Philips CE.

1.3 Phases in the Project and overall Structure of the Report

In line with recommended practices in change management for IT-reliant work systems, the research activities have been divided over five phases as depicted in Figure 2. Because I had to draw upon a large number of publications from several disciplines, I have included references along the text in the successive chapters. Where larger contributions of theoretical background and techniques/methodologies are required these are included in a separate chapter.

These phases are as follows:

Orientation Phase

In the orientation phase, Philips environment and organization structure are explored which contribute to the first Chapter 1-Company description. The literature and the best practices from the different research groups required for the research are addressed in the Chapter 2 Theoretical Background.

Analysis Phase

In the analysis phase the research perspective is established with the research objective, questions, scope & limitations. This contributes to the detailed Assignment & Project Description Chapter 3. Analysis of reasons and benefits for Philips CE with the pilot project and IAF content contributes to Chapter 4.

Design Phase

Design phase contributes to the Chapter 5 with four sub designs,(1)the design ways of working with IAF, (2)IAF content synchronization to the architecture projects, (3)the IAF enabled project phases for the pilot project of Philips CE and lastly (4)the design of the architecture of pilot project.

Assessment Phase

In the assessment phase, the assessment is made for architectures and Architecture Maturity Analysis for architecture process and projects at Philips CE. These assessments are provided in chapters 6.

Implementation Phase

The Implementation Phase consists of recommendations for implementing the IAF at Philips CE in Chapter 7 and the conclusions of the research in Chapter 8.

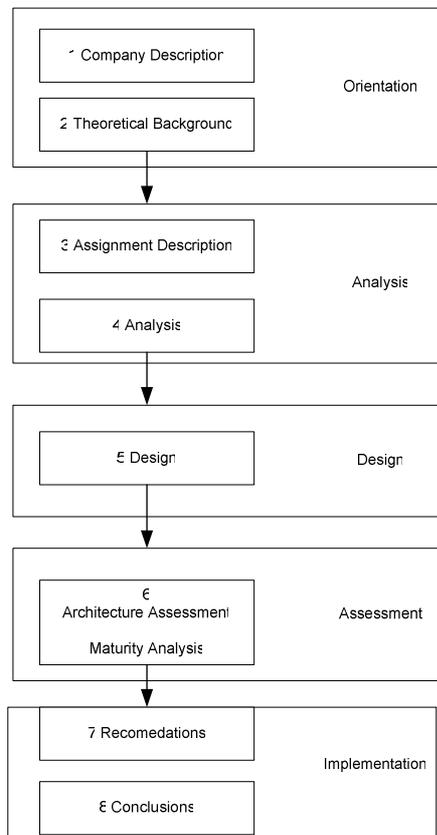


Figure 2: Phases in the Project and Structure of the Report

1.4 Conclusion on Initial Assignment

Philips CE is faced with a situation of using the IAF framework to develop its architectural studies. The Customer and Supplier Collaboration is identified as a pilot project to align the business processes with the IT application landscapes used for collaboration with the customers and suppliers. This leads to a need of exploring new ways of working with IAF framework and if it can help deliver the expected results.

The context of the architectural studies for enterprises and the knowledge of IAF framework are essential to understand and appreciate the research. Therefore the next chapter gives the theoretical background.

2 Theoretical Background

This Chapter provides a broad insight into most aspects needed for this research. The theoretical background is supportive to obtain focus and direction for the research.

This chapter first provides general concepts and definitions for enterprise architectures in section 2.1. There are certain general benefits for the enterprises with enterprise architectures which are elaborated in section 2.2. , these are based on theory research from internet.

Secondly, since this research is based on IAF for Philips CE, IAF elements which exhaustively cover the Business and IT architectures are explained in the section 2.3, and this is based on the IAF workshop and course material from IAF Capgemini Academy.

Lastly the research methodologies for assessing the enterprise architectures and the maturity level analysis of the organizations are explained in section 2.4, these are from the best practices of research organizations from open sources.

2.1 Enterprise Architectures

In this section some of basic definitions of Enterprise Architectures (EA) are stated, this is to give a general idea of the concepts that will be used later in the research.

2.1.1 Basic Definitions

Architecture is defined as “The fundamental organization of a system embodied in its components, their relationships to each other and to the environment and the principles guiding its design and evolution.” [IEEE 1471-2000]

Adapting the definition from the IEEE 1471 2000, Capgemini (IAF framework Academy) defines the Enterprise Architecture as follows, “The fundamental organization of an enterprise embodied in its different architectural descriptions, their relationships to each other and to the environment and the principles guiding its design and evolution.” [Capgemini]

An **architecture framework** is a tool, which can be used for developing a broad range of different architectures. It should describe a method for designing an information system in terms of a set of building blocks, and for showing how the building blocks fit together. It should contain a set of tools and provide a common vocabulary. It should also include a list of recommended standards and compliant products that can be used to implement the building blocks. [TOGAF]

2.1.2 Kinds of Architectures

The increasing trends of complexities in IT systems and the organizations that support these systems have created the necessity for an architectural design of the business and IT systems. Different kinds of architectures can be distinguished by the goals that are pursued. By clearly distinguishing the different aspects of information systems and relating those to the way of thinking of different management levels gives rise to meaningful and balanced discussions.

2.1.2.1 Business architecture

The business architecture defines content of all business systems in the organization. [Perks Col et al].

“The fundamental organization of the enterprise embodied in its domains, their relationships to each other and to the environment and the principles guiding its design and evolution.” [IAF]

The business architecture includes descriptions of the companies' products, the desired development of the business processes and the companies strategic choices made. Any trends and relevant developments regarding the line of business, such as structure of the organization, distribution channels used and growth figures, should be included in the business architecture. Together these results in a number of prerequisites for the way the company should operate in the future.

2.1.2.2 Information architecture

“The fundamental organization of the enterprise information assets embodied in its components, their relationships to each other and to the environment and the principles guiding its design and evolution.”

The information architecture describes the information exchange required to adequately support the business processes. Every information flow is characterized by: the information source, a brief description and the type of data being exchanged. The description should be put in the terminology used by the companies' tactical management.

2.1.2.3 Application architecture

“The fundamental organization of the information-systems embodied in its components, their relationships to each other and to the environment and the principles guiding its design and evolution.”

Different kinds of systems, such as a call-center, management information system or accounting system have different requirements. Similar kinds of systems (transaction processing, reporting or front-office systems) should be included in separate aspect (application) architectures.

2.1.2.4 Technology Infrastructure Architecture

The fundamental organization of the physical IT infrastructure, Embodied in its components, their relationships to each other, to the environment and to the principles guiding its design and evolution.”

2.2 Benefits of Enterprise Architectures

Enterprise Architecture promises and assures some technical advantages and transformational. The benefits for the organization that can be summarized as follows, [TOGAF]

- A more efficient IT operation
 - Lower software development, support, and maintenance costs
 - Increased portability of applications
 - Improved interoperability and easier system and network management
 - A better ability to address critical enterprise-wide issues like security
 - Easier upgrade and exchange of system components
- Better return on existing investment, reduced risk for future investment
 - Reduced complexity in IT infrastructure
 - Maximum return on investment in existing IT infrastructure
 - The flexibility to make, buy, or out-source IT solutions
 - Reduced risk overall in new investment, and the costs of IT ownership
- Faster, simpler, and cheaper procurement
 - Buying decisions are simpler, because the information governing procurement is readily available in a coherent plan.
 - The procurement process is faster - maximizing procurement speed and flexibility

without sacrificing architectural coherence.

According to Schekkerman the choice of architectural frameworks for the company is sometimes a difficult choice. But actually this thesis is not about selecting the framework as IAF framework has already been chosen for Philips. This thesis is about practicality of IAF framework for PCE. This is discussed in the next section of this chapter.

Enterprise Architecture (EA) is a program supported by frameworks, which is able to coordinate the many facets that make up the fundamental essence of an enterprise at a holistic way [Schekkerman2003].

2.3 Integrated Architecture Framework (IAF)

The Integrated Architecture Framework (IAF) of Capgemini is aimed at IT intensive systems supporting the integrated architectural design of business and IT. Architectural design plays a key role in the alignment of business and IT. [Capgemini]

Architectural frameworks address the following areas

- Aspect areas
- Abstraction levels
- View Points
- Relations
- Dependencies

Frameworks structure the complexity in order to mitigate risks of failure

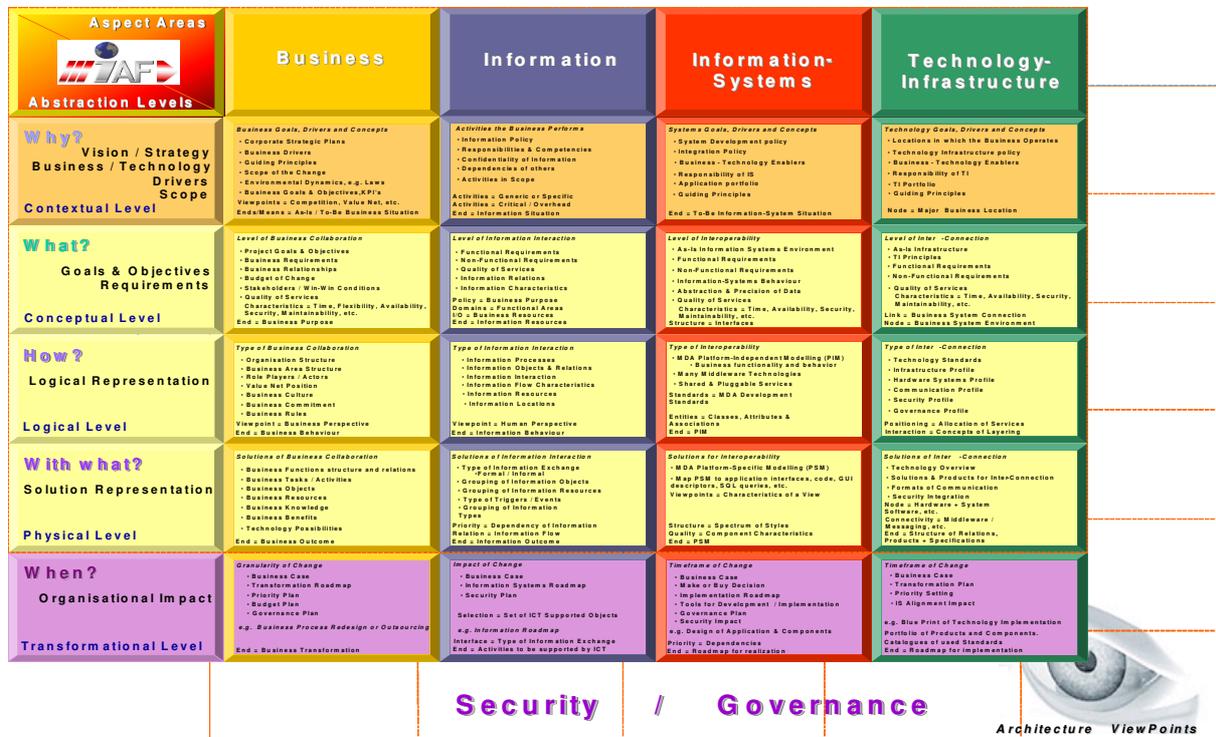


Figure 3 IAF framework

2.3.1 Dimensions of IAF

The Integrated Architecture Framework supports the creation of a complete integrated architectural description of the IT enabled Enterprise. Therefore, the IAF has **three dimensions** that relate to the systems of which an IT-enabled Enterprise is comprised and the products and views of the architectural description. [Goedvolk]

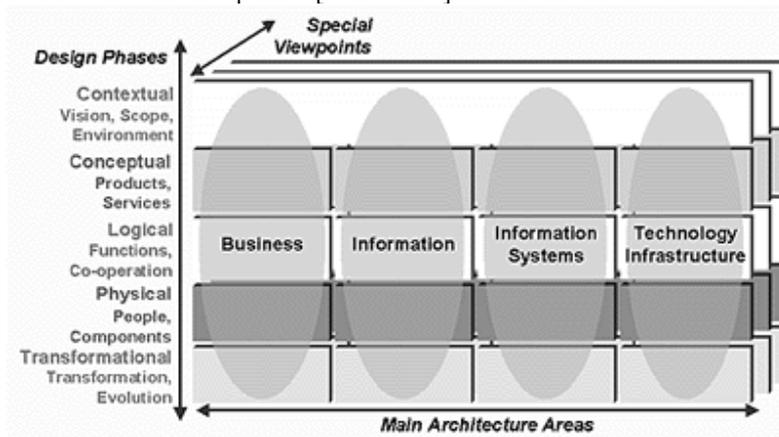


Figure 4-IAF Design Dimensions

The horizontal dimension concerns the four main architecture areas,

- Business Processes,
- Information provision system (including knowledge),
- Information Systems (automated),
- Technology Infrastructure

The vertical dimension concerns the five abstraction levels that are supported by the architectural description. Each design phase or abstraction levels contain a part of the architectural description of the systems in the four architecture areas.

The third dimension is comprised of specific architectural viewpoints that need a holistic approach concerning all main architecture areas. An example is the security viewpoint.

2.3.2 Aspect areas of IAF

These architecture areas of IAF framework are similar to the kinds of architectures discussed in the first section of this chapter.

The Business processes consist of communicating and collaborating people in the role of employee, and of organizational units such as teams or departments. The business processes are organized as one or more supply chains of individuals, organizational units and companies working together in delivering products or services to the customers. The environment of a company is seen as network connecting the company with customers, suppliers and third parties.

Information and knowledge are vital enablers of the business. The people in the business processes are supported by an Information provision system formed by people and organizational units in specific information and knowledge oriented roles such as information provider, information user and information manager. The same people and units that already have a business role in the business processes may perform these information roles. The information provision enables the business by supporting the creation, processing, exchange, storage and use of information and

knowledge. The Information provision in fact acts as the collective memory and frame of reference of the organization. Business Processes and Information Provision System form together the Business System of the enterprise.

The information systems encompass a network of communicating and co-operating software components that deliver IS (automated) services to the people that have a business role and/or information role in the business system. These automated services enable the communication and control in the business processes, and the creation, processing, exchange, storage and use of information and knowledge in the information provision. The technology infrastructure is seen as a network of communicating and co-operating hardware devices and system software and middleware. The Technology Infrastructure (TI) delivers processing, communication and storage capabilities to the information systems and human/computer interfaces to the people in the business system. The information systems and the technology infrastructure form together the IT System of the enterprise.

2.3.3 Abstraction levels of IAF

The **contextual level** describes the mission and strategy of the enterprise, the role of the enterprise in the environment and the scope of the transformation of the business. This information is also used to determine the role of the information systems and infrastructure and the scope of the transformation of these systems. [IAF]

Conceptual Phase

The conceptual phase designs for the four architecture areas respectively:

- The products and services that the business processes within the scope deliver.
- The information services that the information provision delivers in support of the business processes.
- The automated IS services that the information systems deliver in support of the business processes and the information provision.
- The infrastructure services that the technology infrastructure delivers to the information systems.

The **logical level** designs the operation and structure of the business processes, the information provision, the information systems and the technology infrastructure. This is the most creative phase, because here the business system is designed as a collaboration of roles and the IT system as a co-operation of functions. The interaction of the systems with other systems in their environment is also designed.

The **physical level** answers the question who (type of person) performs the roles in the designed business system or what (type of software or hardware) performs the functions in the designed information system and technology infrastructure.

The **transformational level** designs the stages in transformation of the business system and the migration of the IT systems.

2.3.4 Architectural Design Process with IAF framework

According to Goedvolk, the transformation starts with the development of a business vision and IT vision of the new IT enabled enterprise. (As Is and To Be) could be considered separately. The figure below depicts the role of Architectural Design and IAF in the transformation of business and IT. These visions are aligned through an integrated architectural design of the business and IT

system based on IAF. Subsequently, the architectural design is input for the business and IT transformation that results in a new IT enabled enterprise [Goedvolk].

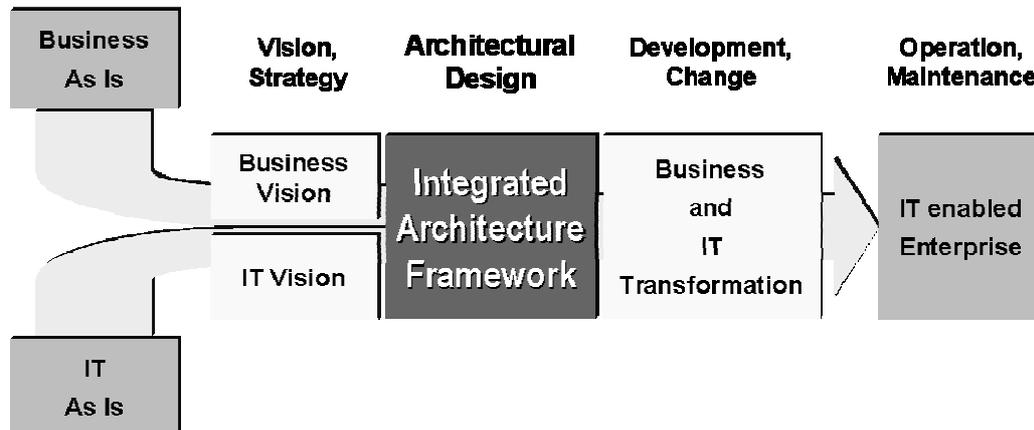


Figure 5 IAF Supported Architectural Process

As Is architecture represents the current state of the enterprise, which is the current situation of Business and IT systems of the company.

To Be architecture represents the future state of the enterprise, which is the future situation of Business and IT systems of the company.

But ISAC was one of the first methods that recognized that in introducing Information Systems one changes an existing environment rather than creating a new one.

This insight matters for the IT intensive enterprise (a first system), as much as for the IT intensive re-engineering of that enterprise (a second reflective system in which the IAF is to be introduced at PCE).

In line with ISAC and current best practices the system life-cycles (Whitten et al) for both systems are divided into the phases “Systems Development Process” and “System Operation and Maintenance.”[Lundeberg et al], these are again discussed in detail along the content in the next chapters.

Organizations that can manage these EA changes efficiently are more successful than those that can not. These organizations must constructively focus in process improvements rather than a number of parallel efforts.

An evaluation of the organizational practices against the models and the processes is called assessment. There are certain techniques for assessing these architectures for organizations which are discussed in the next section.

2.4 Assessment Methodologies

The assessment of the architectures for this research are based on the best practices from the research groups, two of such methods/techniques are used which best suit the situation of Philips CE to contribute to this research.

To assess the architectures is essential because it gives insight in successfully utilizing the framework to support the EA of the organization but also makes the organization more ready for the acceptance of EA.

These assessment techniques are used because provide the following benefits,

- They describe the practices that any organization must perform in order to improve its processes
- They provide a yardstick against which to periodically measure improvement
- Capability Maturity Models address this problem by providing an effective and proven method for an organization to gradually gain control over and improve its IT related development processes.

The following are the assessment methodologies I have applied in my research, for assessing the architecture and the architecture maturity levels of Philips CE.

2.4.1 Architecture Assessment Methods

An Enterprise Architecture Score card (EA Score card) is used for the assessment of architecture based on IFEAD (Institute For Enterprise Architectural Development), an independent research and information exchange organization working on the future state of Enterprise Architecture. Enterprise Architecture Score Card is developed by Jaap Schekkerman of IFEAD describing how to measure that enterprise architecture is 'good' given a certain situation and supporting well described goals and objectives.

