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The Selection, Modeling and Training Framework (SMTF) for Managers in Business Innovation and Transformation Projects: An Executive's Business Architecture and Modeling Strategy

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Abstract: Today business companies are struggling for survival in a very competitive market; and it is not a top secret that the main path for solid business sustainable future, is the continuous process of business transformations to optimize the business companies' resources. Unfortunately, most of the business transformation projects fail, because of the very difficult business transformation project's implementation phase. In order to insure the successes of such business transformation projects and to follow the (re)structuring process of the business company, which is a part of the standardized global economy, it is recommended to the apply business modeling and integration strategy and standards in the business transformation project's implementation phase. Today many standards exist and they are very advanced; these standards and their related tooling environments can help in the unbundling of the actual traditional business environments, through the execution of business transformation projects; to help the business company become part of a dynamic business ecosystem; and to interconnect it easily to the standardized global economy using a modeling strategy. An important factor in the business transformation project of a business environment into an innovative is the role of business modeling and the integration of atomic business services and the business transformation manager must have the knowledge for these two domains. The profile of such a manager has not been sufficiently investigated and this research paper focuses on the business transformation manager's business modeling skills and the related applied modeling strategy; where he/she (he or she, in further text "his" for simplicity reasons) must be capable to design a modeling pattern for the transformed business environment. The business environment must be unbundled into a pool of business processes and atomic business services; this unbundling procedure will help the business environment face its uncertain future and to become a part of the interconnected global economy. The specification of the optimal business transformation manager profile's modeling and integration skills is one of the goals of the authors' selection, modeling and training framework's related research. In this research, the authors try to prove that business modeling is cornerstone for a strategy on how to successfully transform business environments (The Economist, E-management, 2000). These modeling-based transformations need a specific set of skills, which are crucial for the difficult implementation phase (Trad, Kalpic, IMRA, 2013; Trad, Kalpic, IMRA,

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USA, 2014; Trad, Kalpic, IMRA, UK, 2014).

Key words: modeling strategy; business architecture; atomic business services; restructured global economy; business transformation project; business transformation manager and failure rates

JEL codes: M1

1. Introduction and Business Domain

"Chief information officers say, supporting business transformation projects is the top objective for business-outcome-driven enterprise architecture. Enterprise architects, business architects and information technology leaders can learn how one enterprise architecture team delivers detailed analysis to design and execute the successful reinvention of an industrial and automated products company" (Gartner, ID: G00246943, 2013). That implies that business transformation projects are crucial for future of any business and hence an adequate business modeling strategy must be established.

The business transformation manager must insure: (1) A modelling approach that unites all domains in the organization and to improve collaboration, in order to make the business transformation project successful; and (2) that he/she has the technical skills to model the complete solution and equally important, also require skills to insure consensus between all affected stakeholders (Uppal, Rahman, 2013).

1.1 Failure Rates in Business Transformation Projects

This research project delivers managerial recommendations for the business transformation manager's selection, modeling strategy establishment skills and training (and education) skills. The business transformation manager has to manage the technical implementation phase of complex business transformation projects; knowing that business transformation projects implementation phase is the major cause of very high failure rates (CapGemini, 2007, 2009); as shown in Figure 1. The implementations of such business transformation projects require a specific set of enterprise and business architecture strategy knowledge. The authors have based their research on the main fact that only around 12% of business organizations successfully terminate innovation-related business transformations projects (Tidd, Bessant, 2009). It is known that organizations that are successful in managing business transformation projects, outperform other companies in growth and financial performance (Tidd, 2006). Therefore, there is an essential need for more research on the business transformation manager's profiles, especially her/his modeling skills and to enhance the related managerial recommendations.

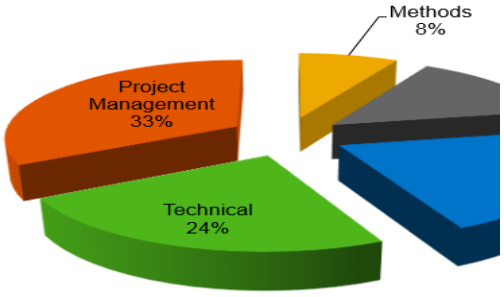

Figure 1 The Difficulties in Managing Business Transformation Projects, Sub-divided by Activities (Uhl, SAP, 2013)

The biggest danger in business transformation projects is to over simplify the very complex and technical implementation phase; which sometimes resembles to a structured chaos management. A successful finalization of the implementation phase can give an important business advantage and guarantee the transformed company's

survival (Farhoomand, 2004). The business transformation manager must implement and apply a in-house heuristic's based reasoning mechanism that is founded on the measurement of success, that consults critical success factors. These critical success factors can be also applied to the business transformation manager's selection, modeling strategy establishment, training needs and to estimate the healthiness of the business transformation project. Business transformation managers can't manage what you can't measure (Chaffey, Ellis-Chadwick, Johnston, Mayer, 2008), this paper's authors add that you can't manage what you cannot model or do not understand. The selection, modeling strategy establishment and training can assist managers' in the profile definition and in the initial coaching in modeling complex business transformation projects, where innovation and standards are used; that will also help to minimize the failure rates, through the application of an atomic iterative approach.