My goal in adapting this method was to aid Philips CE in conducting the internal assessments of the architecture by identifying the weak areas and providing recommendations for implementing IAF.

2.4.1.1 Methodology

Enterprise Architecture Scorecard (EA Score card) is a questionnaire which covers the IAF elements (abstraction levels and aspect areas). This questionnaire consists was assessed by contribution of input from the IT Demand Management team (the problem owners).

2.4.1.2 Assessment Structure

Assessment of EA Score card as a measurement to check the efforts of architectures by answering the questions based on the assessed status with goals and objective of architecture project in mind. Every question on EA score card consists of (cross-section of aspect areas and abstraction levels) of IAF. Depending on the architecture status and its situation at Philips CE the questions are assessed. The following are the three statuses that could be assigned,

- Status0 - Unknown or not documented.
- Status 1- Partly known and partly documented
- Status 2- Fully Known and well documented

The answer comprises of knowledge level and documentation for every aspect.

2.4.2 Maturity Level Assessment of the Organization

The Maturity Level assessment of the organization provides a path for architecture and procedural improvements within an organization. As the architecture matures, predictability, process controls and effectiveness also increases.

This is AMM (Architecture Maturity Models) similar to the CMM levels where the maturity levels indicate the status of EA efforts at an organization for architecture programs the following levels,

- Level 0 is No Program
- Level 1 is Informal Program,

- Level 2 is Repeatable Program,
- Level 3 is Well Defined Program,
- Level 4 is Managed Program,
- Level 5 is Continuously Improving Vital Program -

This Enterprise Architecture Maturity Model, depicted below, and the following section reflect the phases an organization will see as their architecture program is being developed.

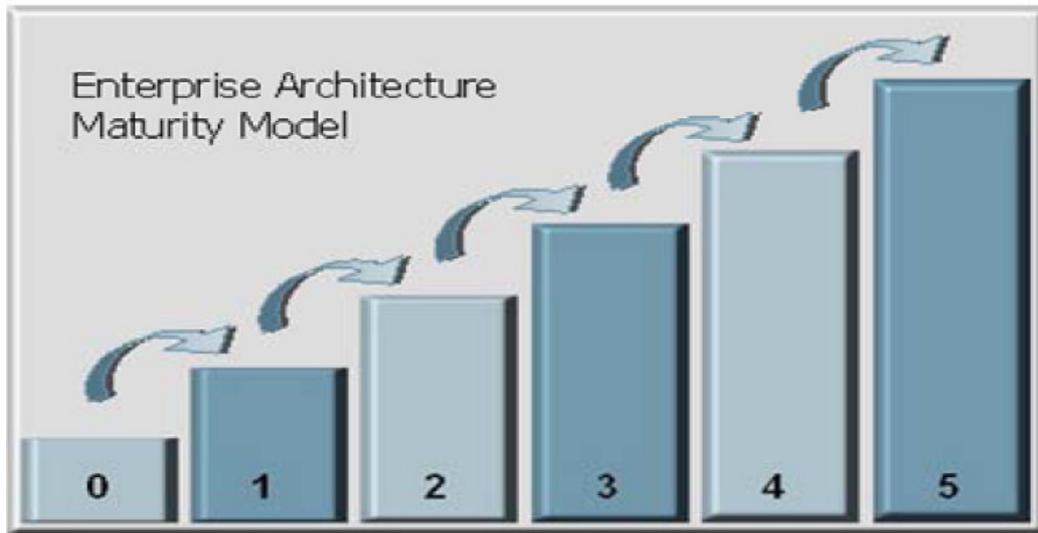


Figure 6 Enterprise Architecture Maturity Model

This is assessed for Philips CE at organizational level and at project level,

2.4.2.1 Architectural Process Maturity Levels of Organizations

This is based on NASCIO EA Model; consist of set of indicators which are used for architectural maturity analysis.

The following are the indicators which are used for the Architectural Maturity Level Analysis,

1. **Governance** - Governance includes the leadership, organizational structures, direction, and processes needed to ensure Information Technology (IT) of roles & responsibilities.
2. **Architecture** Planning ensures the program is managed to assure the goals for implementation are realistic and achievable and the program is kept within scope.
3. **Architecture Framework** consists of the processes, templates and forms used by those documenting the operations and standards of the organization.
4. **Architecture Blueprint** refers to the completed documents that are prepared using the Architecture Framework processes, templates and forms. The Blueprint refers to the documented products and standards, together with their detail, classifications, impact statements, and migration strategies.
5. **Communication** is the element that ensures standards and processes are established and readily available to team members for reference and use. As an organization changes and

programs evolve the continued communication ensures the EA program remains vital and operates optimally.

6. **Compliance** must be reviewed periodically to be sure the business and IT programs and services are operating effectively.
7. **Integration** addresses the ability of the various entities (internal or external to the organization) to coordinate their efforts to the greatest benefit of the organization. This is a key factor, as great efficiencies are gained by identifying similar functions or operations, both inside and outside of an organization.
8. **Involvement** must be part of an EA Program. Without the support of managers and employees who are expected to utilize and follow the defined process, the program is sure to fail.[NASCIO]

Refer to the appendix 6.3 for details of these levels for EA.

Three high-level components of the Enterprise Architecture Framework according to NASCIO are as follows,

- **Architecture Governance** includes the leadership, organizational structures, direction, and processes needed to ensure Information Technology (IT) enables the enterprise's mission, goals, objectives and strategies in a planned manner.
The purpose of architecture governance is to direct or guide architecture initiatives, ensure that organizational performance aligns with the strategic intent of the business, ensure IT resources are used responsibly and Technology Architecture-related risks are managed appropriately.
- **Business Architecture** identifies and describes environmental drivers, and defines the mission, guiding principles, goals, objectives and strategies of the business. This strategic intent is executed through enabling capabilities that include information technology.
Enterprise Architecture ensures appropriate traceability from business architecture to the other allied architectures.
- **Technology Architecture** provides the processes and templates to document products and compliance criteria used within the organization. The Technology Architecture includes the portions of the Enterprise Architecture framework that will set direction for technology and migration of existing IT services. Enterprise Architecture ensures that technical solutions meet the business needs of the organization.

2.4.2.2 Architectural Project Maturity Levels

This is based on Whitten et al (2004) which shows the impact of the System Development process on quality at project level depending on the organizational CMM level. He suggests that the process improvement in organizational processes with methods (IAF in this case) will enable drop of the project duration, person months and the costs.

2.5 Conclusions on the theory

This Chapter provides the basic definitions for Enterprise Architectures, and architectural frameworks to support the organizations draw benefits with EA process. Next IAF framework consists of a set of columns called aspect areas (Business, Information, Information Systems, and Technology Infrastructure) and a set of rows called abstraction levels (Contextual, Conceptual, Logical, Physical and Transformational). Together these aspect areas and abstraction levels exhaustively cover the Business and IT architectures.

The assessment methodologies/techniques are chosen to assess the architectures and the maturity levels of the company for using the EA framework. The other literature used will be articulated along the text in the successive chapters of the project. The next Chapter gives the additional explanation of the assignment and project.

3 Assignment & Project Description

This chapter describes the initial assignment in detail. Since the environment influences the solutions and may even put constraints on the solutions, the context of the assignment is elaborated here. Section 3.1 explains the background literature on project development and causes of the projects. Section 3.2 of this chapter gives clarity on the assignment, the problem types that it entails, and the project approach that I have adopted.

The project approach further refines the research objectives, questions, activities and the deliverables which are explained in Section 3.3.

Section 3.4 explains the scope and the limitations of the research.

Section 3.5 explains project description detailing the different phases, sources, methods used and results of the phases.

3.1 Background from the literature

Whitten et al (2004) emphasize that system development projects come from three kinds of causes which are problem, opportunity and directive.

Problem: an undesirable situation that prevents the organization from fully achieving its purpose, goals, and/or objectives. Often manifest in production or logistic processes, directives come from science, government, or other governance entities (the societal drivers).

Opportunity: a chance to improve the organization even in the absence of an identified problem. They come from the availability of new technology (ICT).

Directive: a new requirement that is imposed by management, government, or some external influence.

According to Whitten, the life cycle of any system is divided into the two phases “Development Process” and “Operation and Maintenance”. In this project when a pilot project is elaborated two systems are evolved: the IAF and the object system of the pilot project (IAF to build the pilot project). In the following sections I will elaborate the implications of these insights for the pilot project approach.

The architectural design process with IAF as explained in section 2.3.4 of chapter 2 in reality is not that straight forward and simple. Philips CE has to create a new project system to adapt IAF and pilot the project.

3.2 Characterizing the Assignment

The initial assignment was to use the IAF framework for piloting the project Customer & Supplier Collaboration.

So the assignment was in two folds,

- A1. Create the IAF content architecture for aligning the business process and IT applications of Customers & Suppliers for collaboration with Philips CE.

A2. Explore how to adapt the IAF framework to the architectural projects of Philips CE,

The use of IAF framework at Philips CE is a directive of the Philips Corporate IT. It gives rise to a number of problems for the operational/implementation part of the company since the analysts, system users, BPO's have to learn and explore how to meet the directive while performing their work.

IAF also provides an 'opportunity' to Philips CE, as it promises to facilitate in architectural processes. The tools to store, maintain, and deploy architectures are also available which might be used in future. The discussions with Corporate IT revealed that they are also considering the purchasing of software tools to support Enterprise Architectural Process.

Initially it was the intention of Philips CE to elaborate the pilot project in my research by means of the METIS tool which had been recommended in a research study on the selection of tools [Dragstra, 2004/05]. But a decision on tool selection has not yet been finalized. So it was decided to first evaluate the IAF framework before committing on the use of specific tools.

Hence the focus of this study came on articulating benefits and directing the implementation of IAF for future projects at Philips CE.

The context of the IAF practicality assignment is illustrated in Figure 7 which is adapted from [Whitten et al, 2004] who populate it with a variant of John Zachman's framework of Information Systems Architecture.

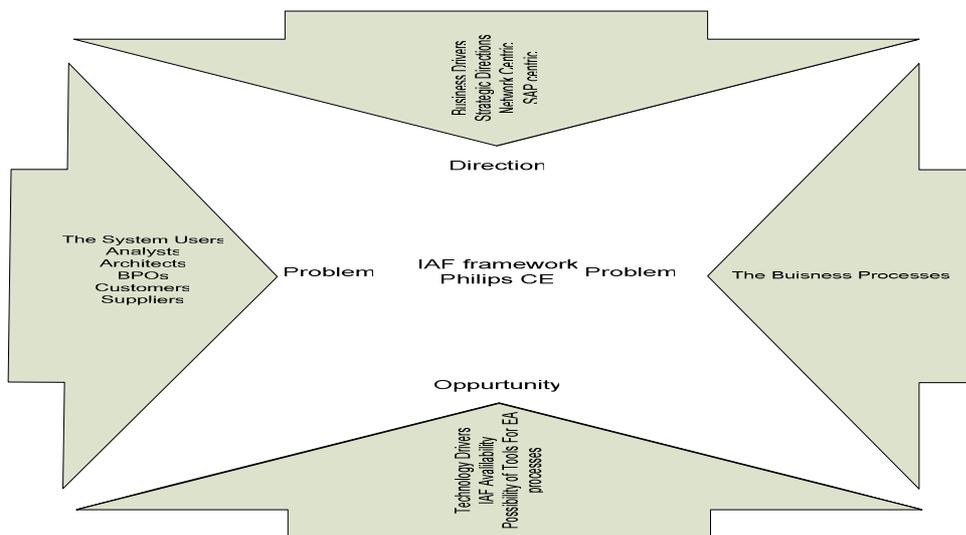


Figure 7 Philips Problem Domain for IAF practicality

This usage of IAF framework for Philips CE must be complemented with the following organization pyramid (from BPTrends) which expresses that Philips CE is a process centric organization that continuously tries to align its business and IT, which matters for the object system of the pilot project . [BPTrends]

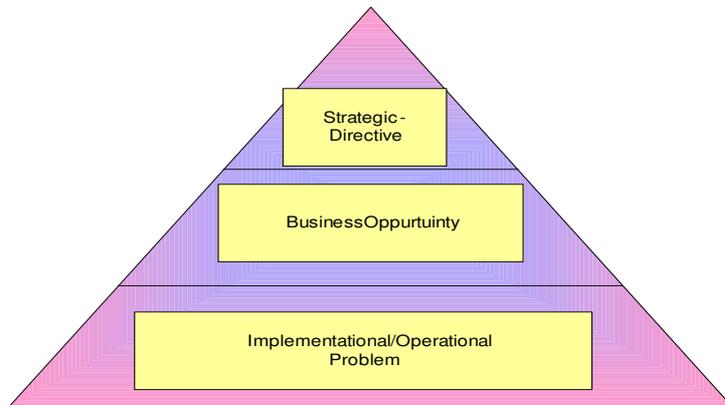


Figure 8- Organizational Pyramid for Philips

In the given situation Philips CE has to adapt itself to function and organize its efforts for IT architectures with IAF methodology. The usability of this IAF framework and the ability to get into the action with the knowledge of doing things rather than theoretical studies is the problem that needs to be addressed by Philips CE.

3.2.1 Translating the Research Objective into Research Questions

The use of IAF framework for Philips CE can be addressed by actually following the methodology for the pilot project which can expose the weak areas of the organization on one hand and on the other hand the ways of working with IAF framework itself. This section gives the research objectives and research questions.

3.2.1.1 Research Objective

The research objective is to “Evaluate the practicality of IAF framework for Organizations such as Philips CE.”

The research objective gives rise to several questions, which are subsequently answered in the later sub sections of this research.

3.2.2 Research Questions

To meet the research objective and the assignment stated above, a number of research questions were articulated for the twofold assignment, these questions formulated are of three kinds based for Philips CE, of Why , How and What.

The following research questions were formulated, for emphasizing the need and the potential benefits, of EA at Philips CE

- Q1. Why does PCE need Enterprise Architecture?
- Q2. What is the benefit for Philips CE with the pilot project architecture?

The following research questions were addressed for and with the Pilot project (C & S Collaboration):

- Q3. Is Customer & Supplier Collaboration a valid project for piloting of IAF enabled phases?
- Q4. How is the pilot project used for evaluating the practicality of IAF?
- Q5. What are the ways of working with IAF framework?

Q6. What is the scope of the pilot project on the IAF framework?

Q7. How is the IAF framework enabled in the pilot project phases for (C & S Collaboration) at Philips CE?

The following research questions were addressed, for using the results from the pilot study, and assessment approaches from the literature,

Q8. How does the architecture (C & S Collaboration) reflect on the IAF framework?

Q9. What does the assessment of architectures indicate/contribute for Philips CE?

Q10. What does maturity level analysis assessment show for Philips CE?

3.2.3 Research Deliverables

The main deliverables of this research, and indication to research questions answered, are as follows,

D1. Architectural models of the pilot project Customer & Supplier Collaboration (Q4 & Q6)

D2. Insight and guidelines of IAF framework for Philips CE (Q5, Q7, & Q9)

D3. Synchronizing the IAF content for the architectural processes (Q7)

D4. An illustration of maturity levels of Philips CE and a program to be managed based on the indicators of maturity scale. (Q1, Q2, & Q10)

D5. Recommendations for the weak areas based on assessment of architecture on IAF framework for

c. Pilot project Customer & Supplier Collaboration. (Q3, Q4)

d. Total Philips CE. (Q8 & Q9)

3.3 Scope and Limitations of the Research

Both the IAF framework and the Pilot project selected give a very extensive scope that can be dived in from any direction between the abstraction levels and aspect areas (rows & columns) based on the results the architecture study is expected to bring.

The scope of the pilot project Customer & Supplier Collaboration from IAF framework includes the first two layers (Conceptual and Contextual) and the Information systems aspect in the physical layer, as shown in Figure 9

The conclusions therefore can be drawn concretely only for the abstraction layers and aspects of IAF that have been practicality explored in IAF.

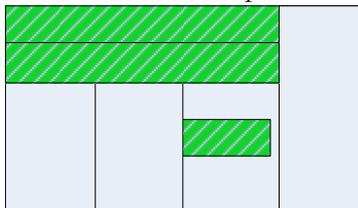


Figure 9: IAF elements addressed for the pilot project

This thesis does not address any other architectural frameworks, in this research IAF framework is the only framework used as it has been already chosen by Philips. The scope of the research is limited to the organization of Philip CE, and to the IAF framework. The methodology of IAF framework is applied to the scope of pilot project Customer & Supplier Collaboration. The business

processes areas of PCE such as Purchasing, Business Creation Process, SCM and Marketing & Sales. The scope is restricted to interview only the internal BPO's/stakeholders.

3.4 Project Approach

This section elaborates the phases of the project Figure 10 into a detailed research model. Activities pertaining to the Pilot Project System Life cycle (development and maintenance & operation) and to the IAF enabled architecture processes (development and maintenance & operation) are merged.

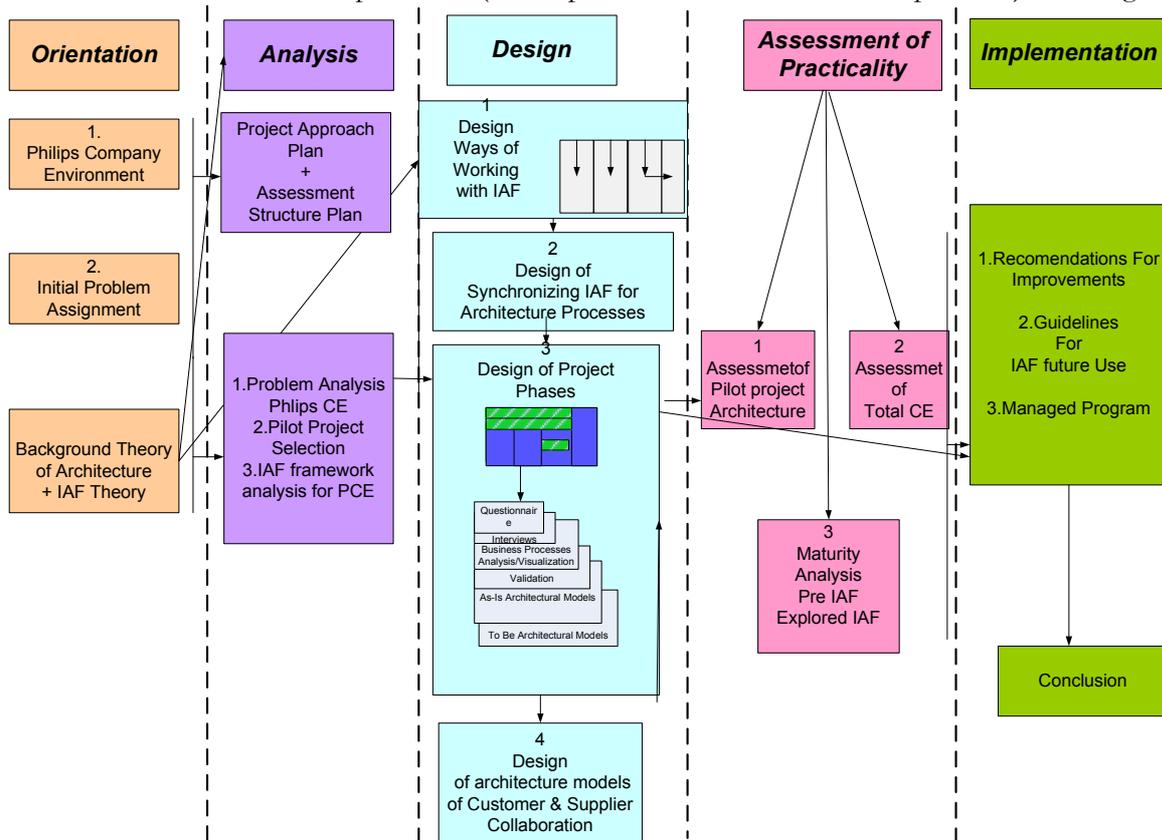


Figure 10 Research Model

The activities in this model have been performed by using a range of research methods and techniques,

- Literature research using articles, and books as the primary sources for having an insight into the theoretical background on the subject.
- Desk research at Philips to obtain the understanding of the environment and insight of the organization. The internal material and available documentation also depict the current situation of Philips which is very useful for the designing the solution to the company.
- Introductory training of IAF Essentials from IAF Capgemini, gave the knowledge of the framework and an opportunity to discuss the similar initiatives at the other PDs of Philips like DAP, Lighting, Semi Conductors.
- Discussions with IAF consultants, Philips Corporate IT and the architects within Philips CE.