1.2 Complexity in the Implementation Phase

The selection, modeling skills and training framework gives the possibility to support the business transformation manager's modeling capacities are in question. In order to manage the overall complexity and achieve a successful integration of business services; hence achieve the business transformation project's success. That implies that the mentioned framework main philosophy is the modeling strategy skills of the business transformation manager, who must be capable of putting together a standardized modeling strategy and architecture for the business transformation project's implementation phase. This strategy and architecture focuses on the creation and development of the "transformation business program" and "solution projects" to support the architecture of business transformation projects (TOGAF, Architecture Transformation, 2007).

Business transformation project's management, face: (1) limitations of traditional business management methods; (2) integration problems in traditional information system management approaches; (3) complexity of business transformation projects' modeling architecture. To counter these complexity issues, there is a need for holistic (meta)management of continuous and extensive changes. On these changes the organization's future success and its survival strongly depend (SAP, BTA, 2014). The holistic management and modeling strategy of complex and business systems need the coordination between various teams with different professional cultures; young professionals can hardly cope with the complexity in the implementation phase. A very dynamic business and avant-garde technology model is required there.

These vital business projects have a very high failure rates and although a lot has been written on the complexity and the important failure rates of business transformations integrating innovation, the rate is growing. To confront this phenomenon, there is a need for a basic profile that is flexible and intelligence based, that has cross-functional modeling capacities. Transformed organizations and business transformation managers need more than basic business information systems knowledge and traditional educational techniques to exploit the inter-related avant-garde modeling technologies in order to successfully conduct business transformation projects. Managing complexity needs modeling strategy skills and education. These failure rates are caused by the lack of a holistic approach (TOGAF, 2014; Uhl, Gollenia, 2012).

In this paper the authors would like to introduce the atomic and iterative "1:1" concept, in order to promote an efficient modelling strategy that would simplify (or atomize) the business transformation project's implementation phase and increase the chances that the business transformation projects succeed. This strategy is mainly a "bottom-up" approach that forces the architect of adaptive business environments to unbundle the monolithic business environment and then to the implement the end business system. Therefore the authors think that a successful business transformation project (and its enterprise architecture) blueprint should be made up of:

(1) an architecture and modelling of an unbundling strategy; for breaking down the business functionalities into atomic business services and (2) a business architecture for assembling atomic business services into business scenarios (Capgemini, 2007; Capgemini, 2009).

1.3 Architect of Adaptive Business Environments

The business transformation manager must have extensive experience in business transformation projects' modeling and architecture; to manage the implementation phase; and that is why she/he needs empirical hands-on skills. This research process showed that the business transformation manager is an architect of adaptive business environments. The research was mainly based on the qualitative hyper-heuristics pattern that can be used to tune the selection, modeling skills and training needs framework factors to estimate the risks of such a project. A concrete selection, modeling strategy establishment and training environment was prototyped and the research defines the managerial recommendations for business transformation managers; where her/his educational background is an essential factor. The actual business and educational environments produce general profiles that can hardly cope with heterogeneous complexity and fast changes. These high frequency changes are mainly due to the hyper-evolution of technology (Trad, Kalpic, EDEN, 2014).

The role of the holistic meta-management approach, implies that the business transformation manager has: (1) a holistic profile with cross-functional skills; (2) with a business modeling background (HEC, 2014); (3) is a flexible and intelligence based person; who is capable to align business requirements, business modeling, business services, information systems' resources and the business entity's strategic objectives (TOGAF, 2014).

1.4 Modeling Strategy — A 1:1 Mapping Concept

To manage the complexity in the implementation phase; an architecture concept must integrate business standards; that is the main concern in keeping the architecture pattern feasibility with so many methodologies and artefacts; that establishes a real world iterative model (TOGAF, 2014). The proposed architecture presents an atomic business services pattern to keep every business artefact simple (or atomic); at the same time these atomic business services must be well classified and "standard" wise interconnected. This simplicity is achieved by the application of the "1:1" mapping rule that is based on atomic business services (Fowler, 2014).

1.5 Atomic or Micro Business Services

The domain of micro-service architecture has advanced and it describes a way of designing business environments as business processes of an independent set of atomic business services. Today there is no precise definition of such an architectural style, there are certain common characteristics around organization around business capability, business intelligence, and decentralized control of business environments (Fowler, 2014). The resultant transformed agile business environment becomes fully automated by the unbundling of the monolithic business environment; that was mainly based on manuel business activities. This unbundling is mainly achieved by using atomic business services. The unbundling process starts with the classification of atomic business services into various categories. The business transformation manager must have extensive knowledge of business services and service oriented architectures for business transformation projects to unbundle the actual business monolithic environment into an automated bank of stateless atomic business services. This process is setup up so that the business transformation manager can rationalize the enterprise's resources and synchronize them with the business processes thru the use of a standardized enterprise architecture framework.

The business service-oriented architecture's paradigm has become a widely adopted solution for enterprise business environments. Hence the atomic business services architecture pattern promises: (1) successful business modeling and integration improvement, (2) business and information technology alignment, (3) traditional

business environments reusability, and (4) fast adaptability to business transformation projects, and (5) changing requirements (Kabzeva, Niemann, Müller, Steinmetz, 2010).

1.6 Lean and Automated Business Systems for an Agile Business Enterprise

The business transformation project's success is also measured by intangible factors and benefits; because they insure its long-term business survival. Business environments; like the agile mechanist organizations; need to implement a generic approach based on business service oriented architecture, that has created a deep paradigmatic shift in the business world. It is replacing colossal monolithic traditional business systems with its traditional business applications, which split across different business corporations. Atomic business services in the form of web services calls are a paradigm shift within a paradigm shift; this is a new business revolution within the innovation revolution. Atomic business services break-up the traditional business environment of an application into independent set of services that can interact together and roam across the internet, with a standardized, unique and flexible interface protocol. The selection, modeling strategy and training proposes using the atomic business services architecture pattern, to help business transformation managers (or enterprise architects and system designers) in building modern lean (or agile) business environments; using a bottom-up approach (Trad, Kalpic, ITI, 2002).

2. The Selection, Modeling Establishment Strategy and Training Framework

Business transformation project's goal is to build agile business environments and for that the selection, modeling strategy and training framework proposes a set of real world managerial recommendations and a concrete modeling strategy. This framework is in the form of a proof of concept, is made up of the following concrete components and sources:

(1) The cockpit, a client component, that manages all the other selection, modeling strategy and training components;

(2) The survey sub-system that is a dynamic document that reflects the survey results.

(3) The aggregator samples and aggregates the presented survey results.

(4) The charting component represents in the surveys' results; in the form of charts and diagrams artifacts.

(5) The selection, modeling strategy and training system can receive input files from a flat file or a relational database.

(6) The heuristics module represents the research's applicative action research model that is the basis of the grounded hyper-heuristics approach.

(7) The Gartner Inc. sources.

2.1 The Enterprise and Business Architecture Skills of the Business Transformation Manager

The selection, modeling strategy and training uses already established standards and recognized sources for enterprise and business architecture's skills (TOGAF, 2014); it builds on top of that these recommendations a modeling strategy on how to finalize the business transformation project's implementation phase.

2.1.1 The Business Modeling Skills

Business modeling strategy establishment skills, as shown in Figure 2 typically comprises: (1) business use cases design; (2) business process modeling; (3) business integration; (4) strategic planning; and (5) atomic business services modeling etc... The business transformation manager must understand the business requirements, then he has to probe for business information, influence business transformation project's team members, facilitate

consensus in the implementation phase, synthesize and translate strategic requirements into actionable tasks, manage factors based risks, etc… The business transformation manager participates in the discovery, modeling and design/documentation of the customer's business scenarios that are the initial driving phase for the solution. The business transformation manager uses the requirements and develops well-formulated business models of the various components for the final agile business environment, and then he has to tune these business models through iterations to fit all business scenarios. The modeling strategy is based on multiple views that are based on a pool of business processes and business services. The business transformation manager is responsible for the overall business transformation project business architecture integrity, modeling and for the maintenance of the modeling pattern that is based on atomic business services. The business transformation manager also ensures the coordination by using atomic business service, and the liaison between the functional groups (especially the management, implementation and marketing groups) to ensure that the business transformation project is realized. The business transformation manager provides and maintains these business models and atomic business services in a business catalog that has to be implemented. He also represents the organization's view of the business transformation project business architecture and modeling strategy (TOGAF, Skills, 2011).

© The Open Group Roles	Architecture Board Member	Architecture Sponsor	Enterprise Architecture Manager	Enterprise Architecture Technology	Enterprise Architecture Data	Enterprise Architecture Applications	Enterprise Architecture Business	Program/Project Manager	IT Designer
Business Skills &Methods									
Business Case	3	4	4	4	4	4	4	4	2
Business Scenario	2	3	4	4	4	4	4	3	2
Organization	3	3	4	3	3	3	4	3	2
Business Process	3	3	4	4	4	4	4	3	2
Strategic Planning	2	3	3	3	3	3	4	3	1
Budget Management	3	3	3	3	3	3	3	4	3
Visioning	3	3	4	3	3	3	4	3	2
Business Metrics	3	4	4	4	4	4	4	4	3
Business Culture	4	4	4	3	3	3	3	3	1
Legacy Investments	4	4	3	2	2	2	2	3	2
Business Functions	3	3	3	3	4	4	4	3	2

Figure 2 The Open Group's Architecture Framework Business Modeling Strategy Skills Table (TOGAF, Skills, 2011)

2.1.2 The Enterprise Architecture Skills

© The Open Group Roles	Architecture Board Member	Architecture Sponsor	Enterprise Architecture Manager	Enterprise Architecture Technology	Enterprise Architecture Data	Enterprise Architecture Applications	Enterprise Architecture Business	Program/Project Manager	IT Designer
Enterprise Architecture Skills									
Business Modeling	2	2	4	3	3	4	4	2	2
Business Process Design	1	1	4	3	3	4	4	2	2
Role Design	2	2	4	3	3	4	4	2	2
Organization Design	2	2	4	3	3	4	4	2	2
Data Design	1	1	3	3	4	3	3	2	3
Application Design	1	1	3	3	3	4	3	2	3
Systems Integration	1	1	4	4	3	3	3	2	2
IT Industry Standards	1	1	4	4	4	4	3	2	3
Service Design	2	2	4	4	3	4	3	2	2
Architecture Principles Design	2	2	4	4	4	4	4	2	2
Architecture Views & Viewpoints Design	2	2	4	4	4	4	4	2	2
Building Block Design	1	1	4	4	4	4	4	2	3
Solutions Modeling	1	1	4	4	4	4	4	2	3
Benefits Analysis	2	2	4	4	4	4	4	4	2
Business Interworking	3	3	4	3	3	4	4	3	1
Systems Behavior	1	1	4	4	4	4	3	3	2
Project Management	1	1	3	3	3	3	3	4	2

Figure 3 The Open Group's Architecture Framework Enterprise Skills Table (TOGAF, skills, 2011)

As shown in Figure 3, another perspective of skills is business transformation project architecture modeling skills, typically comprises: (1) detailed business modeling; (2) business building component design; (3) business applications and actor's role design; (4) standardized business integration, etc… The business transformation manager has the responsibility for business architectural design and he coordinates business technical reference model level; she/he has to often lead a group of the "segment architects and/or solution architects" related to a given business transformation project's sub-project (TOGAF, Skills, 2011).