- Structured interviews for business process analysis with the stakeholders for (the BPO's) with help of the IAF framework.
- Guidance by a Senior Consultant of Capgemini IAF Academy on IAF framework principles to validate the model.
- Best Practices approach from the research organizations and research groups to arrive at a competent yard stick to measure the assessment of the procedures.

Here follows an explanation of the methods used in the different activities performed in each of the five phases.

It is also indicated where the results of these activities are reported, and what have been key sources.

3.4.1 Orientation Phase

Orientation Phase contribute to the first two chapters (1) Company description (with initial problem) and (2) Theory Background of this report, which contains the following details,

- Philips Company Environment is studied, observed with the help of directions from IT management who are the problem owners of Philips CE. The Philips Corporate IT initiatives were gathered and assessment for costs of using METIS was discussed with METIS vendors.
- Initial problem assignment was formulated with help of IT demand management, in consultation with Corporate IT.
- IAF introductory workshop (IAF Essentials) was attended to gain the required knowledge of IAF. Literature is researched on Philips, EA and IAF at Philips. (Appendix1-Abbreviations, Appendix2- Organizational chart confined to the study)

3.4.2 Analysis Phase

Analysis phase consists of two chapters, Chapter 3 & Chapter 4, in which the project approach is formulated from research perspective and the reasons for need of architecture and IAF framework were analyzed for using at Philips CE as follows,

- Project Approach is made based on the insight from the Philips environment, the initial problem description and the theoretical background. The research objective, research questions and research deliverables are formulated. The scope and limitations of the research are articulated. This is detailed in Chapter 3.
- Analysis of the Philips CE, the pilot project selection and IAF framework to adapt to Philips CE are further analyzed. The following contribute to the chapter 4.
 1. Philips CE analysis is based on Fish bone technique and gap analysis to analyze the root cause of need for EA and is based on the interviews, observations at the company. This helps in visualize and improve the quality of architecture at Philips CE. This is provided in section 4.1
 2. Pilot project selection analysis based on the structured interview with the architects of SCM and Planning. The reasons for choosing and how it is helpful for research from the management and situation at the company. This is provided in section 4.2. (Appendix 4.2-problem analysis (C&S Collaboration).
 3. IAF Framework Analysis for Philips CE is based on the IAF framework itself, the situation of Philips CE. To arrive at architectural process with IAF support this can be used in the design phase for simulating the pilot project. This is

provided in section 4.3 of chapter 4.

3.4.3 Design Phase

Design is not prescribed but is achieved based on combination of IAF methodology, supported by literature, consultation with IAF professionals and structured interviews and validations with BPO's. This is done in the following four sub phases, and is detailed in chapter 5.

- Design of the ways of working with IAF framework for Philips CE with IAF framework. This is based on IAF aspect areas and abstraction levels of IAF framework. This is detailed in the section 5.1.
- Design for synchronizing the IAF content architectural processes. An example of Business process architecture based on IAF framework is illustrated. This is based on IAF aspect areas and abstraction levels of IAF framework and Philips CE situation. This is detailed in the section 5.2. (Appendix 5.2- Org. chart Business Processes of PCE)
- Designing of the project phases for piloting the C&S Collaboration, (based on analysis phase section 4.2). This is based on the classical project phases from literature and IAF methodology. (Built on sections 5.1 and 5.2) in the section 5.3. (Appendix 5.3 – IAF Questionnaire for C&S Collaboration)
- Design of the architecture models for Customer & Supplier Collaboration is formulated from the interviews with the business process owners (the stakeholders) and validation from the senior consultants of IAF Capgemini & business in the section 5.4.

3.4.4 Assessment Phase

Assessment phase consists of two steps, first step is Architecture Analysis, and second step is the Architecture Maturity Analysis. These are detailed in Chapter 6 consisting the following,

- Architecture Analysis on an EA Score card by IFEAD (Information For Enterprise Architecture Development) which is an independent research and information exchange organization.
 3. Assessing the architecture of the pilot project Customer and Supplier Collaboration, from design phase. This is provided in section 6.2.1. (Appendix 6.2.1- EA Score card assessment)
 4. Assessing the Total CE architecture based on the input and contribution from IT Demand Management Group of Philips CE. This is provided in section 6.2.2. (Appendix 6.2.2- EA Score card assessment)
- Maturity Level Analysis for improvising the architectural processes, this is conducted as follows,
 3. Architecture Process Maturity at Philips CE is based on the criteria from NASCIO indicators for EA, described in section 6.3.1.
 4. Architecture Project Maturity based on the literature explained in section 6.3.2.

3.4.5 Implementation Phase

Implementation phase consists of two chapters 7 & 8 consisting of Recommendations from the project and Conclusions of the research.

Recommendations for implementing the IAF framework at Philips CE, consisting of the following sub sections in chapter 7,

- Improving the weak areas of Pilot Project Customer & Supplier Collaboration (7.1), based on the assessment (6.2.1).

- Improving the weak areas of Total Philips CE (7.2), based on the assessment (6.2.2).
 - General recommendations for Architectural processes at Philips CE for IAF(7.3),
 - Guidelines for future IAF framework projects. (7.4),
 - Recommendations of Program Management (7.5), based on Maturity Analysis (6.3).
- Conclusions of the research indicate the following in the chapter 8 consisting of following sub sections,
- Practicality of IAF framework for Philips CE. (8.1),
 - Contribution of the research objective. (8.2),
 - Further directions of the research. (8.3).

In this chapter the project approach is formed from research perspective with research objective and questions. The next chapter is analyzes the need and benefits is of Philips CE and IAF support towards it.

4 Analysis

This Chapter provides answers to the research questions Q1, Q2, Q3, and Q4. The analysis is provided on three aspects, firstly Philips CE is analyzed based on the observations, interviews and literature, the gap analysis is provided on one side and the cause effect diagram (fish bone diagram) to indicate the root cause of the problem rather than fighting the symptoms for the need of the proper EA. This also gives an indication of the benefits of EA at Philips CE. The answers to the research questions Q1 and Q2 are provided in section 4.1.

Second the selection of C& S Collaboration as a pilot project is analyzed based on structured interviews with architects of Philips CE. This answers the research question Q3 and Q4 and is provided in the section 4.2.

Lastly, in section 4.3 the analysis of IAF framework for Philips CE is provided where approach to use the framework adaptation to Philips CE is provided. The direction input for simulating/experimenting the pilot project with IAF framework support in the design phase.

4.1 Philips CE Analysis / Problem Analysis

There has been introduction of 'New business models' at PCE because of latest trends of cost reduction, leading to more out-sourcing of the in-house activities, leading to the changes in the supply chain management. The following list illustrates the reasons for changes on the business process at Philips, which emphasizes the changes required for architectures. There must be reflective changes made in the enterprise architecture and its documentation.

- Increasing dynamics of the business environment with shorter product life cycles and shorter time to market. The business agility and the responsiveness also require dynamic divestments of business structures.
- From linear supply chains towards flexible and dynamic value networks
- Business process outsourcing / IT sourcing / off-near-right shoring
- Situational awareness / business intelligence to respond

The first four research questions are answered in the following sub sections of this chapter.

4.1.1 Why do we need Enterprise Architecture for Philips CE?

Philips Consumer Electronics is in transformation phase where it is aiming towards SAP centric IT systems and solutions from the Best of Breed and Legacy systems. The need for transparency in the business processes and IT systems initiates the need for the enterprise architecture. The transition between the present information systems and the future collaborative systems is so far-reaching that can speak of a 'gap' that must be bridged by the Philips. The Past represents the situation of Philips before when there were Best of Breeds/conventional IT and hierarchical structures of the organizations.

As-Is situation represents the current state which is in state of dynamic changes and transitions at the Philips CE.

The To-BE represents the future state of company where the management is looking for net work organizations and SAP centric solutions.

This gap is shown in the Figure 11, is caused due to the fact of,

- Complexity in IT
- Dynamics in Business Process

- Changing Business Models
- Transition to SAP centric solutions



Figure 11 Bridging the Gap

The second reason is that enterprise architecture is needed for the assessment of current as well as the future IT systems. The impact of new technology on the IT applications. The aligning of cross PDs towards One Philips is also a driving factor for enterprise architecture. The Cause Effect diagram in the figure 14 shown below further elaborates the need.

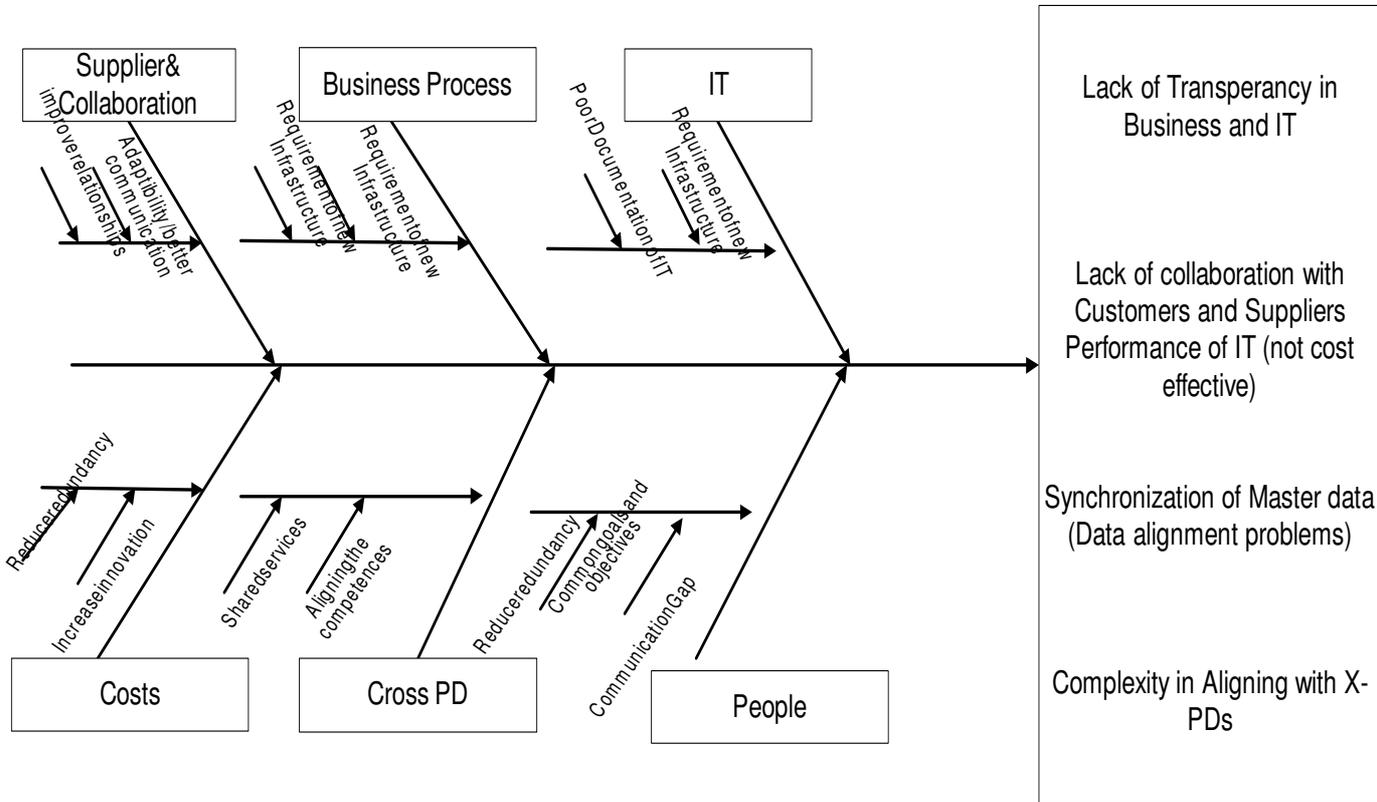


Figure 12 Cause Effect Diagram representing the need of proper EA

The cause-and-effect diagram is also called the Ishikawa diagram (after its creator, Kaoru Ishikawa of Japan), or the fishbone diagram (due to its shape). It was created so that all possible causes of a result could be listed in such a way as to allow graphically showing these possible causes. Dr. W. Edwards Deming adopted this as a helpful tool in improving quality. Both Ishikawa and Deming use this diagram as one of the first tools in the quality management process. From this diagram shown above, the need for architectural models and its documentation at Philips CE can be understood. Rather than fighting the symptoms of individual causes the root of the problem, the need of the proper EA at Philips CE, with which the following list of problems can be addressed in the present environment,

- Suppliers and Customers
 - Improve relationships with the suppliers and customers.
 - Adaptability to the changes in IT/business.
 - Better Communication.
- Business Processes
 - Changes in the Business Models of the Company.
 - Changes in the Strategic Direction
- IT
 - Requirement of new Infrastructure.
 - Poor documentation of Infrastructure of the system.

- People
 - Communication gap due to dynamic changes in the system.
 - People lacking common goals and objectives.
- Cross PDs
 - Alignment with X-PDs
 - Sharing /reuse of more common services
- Costs
 - Increase innovation
 - Reduce

4.1.2 What is the benefit for Philips CE with the pilot project(C&S C) architecture?

There are several benefits of the enterprise architecture as mentioned under the Section 2.2 in Chapter 2. But the main objective for Philips CE is communication. The architectures in the right place with models and the documentation helps to achieve better communications between the businesses and IT. The following are some of the important aspects where Philips CE will benefit in the current situation with regards to the architecture itself.

- The architecture will serve as starting point for the definition of a roadmap and a project portfolio for the realisation of the IT systems enabling the collaboration.
- Business models are better communicated.
- Suppliers and Customers can adapt faster with clear architectures.
- The architecture Provide Philips CE with Architectural design documents for integration and alignment with Corporate IT along with cross PDs to work towards “One Philips” as explained earlier in Chapter1.

4.2 Pilot Project Selection

C& S Collaboration means working together connecting with wide range of suppliers and customers with different technical capabilities is traditionally a costly, complicated and time-consuming proposition. The electronic data exchange in the recent times proves an alternative way for cost effective solutions. This helps the Suppliers and Customers have the exchange of documents for stock planning, SCM, customer demands

This section answers the research questions Q3 and Q4, based on the structured interviews with the architects from the SCM solutions and infrastructure who explained the problems of collaboration with Customers and Suppliers.

Refer to appendix 4 for the problems analysis from the interviews.

4.2.1 Is Customer and Supplier Collaboration a valid pilot project?

Customer & Supplier Collaboration is a crucial topic among business processes at Philips CE. As the economic and business environment threatens the companies’ profit margins business owners face pressure to reduce costs while increasing innovation, adaptability and speed. Concerns about cost reduction prompt the company to explore low cost regions and develop new relationships with its suppliers globally.

Supplier collaboration is the one of the main criteria at Philips Consumer Electronics from product design, development, manufacturing and SCM till marketing.

The interviews from the SCM solutions and infrastructure architects explain the present problems and current situation at PCE. The problems faced at Philips Consumer Electronics which recommend for a stronger Supplier Collaboration, [Philips 4]

Refer to the detailed problem analysis of C& S Collaboration in the appendix 4.2.

The objective of this pilot project is to have the architecture serve as a starting point for the definition of a roadmap and a project portfolio for the realisation of the IT systems enabling the collaboration. This pilot on one hand gives the start of IAF framework introduction to Philips which makes it possible to begin the EA efforts.

While on the other hand, the initiatives taken in the company to solve the problems of collaboration with Suppliers and Customers is being addressed.

This also helps to collaborate with ‘One Philips’ initiatives with Corporate IT and cross PDs.

Customer Supplier Collaboration is chosen as a pilot project is therefore valid for IAF framework, as it Figure 13 helps to plan many facets to collaborate in more systematic way by aligning and organizing the relationships with its Customers and Suppliers.

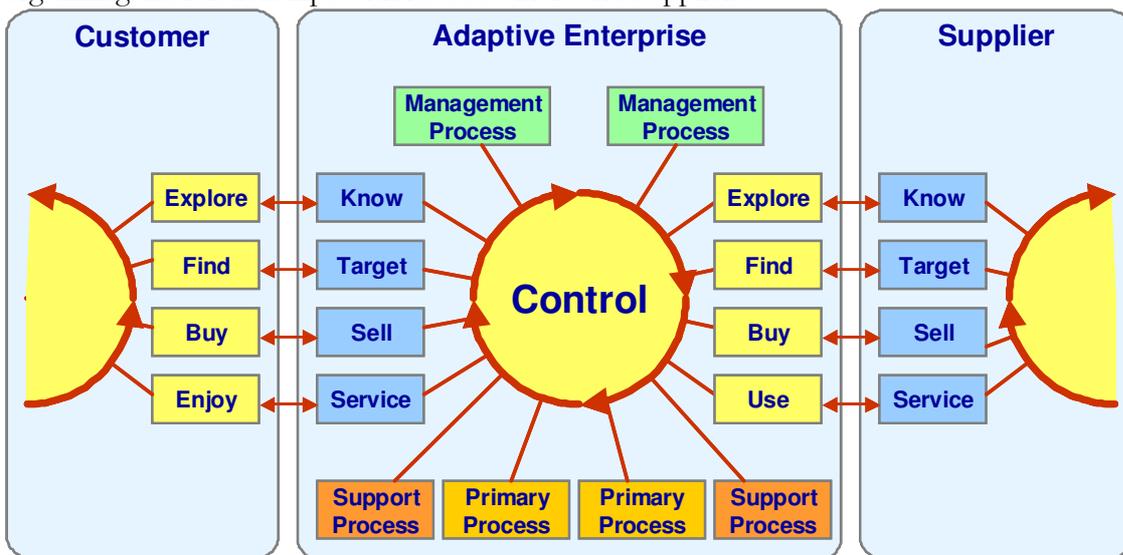


Figure 13 Collaboration Processes

4.2.2 How is the pilot project used for evaluating practicality of IAF (Research objective)?

There exists no prescribed methodology before this project, for evaluation of success of frameworks such as IAF. This achieved in this thesis (research) in two ways by measuring the architecture made (from pilot project) with support of IAF framework and by the readiness/efforts of the Philips CE to use the framework.

Piloting a project gives an opportunity to go through the process and experimenting with IAF framework. Customer Supplier Collaboration is treated as a pilot project for PCE with IAF framework as a tool. The results of pilot project are the architectural models of Customers and Suppliers with IT enabled collaboration processes.

This IAF framework is just in the starting phase for EA at Philips. IAF framework gives a structured approach. So with this pilot project there will be insights on IAF enabled project phases and experience from IAF ways of working is explored.