2.2 "S" for the Selection of the Business Transformation Manager

The business opportunity, problem and implementation phase of such business transformation projects causes high failures rates, therefore there is a need for a risk measurement concept and a predictive approach for the business transformation's manager's profile and role selection formalization. The mentioned framework needs a risk measurement concept approach for the business transformation manager's profile and role selection. The riskiest factor in the transformation process is the role and of the profile of the business transformation manager; more specifically the influence it has on the concrete implementation phase of business transformation project; the authors defined a set of related managerial recommendations of the optimal business transformation manager profile.

2.3 "M" for the Modeling Strategy by the Business Transformation Manager

The business modeling strategy of business transformation project is based on existing standards which are supported by many tools and methodologies. This article proposes how to define the modeling strategy of integration of these standardized methodologies and avoid problems in the implementation phase.

2.4 "T"for the Training of the Business Transformation Manager

The selection, modeling strategy establishment and training framework defines a training program; that can is based on the concept of having three skill groups: (1) business requirements modeling; (2) business process modeling; and (3) information systems modeling and management. Future business transformation managers need to have the skills to model the company's "unique" business architecture and to swiftly identify business transformation iterations, in order to effectively implement them into their business processes as the basis for a sustainable profit based agile business environments. According to the latest Gartner study, the ability to apply versatile and extensive modeling skills in managing and modeling business transformation processes is the most important business priority for a successful business transformation project (Gartner, 2014). The implementation of such business processes requires a specific set of business architecture, implementation, educational and training set of skills (Trad, Kalpic, EDEN, 2014).

3. Research Design and Methodology

This research's project flow, as shown in Figure 4, is based on a grounded hyper heuristics reasoning model that is based on factors. Unfortunately because of the type of the research project, which may take for each interation more than five to ten years, it was not realistic to adopt the full version of this approach. Business transformation projects take a very long time and are difficult to be used for experimental and research purposes. So how is it possible to quantify the data for such a research project?

3.1 The Grounded Hyper-heuristics Pattern, a Mixed Model

Hyper-heuristics are increasingly used in business functional and combinatorial optimization. Instead of trying to solve a problem using a static heuristic, a hyper-heuristic approach attempts to find a combination of heuristics to give a solution to the problem (and in turn it makes it suitable for a class of problem instances).

Hyper-heuristics have been little explored in data mining business transformation fields. Here we apply a hyper-heuristic approach for problem solving, by searching a space of decision tree induction algorithms; as shown in Figure 5. The result of the hyper-heuristic search process can be a new decision tree (Vella, Corne, Murphy, 2009). In this research the hyper-heuristics approach is used, in order to find a combination of heuristics that solve a complex research question. The authors have decided to apply an adequate research model rather than try solving a simplistic problem using a fixed heuristic or descriptive statistics. In fact, the grounded hyper-heuristics can be used as a template to solve future problems related to profile selections. The research showed that the business transformation manager is an architect of adaptive business information systems. The initial selection, modeling and training framework (STF) concept comes from the authors' professional experiences, while during this phase one of the authors designed and implemented an intelligent re-scheduling system (IRS) for the SwissAir airline. The IRS was based on the heuristics pseudo beam search decision tree that strongly influenced the STF's heuristics model (SwissAir, 1998).

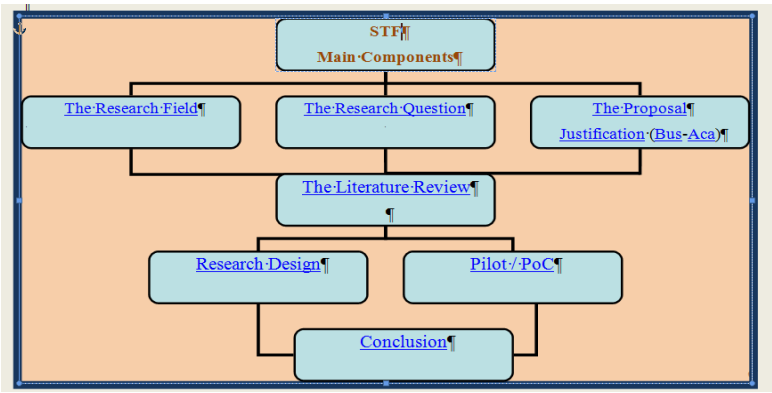

Figure 4 The Research Project Flow Diagram (Trad, Kalpic, Centeris, Literature Review, 2013)

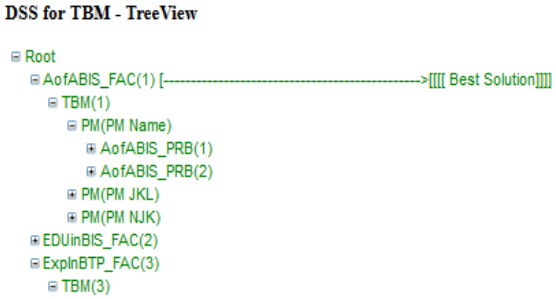

Figure 5 A View on the Selection and Training Framework's Tree Solution Node

This research is based on a mixed "ground hyper-heuristics based reasoning model", shortly named the grounded hyper-heuristics. As this research aims, to qualify the business transformation manager's: (1) profile capacities, (2) background and (3) modeling skills, the requested business transformation manager characteristics are fed as factors in the grounded hyper-heuristics; that in turn should deliver the optimal business transformation manager tunable profile. Business transformation managers, who are also basically technocrats and advanced knowledge workers, design and modeling pattern for the transformation of the business environment in a pro-active hands-on manner. These "requested" factors are also fundamental for the future coordination of business transformation projects; within the global transformed business enterprise. It is an enterprise that is eventually transformed into an "Enterprise 2.0" environment.

The initial selection, modeling strategy establishment and training framework's concept come from the authors' professional experiences, while during this phase the author designed and implemented similar systems. The heuristics module represents the research's applicative action research model that is the basis of the grounded hyper-heuristics approach (grounded hyper-heuristic. The grounded hyper-heuristics component can be launched independently, after that the business transformation manager's basic profile has been defined. Afterwards other factors, are shown as the children of the parents in the decision tree, Figure 5 This component is used to tune the business transformation manager's profile required by the business transformation project's requirements.

3.2 The Selection, Modeling Strategy Establishment and Training Framework's Factors

This reasoning model offers the optimal business transformation manager's skills needed requested by complex business transformation projects. These skills are fed in the form of factors into the reasoning model. That is in fact based on a mixed research method, which will deliver the most important business transformation manager's characteristics. These factors are used also to manage the business transformation project's risks; because there are no standard decision systems that can be applied for such projects, therefore the company can build its own decision support system, with its own list of critical success factors and the weightings strategy.

3.3 The Gartner Group Sources and the Role of Experience

As already explained this research project has a minor quantitative part, because of its nature, that is why the authors have decided to use widely used data and information sources, like the Gartner Group Institute.

4. Recommendations and Roadmap

4.1 The Hype Cycle — Business Architecture and Modeling Strategy Establishment

In the second edition of Gartner's hype cycle for enterprise transformation architecture, that describes aspirations are running high for "enterprise architecture & modeling strategies" and their related applicable business transformation architecture patterns, it describes also the underlying avant-garde technologies; it concludes that business artifacts lag maturity and concrete market penetrations. These are at the tipping point of broader support and adoption status and on completion of the hype cycle for enterprise transformation architecture. Gartner reflections on the mentioned strategy looks as follows (Ylimäki, 2006; Schekkerman, 2004; Gartner, G00201646, 2010):

(1) The Gartner's hype cycle methodology identified two clear business enterprise transformation architecture generations:

- Early-generation enterprise architecture, which corresponds to the right side of the hype cycle, is considered to be a mature business modeling strategy and information technology-oriented disciplines, such as enterprise technology architecture and architecture assurance, that have been supported by the traditional or holisitc approach, which is the information technology standards. This corresponds to the traditional business environments transformation projects management.
- Actual enterprise transformation architecture, which is the latest generation of enterprise architectures that is emerging today, which reveals a new set of business practices, avant-garde techniques and holistic viewpoints; business architectures and modeling strategies… This approach that clients are employing to try to integrate and engage with the business as a partner.

(2) that the evolution of enterprise transformation architecture is focused on the following:

- Engaging and integrating with the standardized global business environment.

- Approaching business transformation project architecture with a focus on the human factor, information &data modeling, governance and business modeling strategy; and not just on technology.
- Supporting hyper-connected enterprises, through atomic business services integration.

(3) Today these two generations of enterprise and business architectures continue to exist and cohabit. However, the aspirations (and thus the hype) in enterprise and business architectures are very high, as several of the entries, including enterprise and business architectures overall, begin to shift toward the regions of high productivity and business automation. Gartner's surveys also reflect this aspiration, that was done in December 2010, shows that 87% of organizations that were surveyed in that in the European and Middle-east area and 66% in North America, affirmed that their highest priority focus for enterprise and business architectures during the years 2011 and 2012 was the aligning the business modeling strategy and information technology vision and strategy; that delivered a strategic business value and enabling a major business transformation project.

4.2 The Role of Standards and Avant-garde Technologies

By standardizing and classifying the behavior and interoperation of atomic business services, it becomes possible to limit the impacts of frequent changes and it also helps to understand in advance the chain of business transformation problems (TOGAF, Directory, 2011). Today most of the business resources and components that make up the business environment are standardized. These standards are: business requirements, business process oriented knowledge management, business process modeling, service oriented architecture, the open group's architecture framework… The business transformation manager will rely on these standards to integrate his company in the global economy, using modeling standards:

(1) The role of business process modeling standards: The evolution and dominance of business process modeling imposed a de facto standard for building and integrating business environments in the standardized global economy. It also shifted the business project management and business transformation manager profiles from pure information technology profiles to business management profiles. That enabled the business transformation project to become a business driven activity, although it had traditionally been driven by information technology managers. The 2012 year's hype cycle for business process management highlights a range of emerging and standardized technologies and methodologies that enable business process modeling to continue to deliver significant, tangible business value to organizations, regardless of industry, culture and size (Gartner, BPM Hype, 2012); business process modeling will be the dominant technology for a long time.

(2) The role of business process integration standards: The selection, modeling strategy and training focuses on the business transformation manager's skills related to his capabilities in business process integration of avant-garde business process through the use of advanced enterprise application integration infrastructure (Gold-Bernstein, William, 2005). The global inter-business environments business process integration is achieved by the use of business process integration techniques.