The results of architectures of C& S collaboration pilot project and Philips CE are assessed on an EA Score card. The lessons learned and from the improvements of weak areas at Philips CE are recommended.

The receptiveness of Philips CE to IAF content architectures is important. The readiness of the efforts from the management will enable implementation of IAF at Philips CE. Therefore the architecture maturity levels of Philips CE is measured for processes and projects resulting in suggestions for a managed program for successful implementation of IAF at Philips CE.

4.3 Analysis of IAF framework for Philips CE

From the discussions with the IT demand management (the problem owners), it was observed that Philips CE had no standard methods or tools before IAF framework for architectural studies and each department has its own architects working closely in their own departments.

The main questionnaire scope of IAF is adapted to Philips CE and IAF the architectural process was made with the help of the IAF consultants, as follows,

4.3.1 IAF framework adaptation to Philips CE

The IAF framework consists of rows & columns (abstraction levels & aspect areas) which contribute to the architecture. These contribute to the main scope of the questionnaire as shown the Figure 14 ; this is adapted to Philips CE. The scope of the architecture can be drawn from the boxes below for example the first two boxes depict the business process models with contextual and conceptual layers.

	<p>Contextual</p> <p>What is the Mission, Vision and Strategy of Philips/Philips CE? What is the environment of the Philips/Philips CE? What is the Corporate Governance Structure?</p> <p>What are the internal and external Business Drivers (especially for collaboration)? What are the main Business Principles?</p>		<p>What are the IT policies, principles and standards? What are the current IT projects What is the structure of the IT Organisation? What is the IT Governance structure?</p>		
Conceptual	<p>Business</p> <p>Which products and services are delivered to the customers and procured from the suppliers? Which External and Internal Actors are involved in the delivery and procurement?</p> <p>Which primary processes are necessary to realise the product and service delivery? Which management and supportive processes must be added? Which Internal Actors are involved in the processes?</p>		<p>Information</p> <p>Which information must be recorded and exchanged in support of the business? Which business objects does this information concern? Which Actors retrieve, record and exchange information?</p>		<p>Info Systems</p> <p>Which services must the Information systems deliver in support of the business? Which part of the information is recorded and exchanged as electronic data? Which Actors use the applications?</p>
	<p>Infrastructure</p> <p>Which services must the infrastructure deliver in support of the applications and the business? Which Actors use the Infrastructure?</p>				
Logical	<p>How are the products and services delivered/procured?</p>	<p>How do these processes work and interact?</p>	<p>How is the information structured? How is it recorded, retrieved and exchanged?</p>	<p>How are these information systems structured, how do they work and interact? How is the data structured?</p>	<p>How is the infrastructure configured?</p>
Physical	<p>With what resources (people, IT, other) is the delivery realised and at what locations?</p>	<p>With what resources are the processes executed and at what locations?</p>	<p>What resources are used for recording, retrieval and exchange information and at what locations is information stored?</p>	<p>With which IT-products are the information systems realised? At what locations are they implemented?</p>	<p>With which IT-products is the infrastructure realised? At what locations are the components implemented?</p>
Transformational	<p>What are the differences between the As-IS and To-Be Product/Service Delivery?</p>	<p>What are the differences between the As-IS and To-Be processes and organisation?</p>	<p>What are the differences between the As-IS and To-Be information provision?</p>	<p>What are the differences between the As-IS and To-Be Information Systems?</p>	<p>What are the differences between the As-IS and To-Be Infrastructure?</p>
	<p>What is the transformation roadmap of the Product/Services, Processes, Organisation, Information Provision, Information Systems and Infrastructure?</p>				

Figure 14 Main Scope of Questionnaire

4.3.2 IAF framework architectural process

The architectural process consists of set steps; this is similar to the IAF WinWin Spiral Model of Schekkerman. During every phase of the IAF WinWin spiral model, iteration between activities inside the phase is a standard part of the process. [Schekkerman1999].

The IAF architectural design process is to get the alignment of business and IT. They are enabled into one IT enabled enterprise as per [Daan Rijsenbrij et al].

The following are the steps that need to be followed for architectural process to create architecture supported by IAF framework at Philips CE. These steps are followed in the design phase to simulate the pilot project C& S Collaboration.

1. IAF main questions and scope are designed to suit purpose and view point.
2. The scope and depth of the architectural vision is agreed for the purpose.
3. The stake holders with their specific concerns are identified.
4. The business case for the systems is created Stakeholders are interviewed.
5. Architectural models are created and validated.

4.4 Conclusions from the Analysis

The research questions Q1, Q2, Q3, and Q4 have been answered, in this Chapter. The IAF framework is adapted with main questionnaire scope to Philips CE.

The IAF architectural process steps mentioned in section 4.3 are used as in the design phase for piloting the project C& S Collaboration. The next chapter discusses the design phase of the research.

5 Design

This chapter describes the design phase of the research questions Q5, Q6, Q7, and Q8 are answered. This does not follow any prescribed methodology but rather a combination of activities are used from the literature, the IAF methodology, knowledge of IAF professional consultants, architects and BPO's of Philips CE.

The first (5.1) and the second sections (5.2) show the design of working with IAF elements and synchronization of IAF content with architectural process respectively based on IAF elements abstraction levels and aspect areas. (An illustration of the C& S Collaboration is given as an example for clarity.)

Section 5.3 is design of IAF enabled project phases for the pilot project C& S Collaboration, based on (5.1 & 5.2) resulting in section 5.4 which depict the design of the architecture of pilot project C& S Collaboration.

5.1 Ways of working with IAF framework

This section answers the research question Q5, based on the IAF theory. The general approaches for IAF projects are explained for IAF. IAF framework may be used for projects such as, (the list is shown as an example)

- Defining a Business Process Architecture,
- E business Application Architectures,
- Defining the IT strategy
- For assessment of an existing system or new application,
- Evaluation of the possible impact of new technology.

Based on the requirement from the business and technology additional projects can be formulated. The IAF consists of a group of boxes in rows and columns which together exhaustively cover the business and IT architectures. Each row and column of this model has its own specific purpose. The columns in the IAF framework define the aspect areas addressed during an integrated architectural approach. Each aspect area requires its own skill sets and addresses its own interrelated topics.

For development of new systems usually the start is at the top levels, the 'what and why' and these are dealt with for all aspect areas, then the lower areas are followed.

The framework will also be useful for projects starting from an arbitrary part of the matrix where a change is considered. Then the consequences and dependencies with the surrounding elements need to be considered. And may be propagation of changes and dependencies is needed to next elements. This is based on overall framework which consists of the following at each abstraction level,

At Contextual level it composes of Strategy.

At Conceptual level it composes of Requirements/services

At Logical level it composes of logical components,

At Physical level it composes of Physical components.

The main reasoning within and across elements of the matrix is done by use of the principles.

Principles give direction to the choices and solution directions that are applicable. They make the arguments and decisions more explicit and traceable. Further there are constraints, standards and guidelines

Principles and rules are used to define architecture; they separate,

- The strategy from the requirements,
- Requirements from solutions ,
- Solutions from Implementations,
- Implementations from Transformations.

For example the pilot project C & S Collaboration architecture will results in discussions for formulating the guidelines and principles for the choice of the application systems for collaboration. These can be imposed from the start and limit the choices and directions within a certain element of the IAF matrix or they can be the result of the discussions and guide further development.

5.1.1 Kinds of Routes

In general routes for the interactions between the columns of Business, Information, Information Systems and Technology Infrastructure, they start at contextual layer to the conceptual layer. This information is acquired and adapted from the IAF training course [IAF Essentials], Depending on the kind of architecture required for the project based on if it's at an Enterprise level, domain level or project level and the scope if the requirement is detailed or a high level design, one of the following three routes can be followed. These routes are suggested as an example,

- General route is on an enterprise level architecture.
- Refined route is on project level knowing the exact detail and aiming for the architecture support which is more refined.
- Prioritizing the project which is also a refined route to avoid the repetition or conflicting goals of the columns.

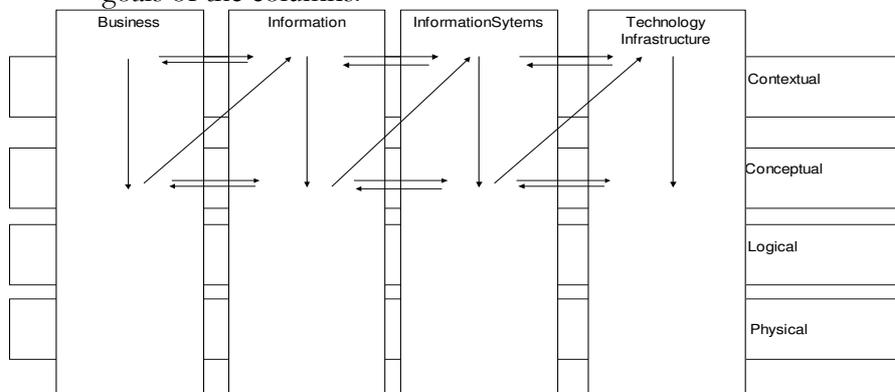


Figure 15 General Route

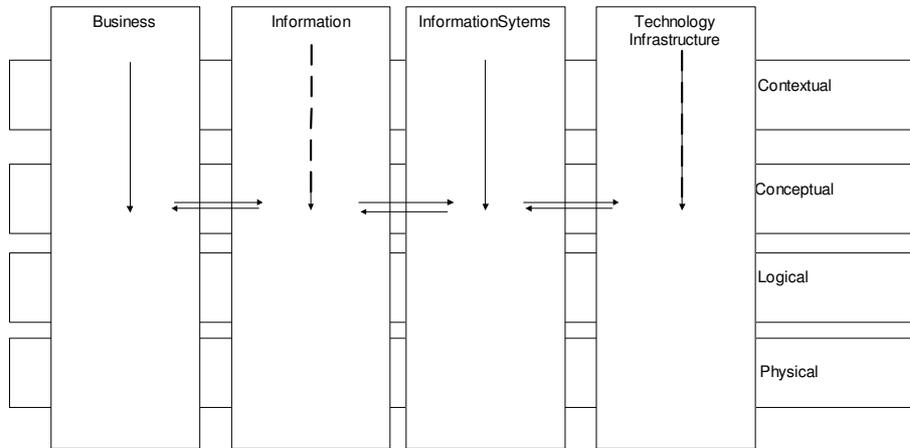


Figure 16 Project Depth

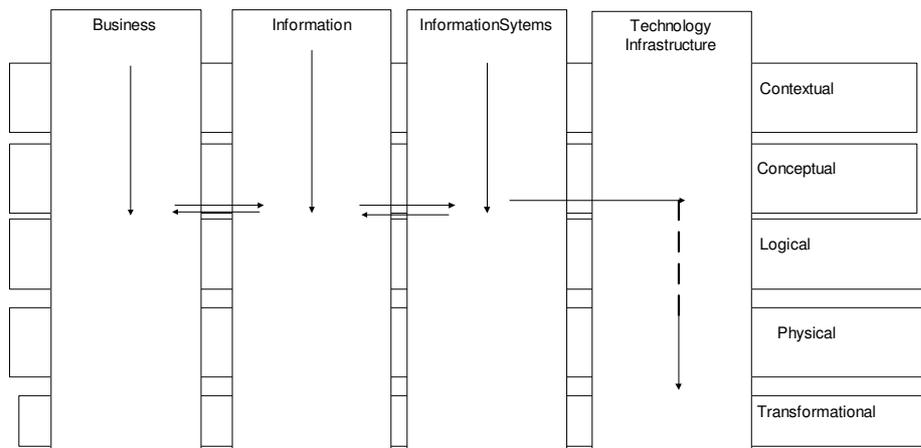


Figure 17 prioritizing the project options

5.2 Design of Synchronization of IAF content with Architecture Processes

This section introduces the synchronization of IAF framework for architecture processes. IAF framework gives a structured process for the architectural activities in the enterprises. Based on section 5.1 this is built. This section illustrates an example of a Business Process Architecture for an Organization is designed in a structured way in six steps.

The business process architecture enables the synchronization and harmonization of the common business processes internal and external to the enterprise on business at one side and on applications systems on the other side.

When the enterprise aims at common business processes and application systems this Business Process Architecture is required.

The Business Process Architecture is shown below uses as an example adapted from the [IAF Essentials], this is further translated and used in the simulation of IAF enabled project phases in section 5.3 of this chapter.

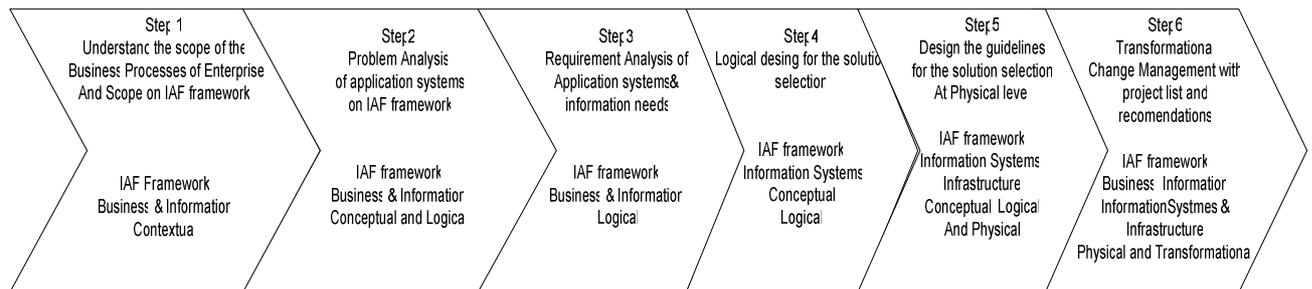


Figure 18-Synchronization of IAF for Business Process Architecture

The following are the steps, which represents Business Process Architecture is required, which is customized for the pilot project C & S Collaboration of Philips CE to make it more concretely understandable.

5.2.1 Step1 –Scope of Business Processes& IAF framework

IAF framework Scope is based on the aspect areas and abstraction levels of the IAF framework, the Business, Information at contextual level are chosen based on the scope of the business processes. The scope of the business processes that is needed for the architecture is first decided. For example the collaboration process with Customers and Suppliers is the main scope of the pilot project. The interactions of these collaboration processes with Philips are supported by certain Information systems. The following were the business processes considered for collaboration, at Philips CE,

- Technology and Development (Design)
- Purchasing
- Supply Chain Management (incl. Manufacturing)
- Marketing
- Servicing

After the discussions from the IT demand management team the following list of stakeholders were finalized for the Customer and Supplier Collaboration. Refer to appendix 5.2 to see the organizational chart consisting of Business Processes and the BPO's for the C & S Collaboration.

5.2.2 Step2- Problem analysis of IT on IAF framework

Based on the scope of the project from Step 1 and the details required for the architecture the IAF main questionnaire is adapted to the project level detail. This is based on the aspect areas and abstraction levels of the IAF framework, the Business, Information at conceptual level.

5.2.3 Step3 –Requirement Analysis of Application systems

Based on the problem analysis in Step2, the requirements are analyzed to get the information needed and solutions of the application systems. This is based on the aspect areas and abstraction levels of

the IAF framework, the Business, Information at conceptual level and the Information Systems at Logical level

5.2.4 Step4-Logical design of solution selection

The requirements analysis from Step 3 provides with options to select the application solutions which are the candidate solutions to the problem, this is step facilitates in the solution selection by the management of the company. This is based on the aspect areas and abstraction levels of the IAF framework the Information Systems at conceptual level and Logical level

5.2.5 Step5-Guidelines for solution selection at Physical level

In this Step the guidelines are drawn to select the feasible application systems based on many aspects like priority of the management decisions, benchmarking from research organizations etc. This is based on the aspect areas and abstraction levels of the IAF framework the Information Systems, Infrastructure at conceptual level, Logical level and Physical level

5.2.6 Step6-Transformational Plan.

The transformation plan suggests the change management plan of how and when the application systems could be in transformed. This could be done in several phases. This is based on the aspect areas and abstraction levels of the IAF framework the Business, Information Systems, Infrastructure at Logical level, Physical level and Transformational levels.

[Note: These steps are not ideal; these are suggested as an example to suggest the ease of IAF framework. This is also in progress at Philips CE and the process is not yet complete.]

5.3 Design Pilot Project Phases –Customer & Supplier Collaboration

This section answers the research question Q6 and Q7; based on input from the sections, 5.1& 5.2 the IAF enabled project phases to an architectural project at Philips CE. This is based on the standardized methodology classical project phases with process of scoping, planning, and organizing an architectural project. The project for Customer and Supplier Collaboration is carried out as a project as shown in the Figure 19 below, depicts the project phases of C& S Collaboration with IAF enabled project phases. This is adapted from [Whitten et al] where the classical project phases and the life cycle of the project are linked. And also from the [Jan Goosenaerts] where the project architects, IAF consultants are linked with the processes depicted as pentagon and double boxes respectively. The double box with ways of working from section 5.1 and pilot project phases with IAF from section 5.2 (first 4 steps) are used.

The pilot project is “simulated” to articulate and analyze the impact that IAF framework can have at Philips CE for IT architecture projects. The classical- IAF framework enabled project phases are represented in the Figure 19 which is a detailed project in itself consisting of five phases as follows,

1. Scope of the architecture on IAF framework,
2. IAF framework enabled Questionnaire/ Interviews for Problem analysis.
3. Requirement analysis of architectures of Business process from IAF framework,
4. Architecture modeling with logical designs on IAF framework.

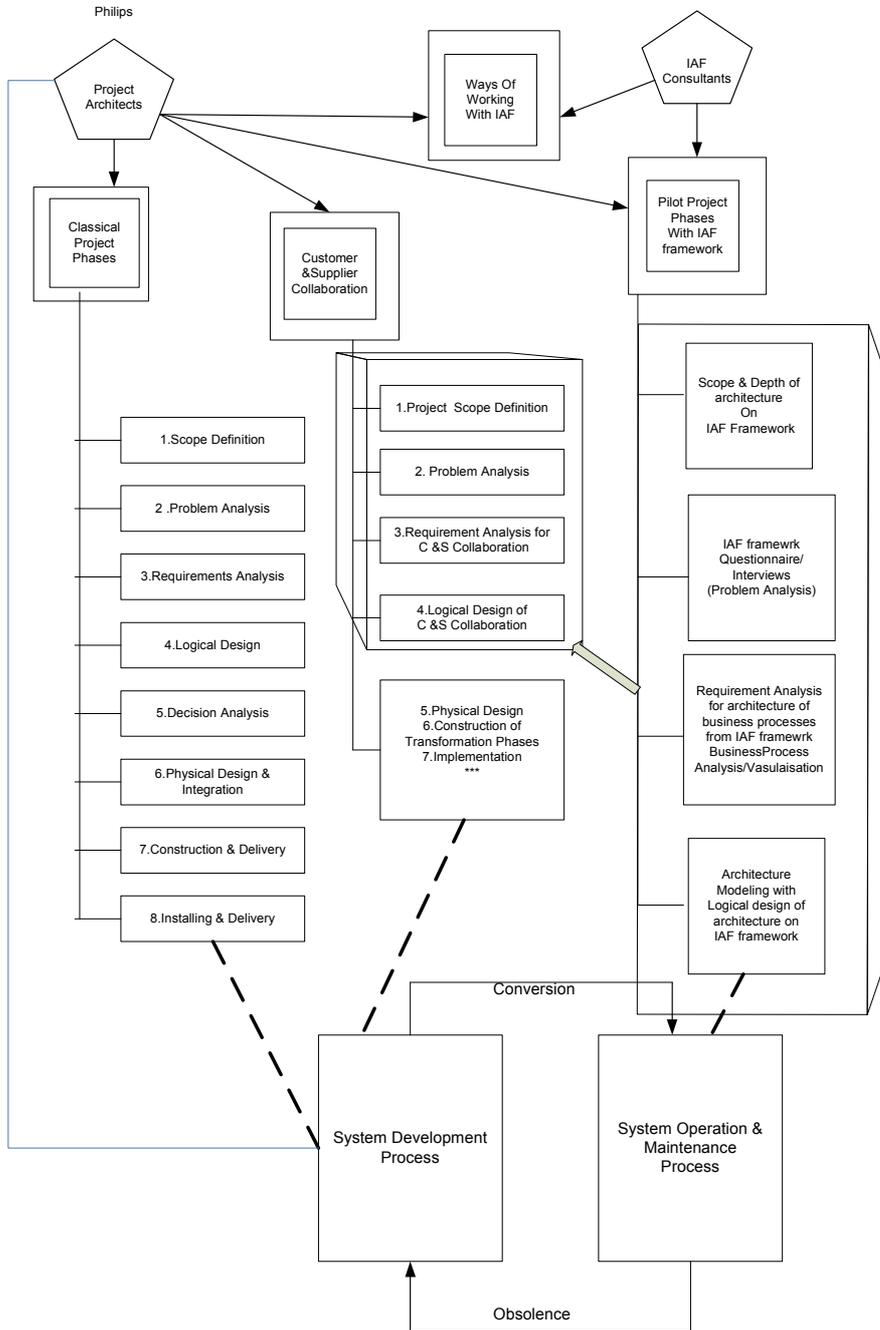


Figure 19: Classical and IAF-enabled project phases for C&S Collaboration

5.3.1 Scope of Architecture on IAF framework,

This section answers the research question Q6 ‘what is the scope of the pilot project on IAF framework?’ The main scope of the project is to define the IT system architecture which supports

the collaboration and interaction with Suppliers and Customers of Philips CE. The business processes considered are explained in 5.2.1.

(Also refer to the appendix of 5.1 consisting of Business Processes)

The considered on IAF framework to define the architecture are the aspect areas of Business, Information Columns contextual and conceptual abstraction levels and Information system at Physical level.

The Scope of the architecture models is restricted to the red boxes shown below on the IAF framework. The high level models for Customer & Supplier Collaboration are considered. The results architecture models will reflect these IAF boxes which are discussed in the next section 5.4 of this chapter.

The architecture will answer the questions based on IAF framework shown below. Primary focus is on the questions in the red boxes, other part will be left out of scope for this project because of time constraints.

The depth is restricted to high-level answers i.e. detailed answers at the logical level about how the processes, information and applications are structured are seen as a task of the realisation for later phases and not considered for this project because of time constraints and as it is not a priority aspect for Philips CE.

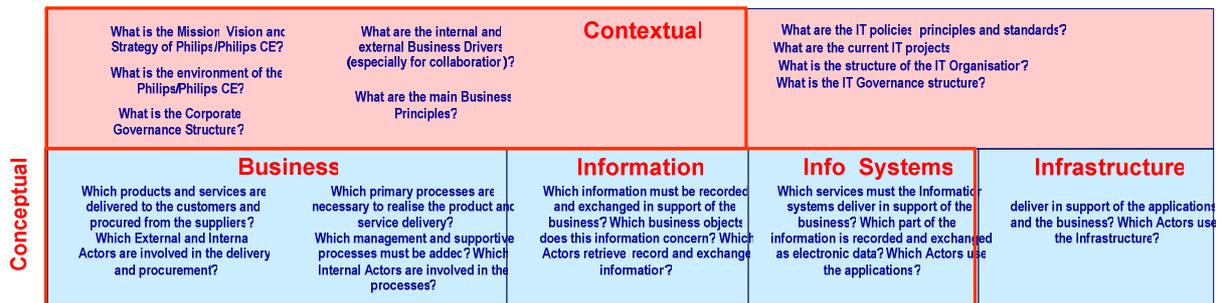


Figure 20-IAF Scope for C & S Collaboration

5.3.2 IAF framework enabled Questionnaire/ Interviews for Problem Analysis.

The scope of project emphasis on the creating the architectural models for C& S Collaboration. A structured questionnaire is prepared based on the IAF (from above mentioned scope) aspect areas and Abstraction levels i.e. the conceptual and conceptual layers of Business, Information and Information Systems of IAF framework.

Refer to the appendix 5.3 for detailed questionnaire based on IAF framework for the C& S Collaboration problem analysis.

5.3.3 Requirement Analysis of Business process (Visualization of Business Process Models)

The requirements for C& S Collaboration are the informational flows and exchanges of Customers and Suppliers with Philips CE and the application systems supporting the collaboration.

The business processes mentioned in section 5.2.1 are individually considered. The interviews with various BPO's are then analyzed and the business processes are aligned between the Customers and Suppliers with respect to Philips CE, as shown below,

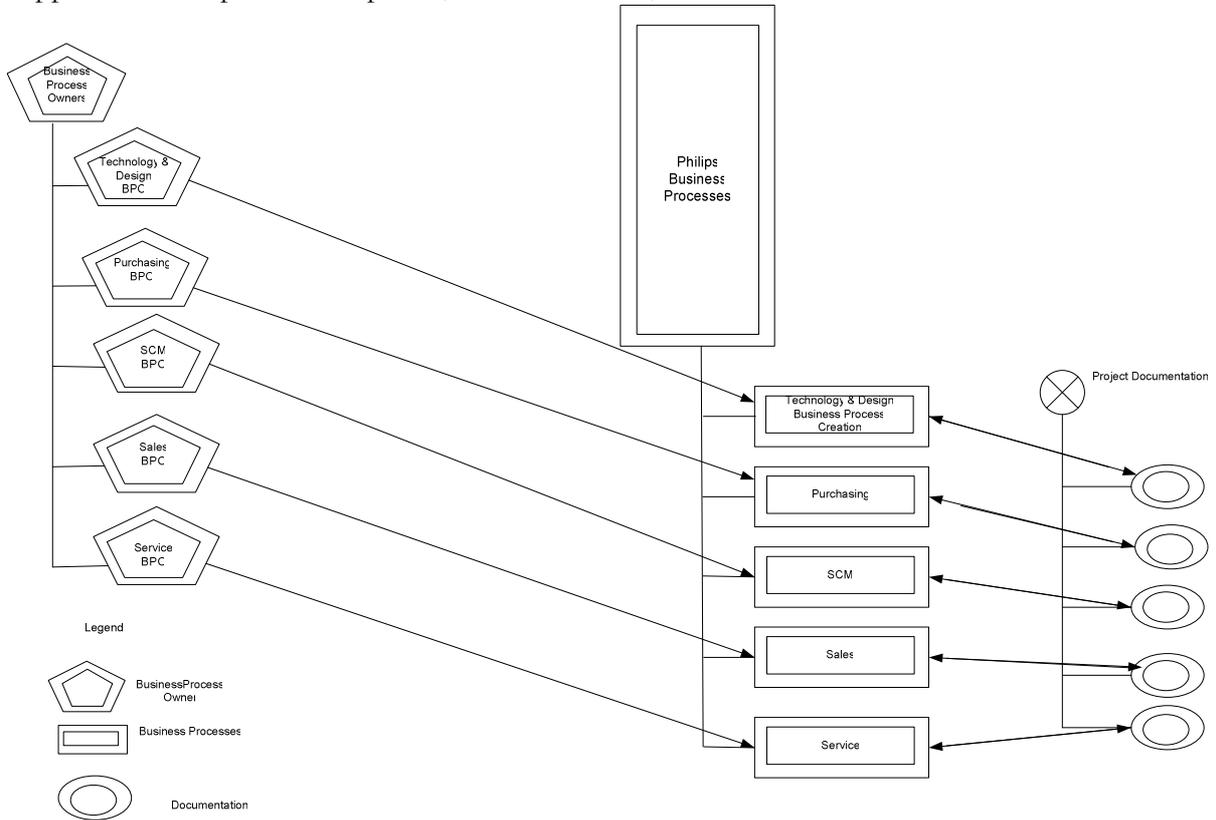


Figure 21-BPO's participation for the pilot project

An example of BCP is shown below, the supplier on the other side is assumed to be having the similar internal processes which are not considered for discussion here. These are represented by the double arrows inside the double boxes consisting of business processes.

These internal business processes have certain information exchanges/deliverables with the suppliers and these deliverables are provided from suppliers. The one sided arrow facing Philips from Supplier depict the deliverables.

The following figure represents the deliverables from the Supplier side to Philips which are supported by external business process in between the Supplier and Philips CE.

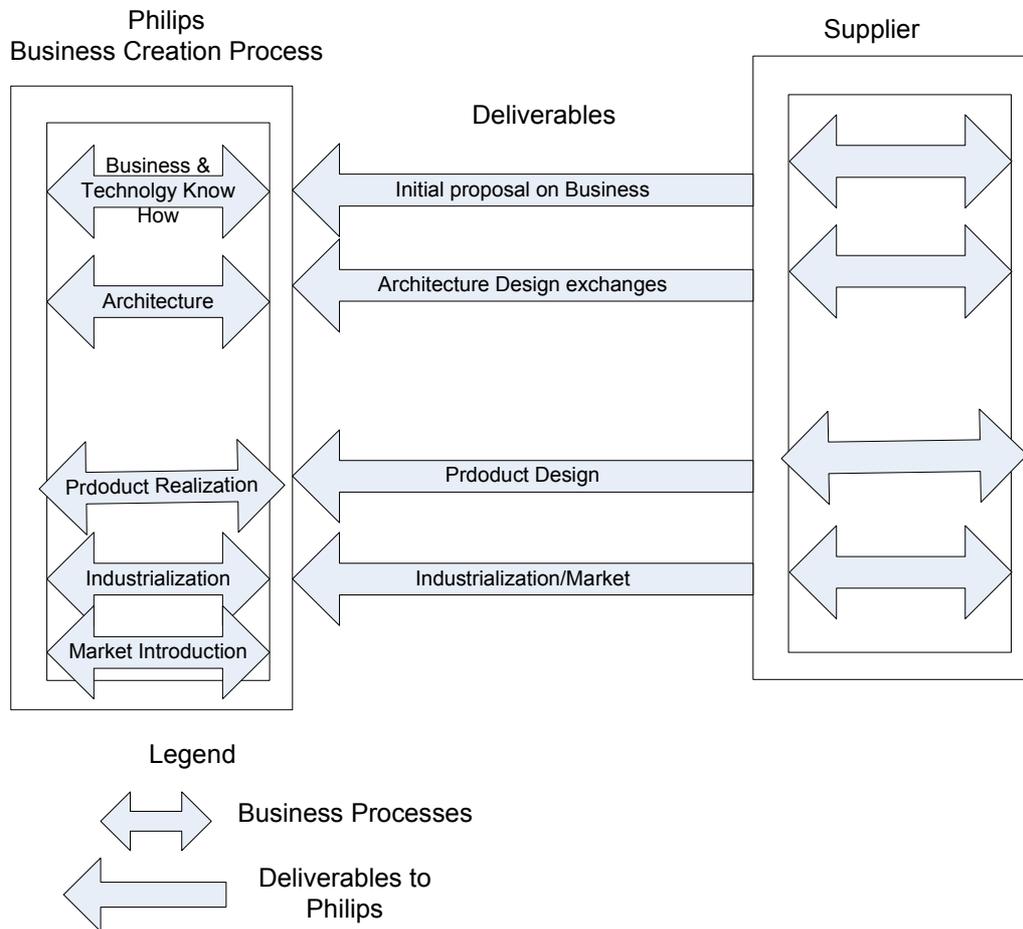


Figure 22 Deliverables between Philips CE & Supplier

5.3.4 Architecture Modelling & Logical designs based on IAF framework.

This section discusses the IT/information systems which support the business processes between the Suppliers and Philips, in the As-Is situation and the To-Be (future) situations. This is modelled and validated for all the business processes from the respective BPO’s who were initially interviewed. The following figures represent the As-Is and To-Be architecture models. A combined representation of the Customer & Supplier Architecture is shown in the next section 5.4.

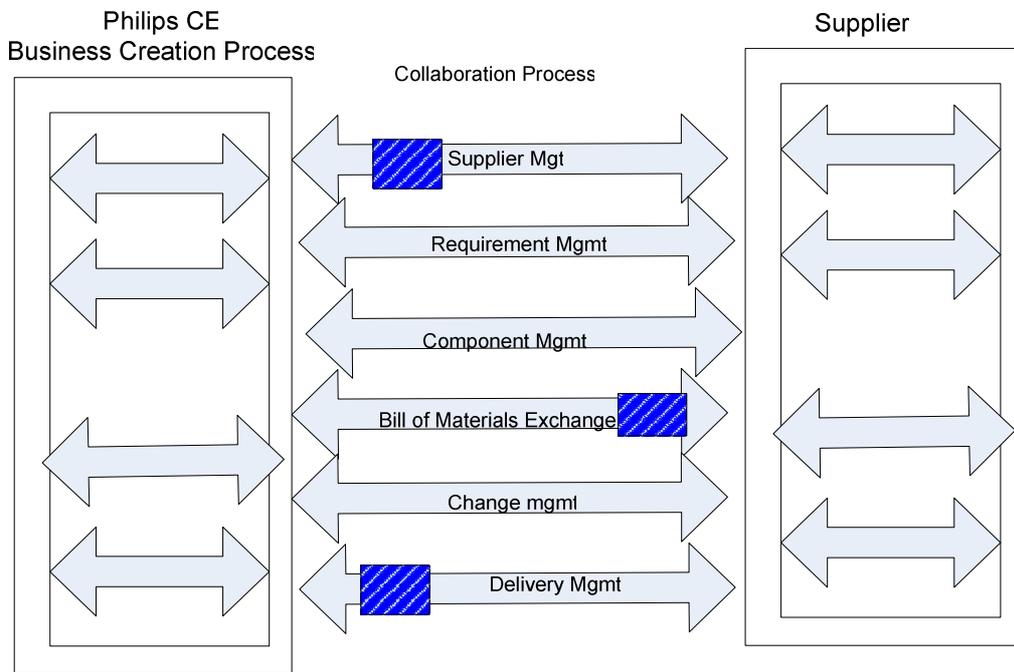


Figure 23 As-Is Architecture for BCP

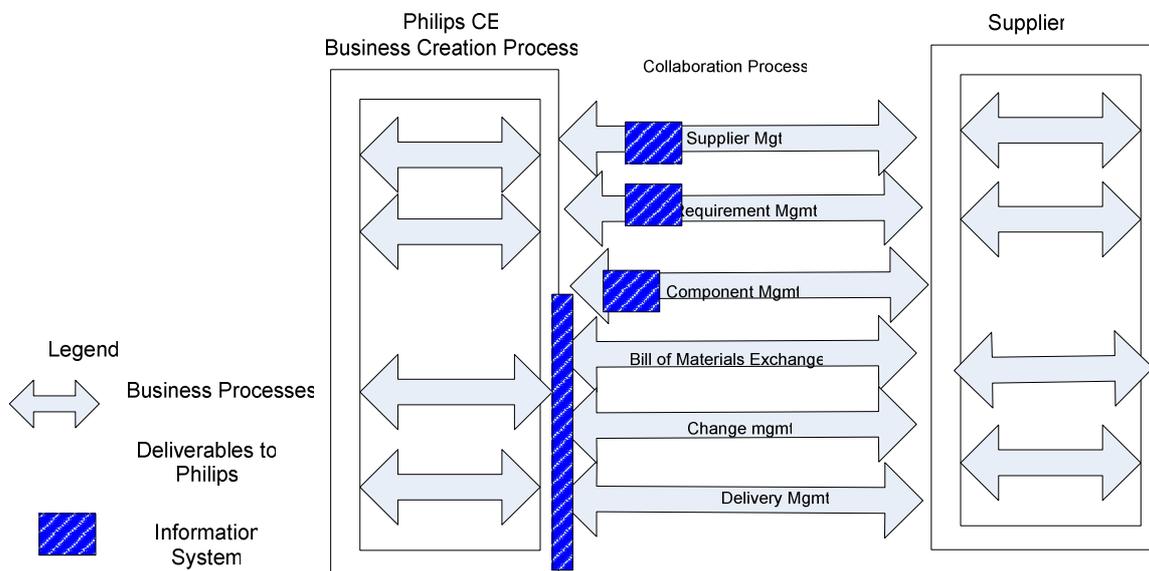


Figure 24 -To-Be Architecture for BCP

5.4 Design of Architectural Models of Customer & Supplier Collaboration

This section answers the research question Q8 which shows the reflection of the architectural models on the IAF framework. ‘How does the architecture (C & S Collaboration) reflect on the IAF framework?’

The architecture of Customer & Supplier Collaboration at high level is called a Business Reference Model for collaboration. This model is considered for discussions with the business internal to Philips CE and also external with cross PDs which relate for aligning the IT systems. These form basis for discussions for the principles of solution selection. This is an initiation towards a common IT platform for entire Philips which enables to face its customers and suppliers with single face.

For example a common website for all information exchanges with its suppliers.

All the business processes for Suppliers are considered on one side while Customers on the other side of Philips CE for collaboration. As an example Supplier Collaboration is shown below, for the business processes BCP, Purchasing and SCM.

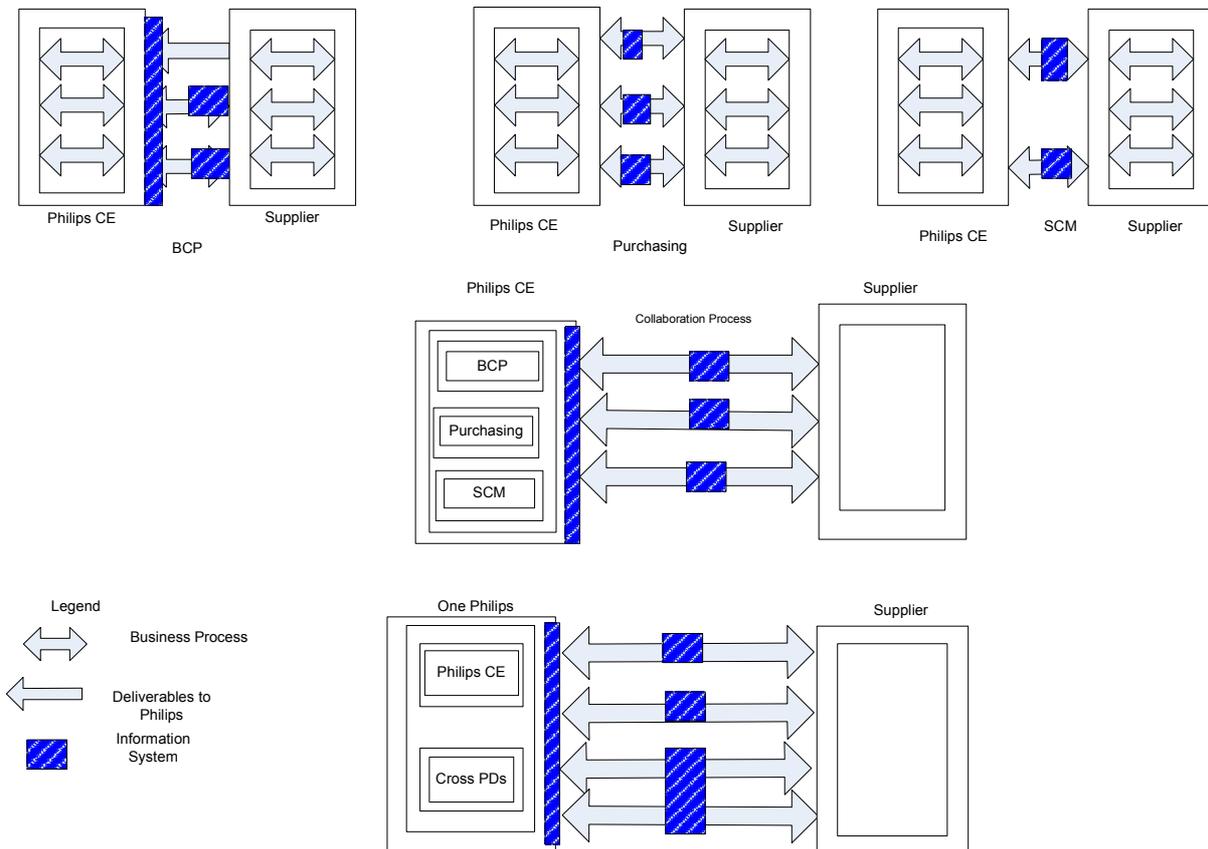


Figure 25- Supplier Collaboration

The architecture model is depicted in following figure below combining the individual Supplier and Customer Collaboration. This is adapted from the literature of domain models for IST infrastructures [Jan Goosenaerts]. The BPO's are represented by the double pentagon, and double boxes the represents the business processes. In this model all the business processes of Philips are considered here which interact with Suppliers and Customers.