(3) Business enterprise's processes and knowledge integration standards: business process integration techniques, knowledge services and business services-oriented architecture, are the basis of business enterprise's processes integration that respects business knowledge standards; that is achieved with the use of business process oriented knowledge management standards. This type of adaptive knowledge management model can be used dynamically (Süß, 2011; Gartner, BPM Survey, 2012), to enhance just-in-time knowledge. The business transformation manager can use metrics (or the critical success factors) to integrate decision making into the BPs; in order to improve the business environments responsiveness to future business transformation project's problems (Markides, 2011).

(4) Business documents standards: Modern business environments are based on lean extensible markup language architectures; therefore the business transformation manager must have skills in the design of markup language-based business related documents. This standard is due to business and technology standards that have been boosted by Fortune 500 companies. Business environment business documentation loads have been standardized on the basis of the markup language format (Christensen, Thomsen, Thomsen, 2007).

(5) Governance standards: applying overall governance for business transformation projects and its agile business environment artifacts is crucial for its success. One of the main reasons for developing a modern business transformation project is to apply governance and monitoring to all its lean business environment's components where financial governance and control of transformed business environments must be automated. It is expected that the business transformation manager is familiar with financial and fraud auditing standards, like Sox-Cobit, Basle II/III, CPA; and he has to have the capacity to integrate them in the business environments transformed processes (TOGAF, ACF, 2014).

(6) Rich internet applications and web 2.0/3.0 standards: The business transformation manager must understand the role of the standardization of various business client technologies such as dynamic web pages, style sheets and the link to the agile business environments. That will help him in the design and implementation phases of the business transformation projects. These technologies are also the basis of the integration of social networks in the business environments. The business transformation manager must have also deep knowledge in social networks and eventually the selection, modeling strategy and training will guide him to enhance his knowledge in that field.

(7) The standardization stack: represents various levels of business resources and technologies needed for the business transformation project standardization. This business standardization stack, is made up of: (1) a lower layer, which is the business infrastructure, (2) atomic business services catalog, and (3) an upper layer that contains the enterprise's business modeling and architecture.

4.3 Enterprise Architecture as a Holistic Architecture — The Case of Capgemini

The open group's architecture framework is a global concept that that integrates major standards; the question is how to keep the enterprise architecture project feasibility with so many methodologies and artefacts; and in the same time insure the real world iterative model; as shown in Figure 6. Enterprise architecture is a methodology for a holistical for leading enterprises to model the business transformation project and to insure an optimal business vision and business outcomes. The output of the transformation architecture is the modeling and communication of business-outcome-driven artifacts that support decision making processes needed for the evolution of the future-state architecture required to deliver the desired business direction. The scope of the business transformation architecture and modeling pattern must include: business cases, actors, business processes, information models, business applications, business models and technology for the new transformed agile enterprise, which standardizes the automated relationship to its external environment. A differentiating characteristic of the discipline of business transformation architecture is that the selection of the right modeling pattern to deliver the expected business outcomes that will reflect its business strategy and future-state vision. Worldwide groups, like Capgemini, where Gartner group's studies prove, that they rely on enterprise architecture (or business transformation projects) frameworks and business transformation managers, enterprise architects (and modelers), rather than leading with traditional business outcomes. Business transformation managers (or enterprise architects) should use this Gartner analysis, which one in a series on enterprise architecture, to analyze Capgemini's vision, strategy and strengths in delivering "business-outcome-driven" enterprise architecture (Gartner, ID: G00247547, 2014).

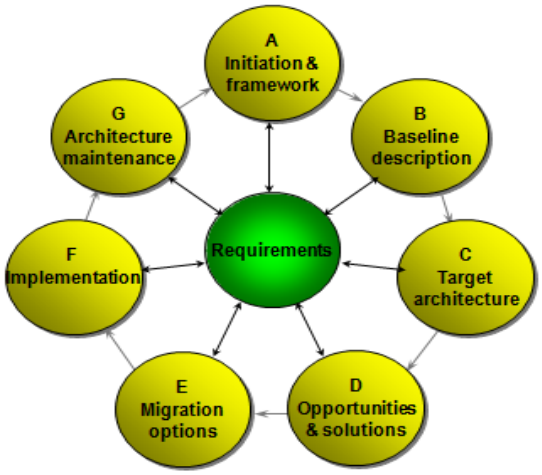

Figure 6 The Diagram Shows the Open Group's Architecture Framework's Main Components (Gartner, G00246931, 2013)

Gartner's research activities suggest also that a high-quality business transformation architecture conforms and maps to the designed business requirements, and applies its purpose (Gartner, G00247547, 2014). That defines a holistic approach with the following disciplines:

(1) Business modeling and architecture design

(2) Information systems management

(3) Organizational engineering

All these disciplines should be based on the atomic business services; where the business transformation manager must take into account that defining a holistic approach can provoke the following types of problems:

(1) Atomic business services architecture can generate a hair ball effect; therefore there will be a need for a strong classification of these services.

(2) Antagonism and resistance between the business entities and information technologies entities.

4.4 Business Outcome Approach

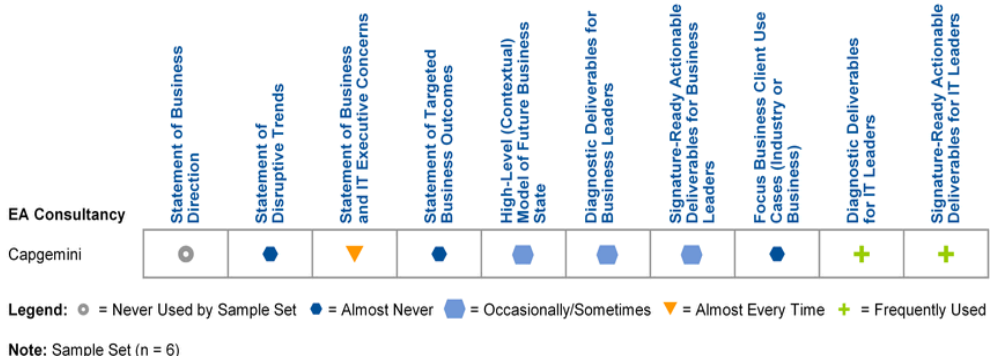

Figure 7 Capgemini's Use of Business-outcome-driven Business Transformation Architecture in Client Engagements

Business environments become more sophisticated and very complex, the challenges facing business transformation projects are shifting away from questions of primitive efficiency and automation towards questions of complexity of management, hyper-time transformations and atomized business agility. Complex transformed environments of existing monolith business systems and actual business information systems create highly complex environments where business transformation become more and more risky and their impacts on changes

become harder to predict (TOGAF, Directory, 2011). To achieve this complex goal there is a need to unbundle the business environment using atomic business services.

4.5 Atomic or Micro Business Services

Cross-functional business process management in the open group architecture framework adoption concept, permits that the business transformation manager holistically manages the business transformation project; and to link the business environment's components using the business information technology, automated business processes and atomic business services, as shown in Figure 8. Theunbundling of the monolithic business environment, is modelled by the business transformation manager (or architect of adaptive business environments) who must have extensive knowledge of business services oriented architecture for business transformation projects; she/he breaks down the actual monolithic business environment into an automatized bank of stateless business services. This is basically an alignment of the business environment's resources that is based on the 1:1 concept. Business environments must support a variety of different business actors including browsers, mobile browsers and native mobile applications. The business environment handles atomic business service requests by executing business processes (Richardson, 2014).

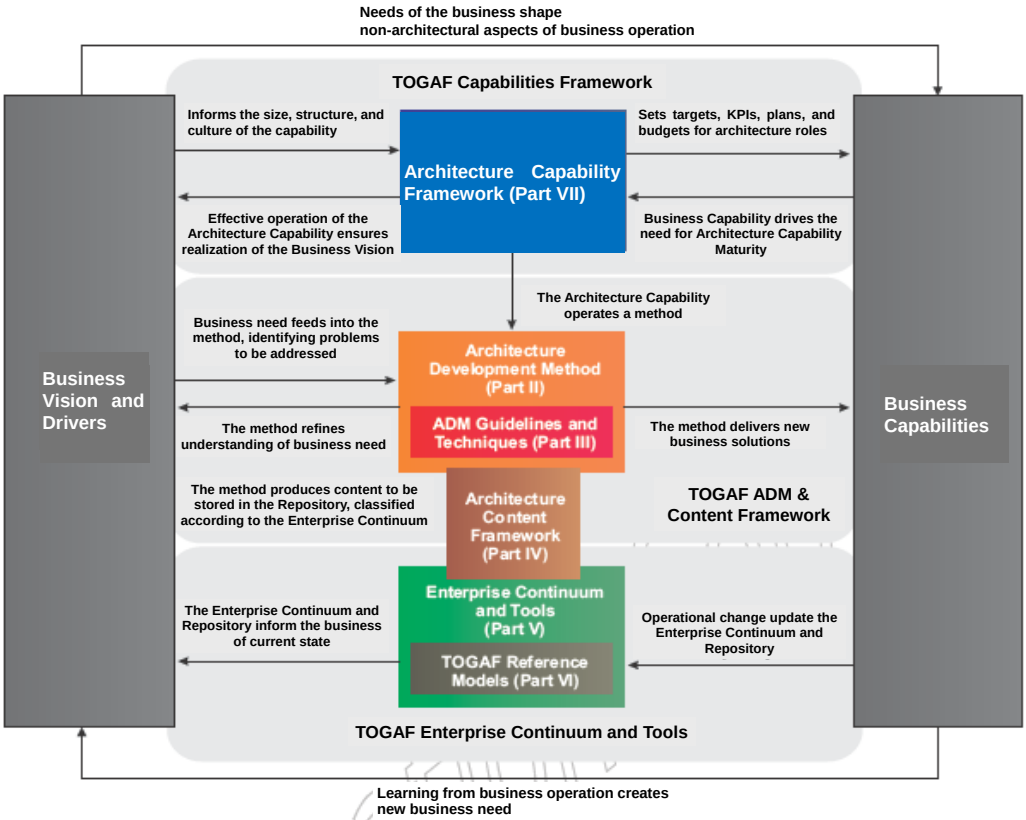

Figure 8 Linking Business to Business Information Technology

4.5.1 Business Services Modeling Strategy

In the case of Capgemini, the business services architecture framework's strategy, methodology and transformation environment, upstreams business scenarios which are not altered to integrate traditional service oriented architecture. Capgemini also believes that a strong business and modeling architectural foundation is needed for a successful business transformation project; this article's authors share this concept. Capgemini is a

member of the open group, where it actively works on the adoption of international certification standards for business and enterprise architects; it participates also in the alignment of the relevant sections of the open group's architecture framework approach; where its service oriented architecture framework provides a conceptual and logical view of services across business, information, application and technology components of the its framework; as shown in Figure 9 (Gartner, ID:G00129890, 2005). The business transformation manager must adopt an established business service oriented architecture framework and the authors recommend a bottom-up approach, where the atomic business service development strategy is the business transformation project is its entry point.