The project documentation is maintained at each business process representing the architecture at a lower level of hierarchy of the business processes.

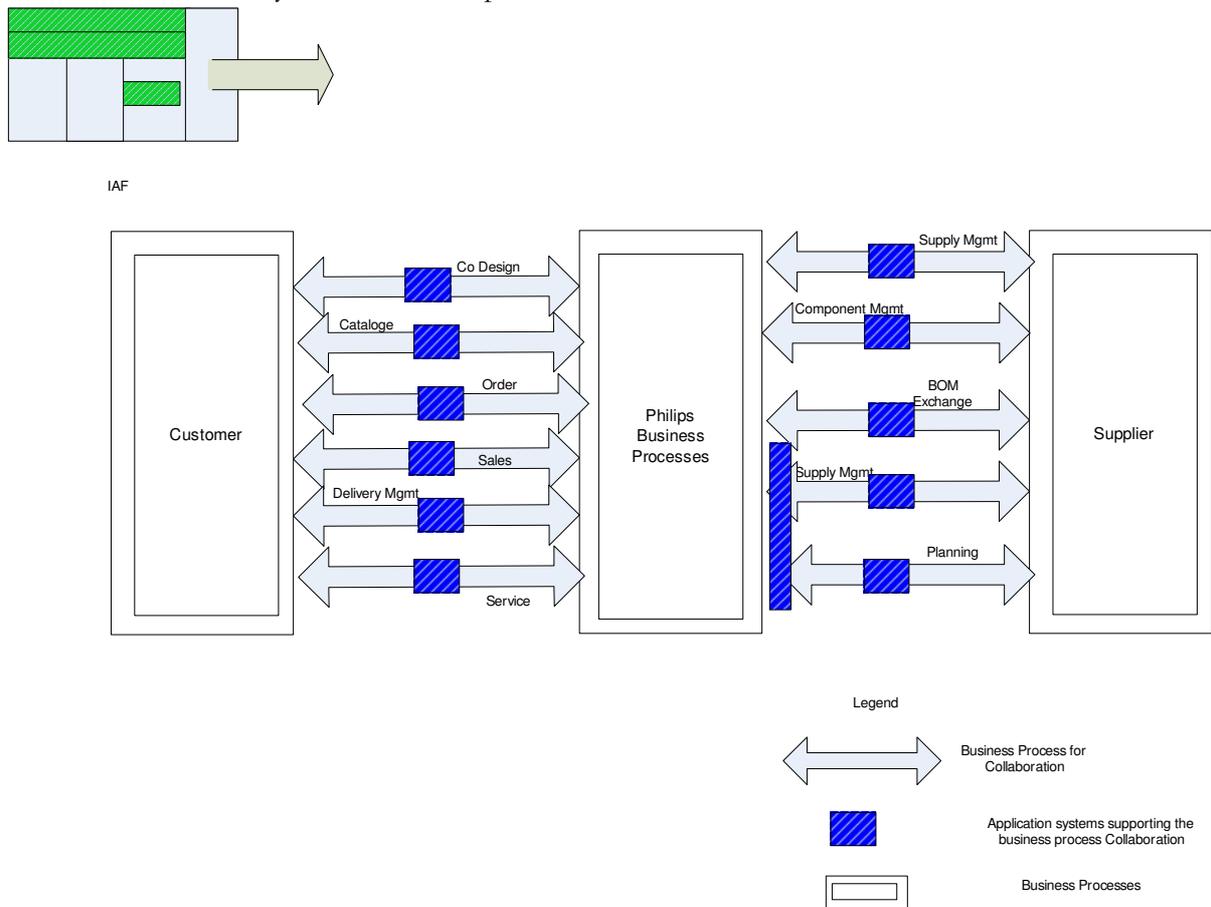


Figure 26 -Customer Supplier Collaboration Architecture

These reflect the business strategy and process of collaboration of Supplier & Customer Collaboration and application systems supporting the collaboration. The contextual & Conceptual layers and IS at Physical level on IAF respectively. As this project is confidential, the original models are in appendix 6 can not given here.

5.5 Conclusions from Design

This design phase answered the research question Q5, Q6, Q7, and Q8. This chapter shows the ways of working IAF and synchronizing the IAF content with architectural processes in general.

Based on which the IAF enabled project phases were simulated/ experimented for C & S Collaboration at Philips CE, which resulted the IAF supported architecture which is taken for the assessment in the next phase.

The next chapter discusses the assessment of the architectures and Philips CE maturity levels in architectural processes.

6 Assessment

This Chapter answers the research questions Q9 and Q10 of the research. There are two parts involved in this assessment phase for the assessment of the architectures.

First, the background from literature for assessment of the architectures is provided in the section 6.1.

Second, the architectures are assessed based on the EA Score card of IFEAD organization is provided in section 6.2. Third, the maturity level analysis of Philips CE for architectural project (processes) is conducted based on the NASCIO AMM described in the section 6.3.

6.1 Background from literature

According to Bas Raadt et al (ICSE 2004) the architecture and the alignment within the organization help harmonize the architectural processes. This emphasizes the following for the architectural process, the architectural projects reflect the alignment of Business –IT aspects like,

- Means of abstractions- Organization have difficulty in using the IS for facilitating aligning the Business-IT (Vision, mission, & Strategy)
- Communication –clear communication for business and technical experts and for all stakeholders (internal and external to organization)
- Management decisions- planning, integration, consistency for decision making.

The success of architecture depends on the following factors like,

- Organizational acceptance of the architectural changes
- Availability of EA frameworks
- Proper usage of architectures,

Bas Raadt et al (CAiSE 05) conjecture that alignment and maturity are like siblings in architecture maturity.

Therefore, the architecture must be successful at the project level also the organizational maturity levels contribute to the success of the program.

The evaluation criterion for any framework is depended on the final acceptance of the architecture, the participation of stakeholders, and the further usage of the architecture in realization processes. The cross PD integration and towards ‘One Philips’.

This is a baseline creation and has been developed from the feedback and discussions with the Philips CE CIO office- IT demand Management, (Mr. Hans Rietbergen and Mr. Thijs de Vries). The architecture assessment is carried out in addition to the maturity level analysis of Philips CE at organizational level and also project level (with IAF introduction).

6.2 Architecture Assessment

This section describes the assessment of architecture based on the EA Score Card of IFEAD. The EA Score card is a questionnaire prepared by IFEAD to get insight and overview of the status of the addressed scope on the framework (aspect areas, abstraction levels) related to the quality check of architecture in the scope per aspect area and abstraction level.

For each of the addressed areas of framework the result on the EA Score card has one the following status,

- Status 0- Unknown and not documented
- Status 1- Partly known and partly documented
- Status 2- Fully Known and well documented

The next sub sections depict the assessment results marked back on the IAF framework.

6.2.1 Assessment of Pilot Project Customer & Supplier Collaboration

This section describes the assessment of the architecture of the Pilot Project Customer Supplier Collaboration; the results of the design phase are used as input for the assessment. The detailed assessment on EA Score card is given as an appendix 6.2.1. The results of the assessment are interpreted on IAF framework with the red boxes below indicating the weak areas which need to be improved,

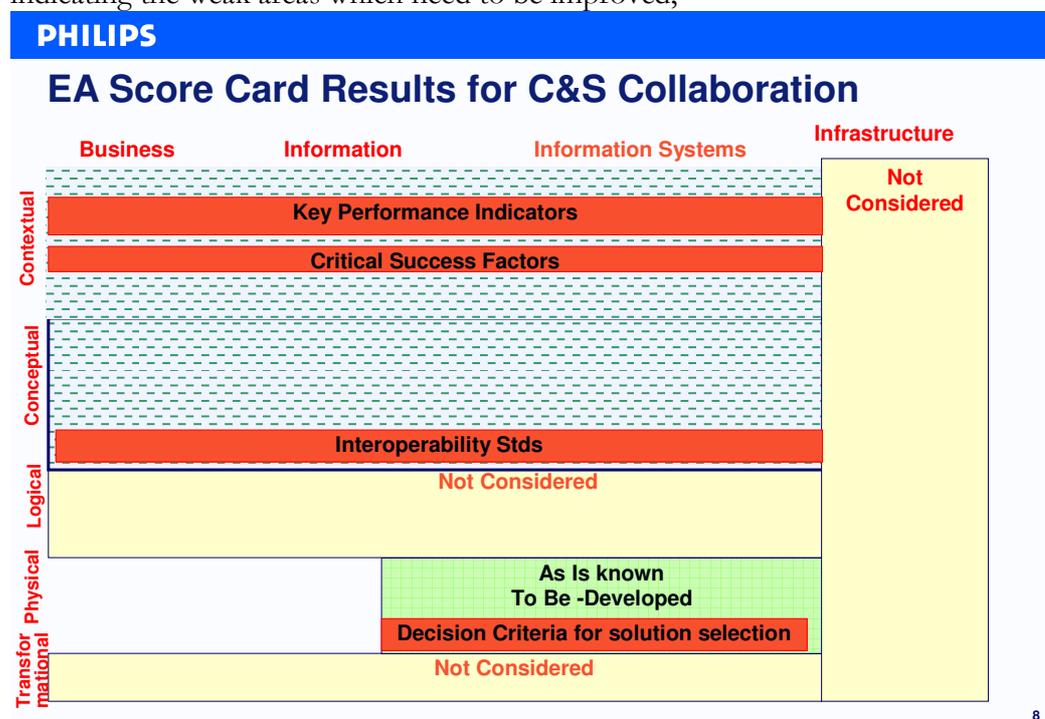


Figure 27 Results of C&S Collaboration Assessment

The assessment gives the following weak areas in the results,

- The Key Performance indicators for were not defined so far for the Customer & Supplier Collaboration.
- The Critical Success Factors for Customer & Supplier Collaboration were not formulated.
- There were no interoperability standards mentioned for the collaboration for example if they would be using EDI, or some international standards.
- The decision criteria for selecting the IT solutions were not formulated.

The recommendations for the improvement of these weak areas are given the next chapter.

6.2.2 Architecture Assessment of Total Philips CE

This section describes the assessment of Total Philips CE architecture based on EA Score card from the input from the IT demand management group. The detailed assessment with the scores is described in the appendix 6.2.2

The results of assessment for Total Philips CE architecture are interpreted on IAF framework with the red boxes below indicating the weak areas which need to be improved.

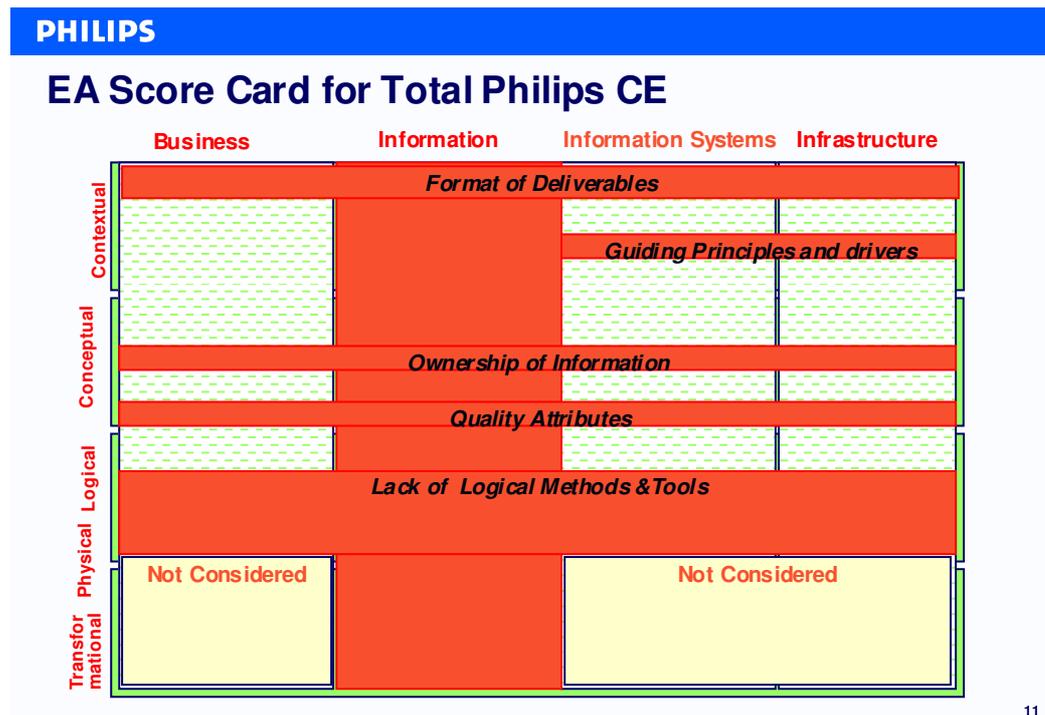


Figure 28 Results of Total Philips CE Assessment

The assessment gives the following weak areas in the results,

- The Format and Deliverables of the architecture at Philips CE are inconsistent; they do not have a unique way of representation of the architectures.
- The Guiding principles and drivers from the IT are unclear and not clearly documented for the traceability of the decisions.
- The ownership of information is not clear. This is essential for traceability of the information.
- Quality attributes were found missing and enough attention is not paid.
- Lack of logical methods and Standardization of tools, to link the architectures is not present.
- The management of Information and data is found inconsistent which is need for Business and IT alignment

The recommendations for the improvement of these weak areas are given the next chapter. The next section describes the architecture maturity analysis of Philips CE.

6.3 Architecture Maturity Analysis

This section answers the research question Q10, which describes the architecture maturity analysis of Philips CE, to architectural processes after the introduction of IAF framework. This is based on the NASCIO indicators of maturity level analysis, which is based on the CMM levels. As the architecture matures, predictability, process controls and effectiveness also increase. This model is chosen as it suits very closely with Philips CE.

According to Whitten et al the as maturity levels increases the risk of the program being efficient in the organization also increases. [Whitten et al]. This would mean that probably then IAF needs to be revised for improvements. But as this is a pilot project for IAF, this is too early to consider any such improvements for IAF.

This maturity level analysis will help Philips CE to get more efficient in the architectural processes and IAF enabled project phases (discussed earlier in 5.3).

Refer to the appendix 6.3 for details on the NASCIO maturity levels.

6.3.1 Architectural Process Maturity level

This section describes the maturity level analysis architecture process at Philips CE is based on NASCIO (National Association of State Chief Information Officers). The criterion for the architectural processes are shown below,

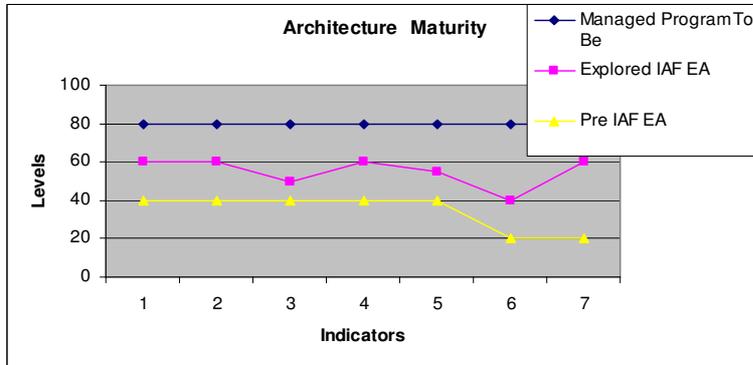
- Pre IAF – Architectural processes before IAF framework was introduced at Philips CE.
- ‘Explored IAF ‘- Architectural capability at Philips CE after the introduction of IAF framework for IAF enabled architectural projects.
- Managed Program level is suggested as an ideal To-Be program.

The maturity analysis from the indicators of NASCIO for three stages of Philips is summarized in the following Table 2,

- Level 0 is No Program,
- Level 1 is Informal Program,
- Level 2 is Repeatable Program,
- Level 3 is Well Defined Program,
- Level 4 is Managed Program,
- Level 5 is Continuously Improving Vital Program.

Indicators	Philips -Pre IAF	Philips –Explored IAF	To Be Managed
1. Governance	Level 1	Level 3	Level 4
2. Planning	Level 1	Level 3	Level 4
3. Framework	Level 0	Level 3	Level 4
4. Blueprint	Level 1	Level 2-3	Level 4
5. Communication	Level 1	Level 2	Level 4
6. Integration	Level 0	Level 3	Level 4
7. Involvement	Level 0	Level 3	Level 4

Table 1



analysis, an ideal managed program established for Philip CE based on the NASCIO AMM levels as shown below, from this program certain crucial action points are drawn out for recommendations in next chapter.

Philips CE- Enterprise Architecture Managed Program ToBe With IAF framework					
<p>Step 1 Governance</p> <p>Spread knowledge of the IAF framework.</p> <p>Establish Training programs.</p> <p>Talk the language of the IAF framework officially</p> <p>Establish roles ,resources and responsibilities to review and update changes of the EA framework</p>	<p>Step 2 Planning</p> <p>Review plans and Incorporate Changes</p> <p>Establish Metrics and measure the effectiveness of the architecture programs. (KPI's should be established)</p> <p>Set goals for future.</p>	<p>Step 3 Framework</p> <p>Establiish Templates and corrective plans to stucture them.</p> <p>Adapt the changes to the framework to replace the defecencies to suit to the organization</p> <p>Regular meetings and workshops for the review of the IAF framework</p>	<p>Step 4 Blueprint EA documentation</p> <p>Document the information at strategic level, business level and the operational level.</p> <p>Document the business drivers.</p> <p>Update the EA which is already documented with changes</p>	<p>Step 5 Communication</p> <p>Establish formal communication.</p> <p>Metrics to measure the communication process of EA</p> <p>Establish EA awareness training for employees</p> <p>Review communication process and incorporate changes to EA.</p>	<p>Step 6 Integration & involvement</p> <p>Integrate changes when a problem or new functionality arises.</p> <p>Employees thourght must have good understanding of the architecture principles and participate in EA as every project will have a touch in the EA program.</p>

Figure 29 An ideal Program for EA efforts

6.3.2 Architectural Project Maturity Level

This section provides the discussion on architectural maturity impacting the architectural process at project level impacting the quality; this is based on Whitten et al (2004) which suggest that impacts of the system developments would result in Quality improvement for processes with a drop in duration in project time, costs and person months.

Hypothetically I have adapted that with introduction of IAF at Philips CE, there was a huge improvement in the representation of the architecture for C & S Collaboration and also a drop of person months, duration and costs.

If the recommendations are successfully carried by possible introduction of tool support in addition to IAF the future projects at Philips CE will be more efficient in quality and information. This is represented in following diagram (from similar data of Whitten et al (2004))

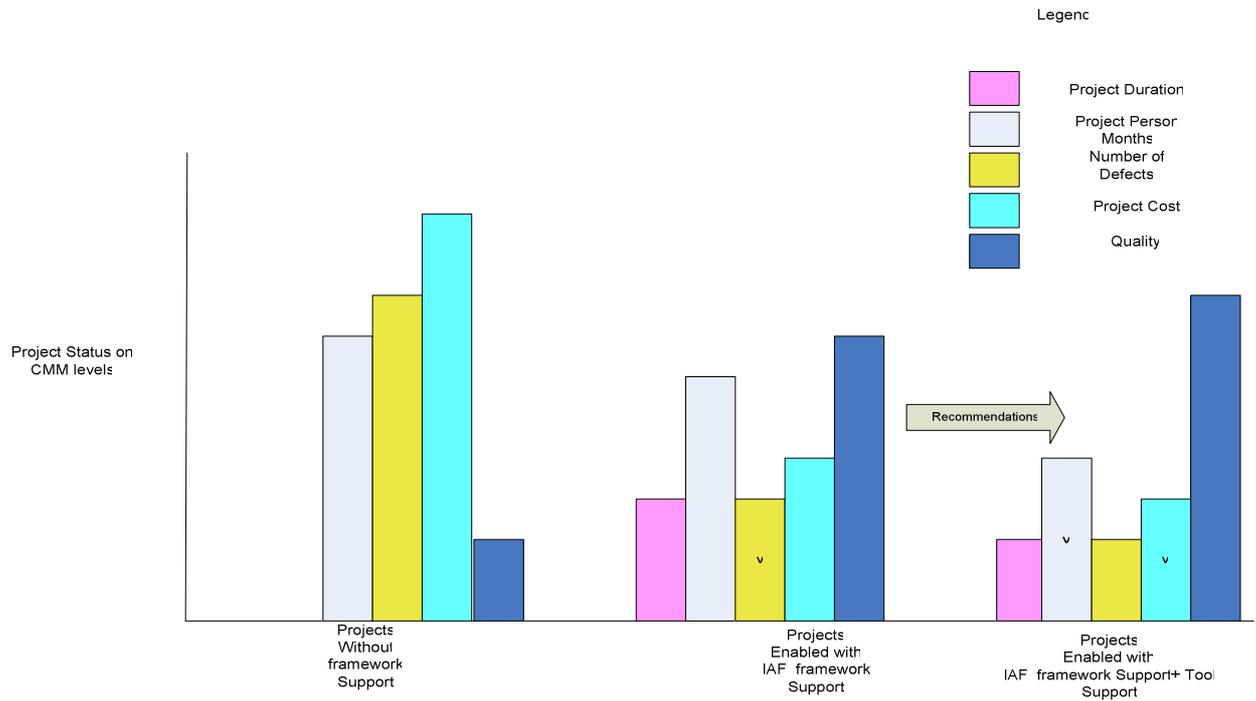


Figure 30 Maturity levels of Project at PCE with IAF

6.3.3 Conclusions from the Assessment

The research questions Q9 and Q10 are answered in this chapter. The assessment of the architecture of the pilot project Customer and Supplier Collaboration and Total Philips CE architecture provide certain weak areas for improvements at Philips CE.

The maturity analysis also suggests that Philips CE has to implement recommendations that are suggested from the assessing the architectures for improving the efficiency of use of IAF framework.

The suggested recommendations are provided in the next chapter.

7 Recommendations for Implementation

This chapter discusses the recommendations from the research analysis consisting of five subsections. The recommendations are based on lessons learned from IAF enabled pilot project C & S Collaboration, assessment and the maturity. These fulfil the need of architecture at Philips CE and fill the gaps analysed in chapter 4.

These recommendations can be categorized based on the two folded assignment discussed in Chapter 3, (A1- Creation of IAF enabled architecture for C & S Collaboration, A2- Exploring IAF to be implemented at Philips CE.)

First, the recommendations for weak areas from C & S Collaboration are given in section 7.1 (A1). Second, the recommendations for weak areas of Philips CE are given in the section 7.2(A1). Third, the recommendations for Architectural Projects in general based on IAF enabled pilot project from C & S Collaboration in section 7.3(A2). Fourth, in section 4.4 the guidelines of using the IAF framework (A2). Fifth, the crucial points of IAF program management in section 7.5. (A2)

Section 7.6 gives the prioritization of these recommendations into action points and proposed next steps for Philips CE –CIO IT Demand Management.

7.1 Recommendations for the Customer Supplier Collaboration

From the results of the architecture assessments for the Customer and Supplier Collaboration project, the following weak areas of the project are identified, and recommendations are given for improving the current situation. (Based on the results from section 6.2.1)

Table 2

Weak Area	Current Situation	Recommendations
1. Key Performance Indicators	The KPIs have not been defined.	Define the KPIs and relate them with ways of working. Include in the PIR.(Project Identification Report) e.g. Link the KPIs to the Business-IT strategy ➤ Suppliers Collaboration Web portal how many suppliers get access to initial portal vs. how many get access to the APO systems. ➤ Customers Collaboration Define KPIs for Strategic Key Accounts vs. the rest.
2. Critical Success Factors	CSFs were not defined for the C&S collaboration.	Define the CSF and include in the PIR/PDR. Link them from the KPIs defined. (PIR-Project Identification Report) (PDR-Project Definition Report)
3. Interoperability Standards	Were not defined	Interoperability Standards have to be defined. Define a project to define the interoperability standards for C& S collaboration. e.g. International Standard Messages

4. Decision Criteria for Solution selection	Not defined.	Make guidelines in PIR for solution selection based on, <ul style="list-style-type: none"> ➤ Based on Philips/CE IT strategy, costs etc. ➤ Feedback from the research organizations like Gartner, etc.
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Note: These are the report templates for the projects at Philips CE
(PIR-Project Identification Report)
(PDR-Project Definition Report)

7.2 Recommendations for the Total Philips CE

From the results of the architecture assessments for the Total Philips CE, the following weak areas of the architectures are identified, and recommendations are given for improving the current situation of architecture at Philips CE, (based on the results from the section 6.2.2)

Table 3

Weak Areas	Current Situation	Recommendations
1. Form and format of deliverables	Not clear e.g. IT architecture form & format are different for all projects.	Define the format, agree on the standards and include them in PIR.
2. Guiding principles & Drivers	Not clear for IT e.g. Driving principles for SAP centric choice	Define them in the PIR template
3. Ownership of Information!	Information is not consolidated, inconsistent & separate.	Define a project to identify the owner of information, for traceability and transparency of the business and IT.
4. Quality Attributes (The non functional attributes) E.g. Security	The quality attributes are not defined.	Define them in PIR/PDR. Quality attributes help in <ul style="list-style-type: none"> ➤ Decision making. ➤ Prioritizing the goals. ➤ Base factor for the decision criteria for solution selection.
5. Lack of Logical Methods and Tools.	Not clearly defined or structured. No standards of tools	<ul style="list-style-type: none"> ➤ Have logical connections in Business architecture models & IT architecture models. ➤ Investigate/Benchmark in identifying the tools, because tools can group them together & document. ➤ Define the projects (components) such that they can be grouped together.
6. Information Layer!	It is not clear which information is stored, retrieved, recorded, transmitted, reported, & their	Define a project for information architecture, starting from the ownership of information project. This is essential for Synchronization and integration.

	references. The data exchange between the systems is not clear.	
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Note: These are the report templates for the projects at Philips CE
 (PIR-Project Identification Report)
 (PDR-Project Definition Report)

7.3 General Recommendations for Architectural Projects

Certain general recommendations are drawn from the IAF enabled pilot project Customer & Supplier Collaboration. The table below suggests the improvements and reasons needed for the improvements and how they can be achieved.

Table 4

What to Improve?	Why to Improve?	How to Improve?(Recommendations)
1. Architectural Modeling Standards to be developed	<ul style="list-style-type: none"> ➤ No Standards ➤ No Fixed Format for representation. ➤ No consistent documentation. 	<ul style="list-style-type: none"> ➤ Agree on the naming, formats and representation. ➤ Consistency in models. ➤ Carry forward the modeling rules with improvisation.
2. Repository of Architecture models	<ul style="list-style-type: none"> ➤ Modeling content is stored on the drives. ➤ Not in database. 	Store and share the content for common visibility and usage.
3. Aligning the Modeling efforts	Separate projects like, <ul style="list-style-type: none"> ➤ Business architecture with IT applications e.g. Customer Supplier Collaboration ➤ The e-portals for supplier. ➤ The infrastructure and security of To Be applications. 	<ul style="list-style-type: none"> ➤ Share the knowledge. ➤ Continue with the base models created (templates). ➤ Talk the similar language of modeling. ➤ Put them together in the database.
4. Architecture team & Additional Resources	Working separately.	Group Architects together (pooling) to work in collaboration
5. IAF knowledge	Familiarity with terminology is important.	<ul style="list-style-type: none"> ➤ IAF orientation workshops. ➤ Incorporation of the terminology in all the projects, since all the projects will touch the framework somewhere.

6. Business Processes (BPO's understanding of IT I.e. the visualization of information flows)	The process information for Business-IT is present in irregular formats.	Present them in more structured way which is easy to visualize.
7. Project list for IT project with IAF framework.	For connecting the link between the architectures & future planning.	Make list of IT projects for the architecture development with IAF framework. This should be based on IT strategy and IT portfolio.
8. Databases for Business Processes	No database for Business process	Maintain historical databases. This must be considered as a BPO ownership.

7.4 Guidelines for Future use of IAF framework

The pilot project Customer and Supplier Collaboration with IAF framework, certain lessons have been learned which will enable to use the IAF framework better in the upcoming projects at Philips CE, and collaborate with cross PDs. The following are the set of guidelines for future use of IAF framework,

- Scope and Depth of the architecture
The level of detail and main objective of architecture should be clear. The IAF main questionnaire is then tailored to the project level.
- Modelling View point
The modeling view point, the deliverables, the format of the content must be agreed by the architects, system owners and the stakeholders involved in the architecture.
- Involvement of Stakeholders
The stakeholders must be involved at regular phases of the architecture for the decision criteria of solution selection. This helps in visualization of common goals.
- Consistency of Architecture
The architectures must have consistency, which helps in sharing of knowledge and integrated solutions.
- Communication & Ways of working
There should be similarity in the ways of working & communication of IAF framework internally by all the departments with in Philips CE and across with all PDs.

7.5 Managed Program

These are some of the indicators for improvement suggested from the Maturity level analysis for Philips CE, which are crucial to be implemented for the next project list.

Table 5

Indicators for Improvement	What to Improve?
1. Governance	<ul style="list-style-type: none"> ➤ Spread knowledge of the IAF framework. ➤ Establish Training programs. ➤ Talk the language of the IAF framework officially ➤ Establish roles ,resources and responsibilities to review and update changes of the IAF

	framework
2. Planning	<ul style="list-style-type: none"> ➤ Plan all the architectural projects on the basis of IT portfolio. ➤ Make a time plan for the list of IT projects
3. Framework	<ul style="list-style-type: none"> ➤ Consider the architectural projects as real projects. ➤ Define scope, project teams, planning, resources etc.
4. Blueprint/Documentation	<ul style="list-style-type: none"> ➤ Document architecture and the related decision criteria.
5. Communication	<ul style="list-style-type: none"> ➤ Align the Philips CE architectural initiatives with Corporate IT.

7.6 Prioritization of Recommendations

This chapter provided the recommendations for Philips CE at various levels on how the IAF framework must be more practically used and how Philips CE can be organized to be more receptive towards the architectural process changes. They are further translated into a set of action points and proposed next steps for Philips CE which is as follows:

1. Make a concrete list of IT architectural projects as real projects.
2. Adopt IAF framework for all architectural projects.
3. Define templates to be used in PIR for documenting the IT architectural projects.
4. Define the decision/ selection criteria to choose the Right solution.
5. Define the template for documenting the criteria list.
6. Define the ownership of data and information.

These action points and proposed next steps were accepted by the CIO and the IT Demand Management group and later they would be passed on to the Architectural Board for further discussion of the projects with IAF framework.

The next chapter provides the Conclusions of the research.

8 Conclusions

As a concluding Chapter of this report, the overview of the research and the project are described. This chapter consists of three sections, first the conclusions on IAF framework for Philips CE.

Second, the generalizations are given on contribution of this research objective, i.e. Practicality of IAF framework for Organizations such as Philips CE, described in section 8.2.

Finally, suggesting the directions for further research in future is provided in section 8.3.

8.1 IAF framework at Philips CE

This research started with an assignment of creating the architecture for pilot project C & S Collaboration supported by IAF framework and exploring the IAF framework to suit and adapt to Philips CE.

- The architecture models for C & S Collaboration are designed with the support of IAF framework.
- The architectures were then assessed for the pilot project C & S Collaboration and Total Philips CE architecture which indicated some weak areas for improvements.
- Maturity level analysis was conducted on Philips CE and the architectural projects which indicate the improvements that is required from Philips CE to be more receptive to the IAF framework.
- The recommendations from the assessment of the architectures and maturity level analysis are provided to Philips CE which contributes to the usage of IAF framework.

So, the results of pilot project C & S Collaboration indicate that IAF successfully contributed to support the architectural models. Suggestions for implementing the IAF for future projects were provided. This makes the IAF framework practical for Philips CE for future architectural projects.

8.2 General conclusions for Practicality of IAF for IAF enabled organizations

This section describes contributions from the research objective for practicality of IAF framework for organizations such as Philips CE. There are a lot of theoretical methods mentioned for using the frameworks but practicality to organization is concerned with actual use rather than theories.

Practicality is not a prescribed methodology before this research. Practicality is achieved by actually doing and using the IAF framework for creating the architectures, assessing the architectures and providing maturity analysis for improvising the efforts by the organizations.

This was achieved by actually using the IAF framework as a base to support the pilot project as follows,

- The ways of working with IAF framework is explored,(5.1)
- The phases of synchronizing the IAF framework with architecture modeling are designed.(5.2)
- The classical project phases were transformed to IAF enabled pilot project phases which uses the IAF framework (5.3)
- The architectural models designed.(5.4)

- The architectural models were assessed and recommendations were provided for improvements.(6.2,7.1,&7.2)
- Based on the classical project phases(5.3), the project maturity levels (6.2.2) were established suggesting the IAF architecture improvements(system development process) with recommendations for architectural projects(7.3)

8.3 Further Directions of Research

This section provides with some topics for further research directions in future, these directions are actually can be continuation of this research. The following are some of the topics,

- **How can IAF Framework be improved with architectural projects,**

In this research it was obvious that Philips CE was making efforts to suit to the IAF framework and make it practical for the architectural projects.

But it is also possible that the IAF framework needs improvements when the architectural process reaches a fairly good maturity levels on the AMM levels.

- **Guidelines for selection procedure for IT solutions**

The requirements of IT solutions from the business sometimes can not be realized immediately. Solutions could be built for longer term to align the business & IT solutions. Based on what criteria can the choice be made to arrive at prioritization of optimum IT solutions?

- **Transformational Change Plan**

When can the transformational change plan be made with timeframe and a roadmap? Is it dependent on the business case, Characteristics of the nature of the need: is it a problem, an opportunity or a solution? What is the impact of this on the IT project portfolio management?

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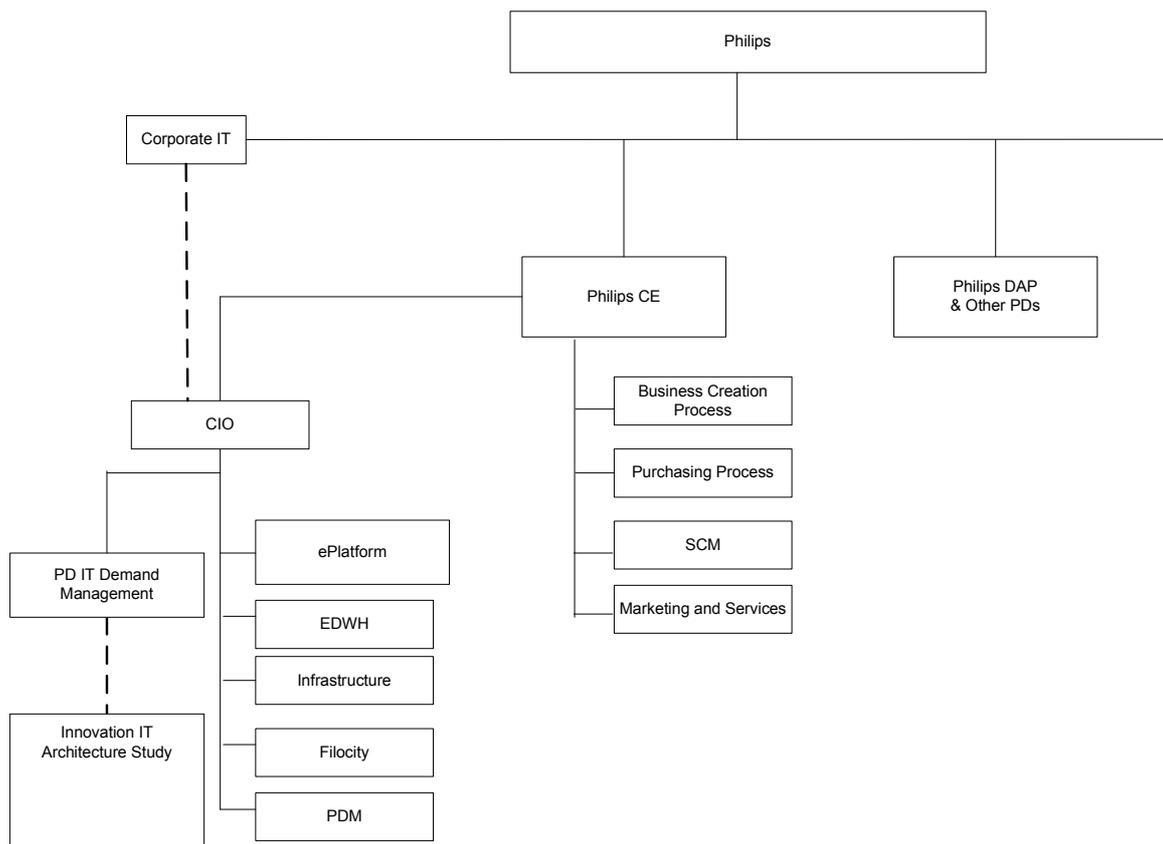
11.1 Appendix 1- Abbreviations

Appendix-1 Abbreviations

	Abbreviations	Explanation
1.	IAF	Integrated Architecture Framework
2.	PCE/Philips CE	Philips Consumer Electronics
3.	EA	Enterprise Architecture
4.	CEO	Chief Executive Officer
5.	CIO	Chief Information Officer
6.	CRT	Cathode Ray Tube
7.	BCP	Business Creation Process
8.	DAP	Daily Appliances and Products
9.	SCM	Supply Chain Management
10.	TSS	Transaction Shared Services
11.	P2P	Peer To Peer
12.	EC &C	Enterprise Communication & Collaboration
13.	PD	Product Division
14.	X-PDs	Cross Product Divisions
15.	ECI	Electronic Computing Infrastructure
16.	AS-IS	As-Is (Current)
17.	TO-BE	To-Be(Future)
18.	TOGAF	The Open Group Architecture Framework
19.	DoDAF	
20.	TI	Technology Infrastructure
21.	IT	Information Technology
22.	IS	Information Systems
23.	ICT	Information Communication Technology
24.	PHERA	Philips Enterprise Reference Architecture
25.	C&SC	Customer and Supplier Collaboration
26.	BU	Business Unit
27.	BG	Business Group
28.	WoW	Ways of Working
29.	ATP	Available To Promise
30.	VMI	Vendor Managed Inventory
31.	IC	Integrated Component
32.	SC	Semi Conductors
33.	C & S Collaboration/(pilot project)	Customer and Supplier Collaboration
34.	As-Is	Current Situation
35.	To-Be	Future Situation

11.2 Appendix 2- Organizational Chart of Philips

The following is organizational chart of Philips, from this assignment point of view. The departments which are relevant for this study are only shown for clear understanding.



11.3 Appendix 4.2 -C & S Collaboration Pilot Problem Analysis

The problems of Customer and Supplier Collaboration are articulated in this appendix. This is based on the results of the interviews with SCM and Infrastructure architects of Philips CE.

Problems with Supplier Collaboration

The interviews from the SCM solutions and infrastructure architects explain the present problems and AS-IS situation at PCE. The following are some of the problems faced at Philips Consumer Electronics which recommend for a stronger Supplier Collaboration, [Philips 4]

1. Stock Planning Problems- Unreliable ATP (Available To Promise) stock to countries.
2. Fluctuations in maintaining the planning schedules.
3. Big differences in current WoW's (ways of working) between business groups and business units and between sites within same BU (= different starting points)
 - Timelines and contents of communications with Jabil(Supplier)
 - Constraints management, Frozen periods
4. Drastic increase in work loads for not managing the 2nd tier components.
5. Suppliers do not organize planning.
6. Suppliers do not maintain any safety stock.
7. Other competitors have better planning, commit and execution cycles compared to Philips.

The following are the major requirements for the Supplier Collaboration processes at Philips Consumer Electronics, [Philips 3]

1. Managing the real constraints in the Supply Chain: critical 2nd tier components (IC's):
 - Long lead-times, long freeze periods
 - Constrained supply;
 - Creating liabilities
2. Create a better (more realistic) wish plan for the first tier suppliers
 - Capacity reservations at 2nd tier suppliers set the boundaries for the weekly process with the 1st tier suppliers I.e. wish plan is already "smoothed" by the real constraining factors: 2nd tier component constraints
3. Global visibility of 2nd tier components:
 - Allocate constrained 2nd tier component supplies across EMS suppliers in times of increasing demand.
 - Exposure and obsolescence management in times of decreasing demand and for phasing out products.
 - Automated information exchange (incl. constraints updates) with suppliers

Problems with Customer Collaboration

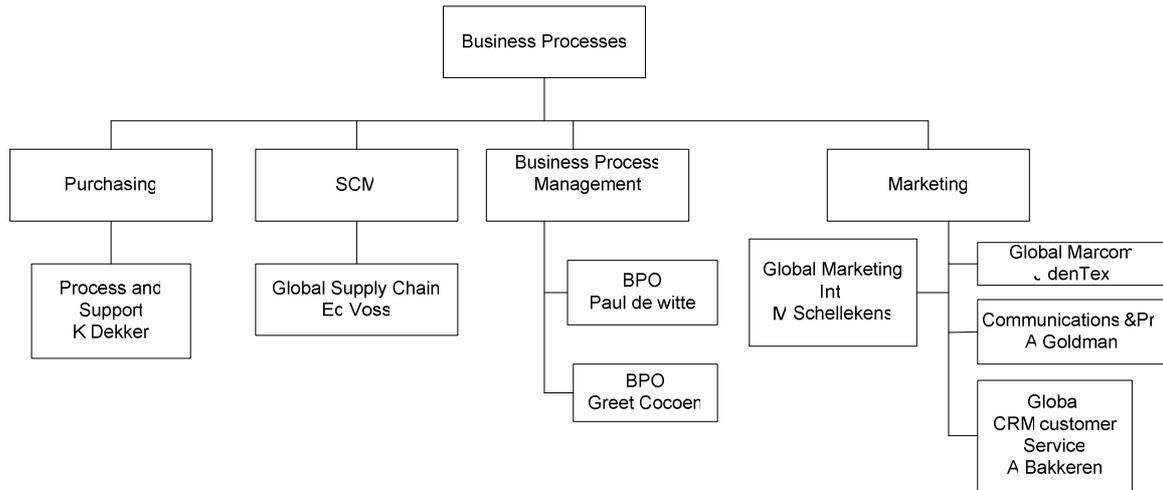
The following problems are gathered from the interviews with the business process owners.

1. Catalogue Management: Up-to-date management of the catalogues for various regions.
2. Improve the accuracy to reach the customer.

3. Request from customers to manage the VMI.
4. Manage Product information from customer's viewpoint.
5. Ease of business with customers.
6. Product information earlier than the product realization

11.4 Appendix 5.2- Organizational Chart of Business Processes

The following is the organizational chart, consisting of Business Processes that were identified for Customer and Supplier Collaboration by IT Demand Management of Philips CE.



11.5 Appendix 5.3 IAF based Questionnaire

Based on main scope of questionnaire of IAF and the scope of the business processes selected from Philips CE. A questionnaire was prepared for C & S Collaboration pilot project for business process architecture with IT applications. The results of the interviews were analyzed for visualization of collaboration between Philips and its Suppliers, & Customers.

The following is the questionnaire list which was used for the interviews with the business process owners,

1. What is the Vision of Collaboration?
2. What is the Strategic Direction of Philips for collaboration?
3. At Philips corporate level?
4. b) At Philips CE level?
5. What are the internal and external business drivers for collaboration?
6. What are the different Business Models for Collaboration
7. What are the business process areas where you have currently collaboration? What is your role in the Collaboration Process?
8. What are the business process areas where you expect (in the future) more or improved collaboration?
9. What are current applications supporting the collaboration process?
10. What are future applications supporting the collaboration process? Expected ones?

11.6 Appendix 6.3 NASCIO based indicators for AMM programs

EA LEVEL 0 - NO PROGRAM

There is not a documented architectural framework in place at this level of maturity. While solutions are developed and implemented, this is done with no recognized standards or base practices. The organization is completely reliant on the knowledge of independent contributors.

What to expect of an organization at this level

Administration

- No Architecture Governance is in place •

Planning

- No plans for developing Enterprise Architecture are in place

Framework

- Architecture processes and templates are not documented

Blueprint

- IT technology standards are not documented

Communication

- Senior Management and agencies are not aware of what enterprise architecture is or the benefits

Compliance

- No compliance process exists within the organization.

Integration

- No program in place for integration across the enterprise

Involvement

- There is no program in place for Enterprise Architecture awareness
- Several independent groups or individuals typically work to solve a single issue

EA LEVEL 1 - INFORMAL PROGRAM

The base architecture framework and standards have been defined and are typically performed informally. There is general consensus that these steps should be performed, however they may not be tracked and followed. Organizations with an Enterprise Architecture framework at this level are still dependant on the knowledge of individual contributors.

What to expect of an organization at this level

Administration

- The need for committees to define the standards and processes has been identified •

Planning

- Need for Enterprise Architecture has been identified
- EA activities are informal and unstructured

Framework

- Processes are ad hoc and informal, processes followed may not be consistent
- There is no unified architecture process across technologies and lines of business

Blueprint

- Documentation of business drivers, technology standards, etc. are informal and inconsistent

Communication

- The need to create greater awareness about EA has been identified
- Little communication exists about the EA process or possible process improvements

Compliance

- The need for compliance to standards has been identified
- Compliance is informal and unstructured
- Compliance cannot be measured effectively, because processes and procedures are not consistent across areas and/or projects

Integration

- The need to document common functions that integrate with an EA Program has been identified
- Projects and purchases are typically done in isolation, resulting in costly purchases and redundant development and training requirements

Involvement

- The organization has identified a need to make staff throughout the enterprise aware of the benefits and concepts of Enterprise Architecture
- EA awareness efforts are informal and inconsistent
- Some groups are unsupportive of the efforts and may cause unrest in the organization

EA LEVEL 2 - REPEATABLE PROGRAM

The base architecture and standards have been identified and are being tracked and verified. At this point in the program processes are repeatable and reusable templates are starting to be developed. The need for product and compliance components to conform to the standards and requirements has been agreed upon, and metrics are used to track process area performance.

What to expect of an organization at this level

Administration

- A need for Architecture Governance has been identified •
- EA Program has begun to develop clear roles and responsibilities
- Governance committees are starting to form

Planning

- The organization has begun to develop a vision for Enterprise Architecture
- Organization has begun to identify EA tasks, and resource requirements.
- Organization has decided on a methodology and begun to develop a plan for their EA Program

Framework

- The basic EA Program is documented
- Processes are planned and tracked
- The organization is beginning to reuse methods for capturing critical EA information

Blueprint

- Business Drivers, and strategic information have been identified
- The need for an EA repository for storage and dissemination of the captured EA information has been identified

Communication

- The need for Enterprise Architecture is being communicated to Senior Management
- EA awareness activities are beginning to emerge or be developed

Compliance

- The organization has begun to develop a compliance process to ensure that projects and enhancements are consistent with EA standards

Integration

- The need for integration to the EA Program Framework (Architecture Lifecycle Processes) has been identified
- The various touch-points between the Management Processes and the EA Program Framework have been mapped (however, no details exist as to how the integration will work)

Involvement

- The organization has begun to develop plans for EA educational sessions and materials to increase the awareness and understanding of the EA concepts and processes
- EA concepts are beginning to be introduced and more consistently discussed in normal day-to-day Meetings

EA LEVEL 3 - WELL-DEFINED PROGRAM

The enterprise architecture framework is well defined; using approved standard and/or customized versions of the templates. Processes are documented across the organization. Performance metrics are being tracked and monitored in relationship to other general practices and process areas.

What to expect of an organization at this level

Administration

- Architecture Governance committees are defined, and have defined roles and responsibilities •
- Authority of the governance committees is aligned to work together smoothly

Planning

- EA Program plans are well-defined, including governance roles & responsibilities, a structured framework and timeline for developing the EA, and financial & staffing resource requirements
- EA activities are carried out according to the defined plan

Framework

- The lifecycle architecture processes have been defined and documented
- Generic architecture processes are being customized for uses by agencies, departments, etc.
- Process models have been prepared
- Templates are used to ensure the capturing of information is consistent

Blueprint

- Classification of existing technology standards is consistent
- Documentation of business drivers, and strategic information is consistent

Communication

- The architecture is well defined and communicated
- Training is provided for Senior management and agencies regarding architecture and its benefits
- Training is provided for members of the EA committees

Compliance

- A formal EA compliance process is well-defined and is an integral part of the EA lifecycle processes
- The EA Compliance process is followed consistently throughout the enterprise •
- A Business Case is required for variance from the EA standards

Integration

- EA Program is integrated with strategic planning and budgeting processes
- Touch-points of management processes to the EA are well-defined

Involvement

- The organization begins to operate as a team, using the defined architecture program and standards
- Senior Management participate in various EA committees
- Business and technical staff participate in EA committees

EA LEVEL 4 - MANAGED PROGRAM

At this point performance metrics are collected, analyzed and acted upon. The metrics are used to predict performance and provide better understanding of the processes and capabilities.

What to expect of an organization at this level

Administration

- Governance roles and responsibilities are reviewed and updated to incorporate changes to the EA Framework

Planning

- EA plans are reviewed and changes are incorporated to improve the EA Program
- The organization captures metrics to measure the progress against the established EA plans
- Goals are being set for the future of the EA Program Plan

Framework

- The organization captures metrics to measure the effectiveness of the EA processes and templates
- Corrective action plans are put in place when deficiencies in templates and/or procedures are identified
- Meetings are held regularly to review modifications to the EA Framework

Blueprint

- Documentation of business drivers and strategic information has become a standard practice
- Documentation and classification of products and compliances has become a standard practice

- The organization captures metrics from the Compliance process to identify the need for updates to
- Blueprint information and/or classifications

Communication

- A formal Communication process is in place and being followed
- The communication process is reviewed and changes are incorporated to improve the communication of architecture activity and detail.
- EA awareness training is incorporated into new employee orientation
- The organization captures metrics to measure the effectiveness of the EA Communication process

Compliance

- Compliance to the EA standards has become common practice throughout the enterprise
- Quality metrics associated with the business cases are captured
- The compliance process is reviewed and updated when deficiencies or enhancements to the process are identified

Integration

- Enterprise Architecture is used to guide development and acquisition
- The organization captures metrics to measure the savings in resources, including time and money
- Costs and benefits, including benefits across agency boundaries, are considered in identifying projects
- Integration procedures are reviewed and the process is updated when problems or new functionality is identified

Involvement

- Personnel throughout the organization have a good understanding of the architecture principals and participate in the EA processes as members of committees or as their projects, etc. have touch points with the architecture
- The organization captures metrics to measure the awareness, participation, acceptance and satisfaction with the EA Program

EA LEVEL 5 - CONTINUOUSLY IMPROVING VITAL PROGRAM

The processes are mature; targets have been set for effectiveness and efficiency based on business and technical goals. There are ongoing refinements and improvements based on the understanding of the impact changes have to these processes.

What to expect of an organization at this level

Administration

- Governance committees proactively review their activities and institute changes to improve their processes
- The organization works with other states to share ideas for improvements to their EA Administration.

Planning

- Action plans are proactively implemented to increase the effectiveness of the EA Program based on captured metrics.
- Organization works with other states to share ideas with focus on improvements to the planning process for the future EA Program.

Framework

- The lifecycle processes are being followed and have become second-nature to the organization •
- Captured metrics are used to identify inefficiencies in EA processes and templates prior to notification of issues
- Organization works with other states to share ideas for improvements to EA processes and templates.

Blueprint

- Captured business and technology information is reviewed in conjunction with the monitoring of new technology and business trends to proactively identify technology that will improve business

- The organization works with other states to share information regarding business and technology trends

Communication

- Metrics are used to proactively identify opportunities for improved communication avenues
- The organization works with other states to share ideas for improvements to the communications processes

Compliance

- Information gathered during the compliance process is used to proactively identify updates to the EA standards and/or framework
- Architecture metrics are used to drive continuous process improvements in the Business Cases
- The organization works with other states to share ideas for improvements to the compliance process

Integration

- The Enterprise Architecture process drives continual reinvention throughout the enterprise
- Business influences Technology and Technology influences Business
- Captured metrics are used to proactively identify improvements to the EA framework or blueprint information and/or integration processes.
- Organization works with other states to share ideas for improved integration, including procurement and project management practices

Involvement

- Agencies and departments work together as contributors to the architecture and its processes
- The organization uses the captured metrics to proactively create action plans for improvement in the EA marketing and educational programs
- The organization works with other states to share ideas for creating an atmosphere for active involvement and participation in EA Program and activities across the enterprise.

11.7 Appendix 6.2.1- Architecture assessment C & S Collaboration

2- Clear = Well defined and documented

1- Partially Clear = partially addressed and documented

0- Unclear = NOT identified or addressed, NOT defined or NOT documented

Table 7

Architectural Score Card	Business	Information	Information Systems	Technology Infrastructure
1. Are the Mission, Vision, and Goals & Objectives of the enterprise architecture set?	2	2	2	NA
2. Is the Scope of the enterprise architecture program defined?	2	2	2	NA
3. Is the Form & Function Level of deliverables defined?	2	2	2	NA
4. Is the Business & IT Strategy defined?	0	0	0	NA
5. Are the Guiding Principles & Drivers defined?	2	2	2	NA
6. Are the Key Performance Indicators defined?	0-1	0-1	0-1	NA
7. Are the Critical Success Factors defined?	0-1	0-1	0-1	NA
8. Are the Critical Stakeholders defined?	2	2	2	NA

<i>Contextual Level</i>	11.5	11.5	11.5	NA
9. Are the Collaborative Parties involved defined?	2	2	2	NA
10. Are the Contractual Agreements defined?	NA	NA	NA	NA
11. Are the Interoperability Standards defined?	0	0	0	NA
12. Are the related Law & Regulations defined?	0	0	0	NA
13. Is the Ownership of Information defined?	NA	NA	NA	NA
14. Are the business Requirements defined?	2	2	2	NA
15. Are the Non-Functional Requirements defined ie. Quality attributes?	2	2	2	NA
16. Are the Concepts in use defined?	2	2	2	NA
17. Are the Security Requirements defined?	2	2	2	NA
18. Are the Governance Requirements defined?	2	2	2	NA
<i>Conceptual Level</i>	10	10	10	0
Logical Level	NOT Considered /Applicable			
Physical Level	(NA)	NA down below	NA down below	NA down below
Transformational Level				
<i>All Level</i>	21.5	21.5	21.5	NA

11.8 Appendix 6.2.2-Architecture Assessment of Total Philips CE

2- Clear = Well defined and documented

1- Partially Clear = partially addressed and documented

0- Unclear = NOT identified or addressed, NOT defined or NOT documented

Table 8

Architectural Score Card	Business	Information	Information Systems	Technology Infrastructure
19. Are the Mission, Vision, and Goals & Objectives of the enterprise architecture set?	2	0	2	2
20. Is the Scope of the enterprise architecture program defined?	2	0	2	2
21. Is the Form & Function Level of deliverables defined?	2	0	1-2	1
22. Is the Business & IT Strategy defined?	2	0	2	2
23. Are the Guiding Principles & Drivers defined?	2	0	1-2	1-2
24. Are the Key Performance Indicators defined?	2	0	2	2
25. Are the Critical Success Factors defined?	2	0	2	2
26. Are the Critical Stakeholders defined?	2	0	2	2
<i>Contextual Level</i>	12	0	15	14.5

27. Are the Collaborative Parties involved defined?	2	0	2	2
28. Are the Contractual Agreements defined?	2	0	2	2
29. Are the Interoperability Standards defined?	2	0	2	2
30. Are the related Law & Regulations defined?	2	0	2	2
31. Is the Ownership of Information defined?	1	0	1	NA
32. Are the business Requirements defined?	2	0	2	2
33. Are the Non-Functional Requirements defined ie. Quality attributes?	0	0	0	0
34. Are the Concepts in use defined?	2	0	2	2
35. Are the Security Requirements defined?	2	0	2	2
36. Are the Governance Requirements defined?	2	0	2	2
<i>Conceptual Level</i>	8	0	8	8
37. Are there deliverables at logical level?	2	0	2	2
38. Are the critical logical design decisions defined?	NA	NA	NA	NA
39. Are the critical logical design decisions traceable?	NA	NA	NA	NA
40. Are the Logical Description Methods & Techniques defined?	NA	NA	NA	NA

41. Are you using tools for modelling at the logical level?	NA	NA	NA	NA
42. Are there Logical Standards?	NA	NA	NA	NA
<i>Logical Level</i>	NA	NA	NA	NA
Physical level				
Transformational level	Not Considered/Applicable (NA)	NA	NA	NA
<i>All Level</i>	31	0	34	32.5