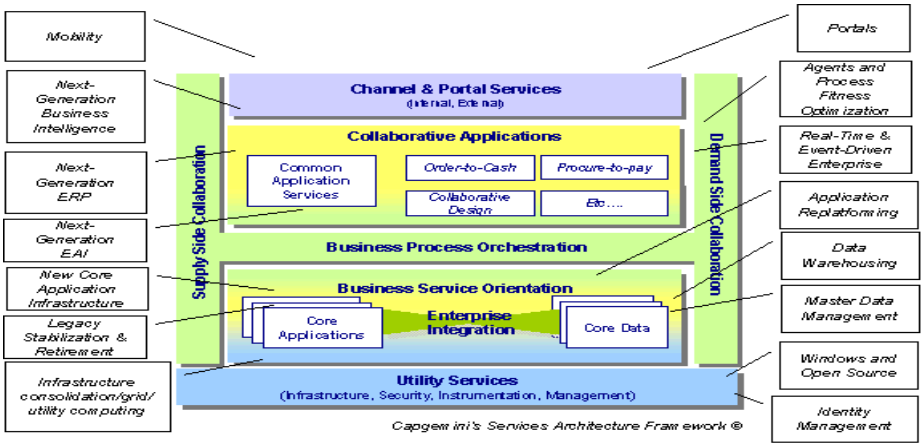

Figure 9 Capgemini Service Oriented Architecture Framework (Capgemini, G00129890, 2005)

4.5.2 The Role of Directories of Business Services

When a business transformation project starts the executive management, senior business analysts and business system designers, create the top level organizational design artifact which is used to create the classification concept and that becomes a point of reference for the modeling process. This classification concept is used to classify the atomic business services and business processes. This concept of atomic services provides a business architectural style that is specifically intended to simplify the business transformation and the interoperation of different parts of the (re)structured business company. By structuring and transforming capability, the authors refer to the notions of atomic, unique, meaningful, granular unbundling into business services as opposed to the opaque, silo'ed business units; this enables to quickly discover the functional capabilities of the new digital company, and to avoid duplicating similar business capabilities across the organization and to assemble just-in-time new business capabilities & models. From a business engineering perspective, business services focuses on (re)structuring the old business environments in a manner that enables business system's flexibility and agility. Agility is a necessity in today's complex and fast-changing business environment. Business services modeling strategy's aim is to break down the traditional business "silos" into portfolios of more granular business services that operate in a standardized, open and inter-operable concept (TOGAF, Directory, 2011). The unbundling of business activities and their decomposition in the form of atomic business service that can be filtered, traced, and queried, from the business transformation project's business models; are stored in the business environment's business environment catalogs. Catalogs contain the following entities: 1) Organizational units' information, business function; and 2) the atomic business service & its information system service equivalence (TOGAF, Catalog, 2011).

4.5.3 Business Monitoring, Management and Administration

The survival of the transformed business environment depends on the way the employees react to various types of business transformation project tasks, and to just-in-time business problems; like for example in logistics, hotline, production… Managing these problems would surely improve the company's churn rate. It would be optimal to define a problems management concept that is based on atomic business services assembly. The business transformation manager must be capable of designing, preparing, and managing the agile business environment's administration & monitoring concept, of: (a) the maintenance and production of the agile business environment; (b) the synchronized error management system; (c) the integration of the business administration monitor environment (BAM); (d) an "Ishikawa-like" problem solving concept (Whitten, Bentley, 2011); and (e) the integration of trace logging systems.

4.6 A Bottom-up Approach

To avoid problems in the implementation phase, the bottom-up approach is highly recommended; where the first step would be to convert the monolith environment into a structured ocean of atomic business services. Nevertheless this new structure needs a well-defined "umbrella" that is a high level top-down concept (Desfray, Raymond, 2014). Therefore, a mixed approach is needed, where the priority is given to the bottom-up approach; where this concept is hands-on and will define the "go/no-go" criteria. The bottom-up "1:1" approach for a specific business requirement will look as follows:

(1) Describe the business "use case" for a specific business activity.

(2) Model the corresponding class and business process diagram.

(3) Add this atomic business service to the business transformation project's architecture repository.

(4) Document and persist in directory for classification, the newly created atomic business services.

4.7 Organizational Engineering and the Unified Process

When modeling the top-down approach, the executive management (executive management, business transformation managers…) have to define the new business company's organizational structure, where its outputs will serve to link the various company's actors, business units & resources, external partners… to concrete business processes models and atomic business services. This will help mainly in the classification and mapping concept that is needed for the atomic business services.

4.8 The "1:1"Approach and Mapping

This research's methodology was based on the axiom that "1" hypothesis has a "1:1" relationship with "1" selection, modeling strategy establishment and training's managerial recommendation and also has a "1:1" relationship with a corresponding factor. The same "1:1" concept can be adapted for modeling of the business transformation projects' business artifacts. Where a model maps to a single business feature independently of the whole environment and that mapping can generate all the related business artifacts; this basic atomic feature generates all the other business system relevant elements. That makes the iterative changes easier to manage and the modeling just an assembling of the atomic business services. The promotion of the "1:1"modelling concept is based on the idea that all the business artefacts are inter-related; where a business feature is all-over related with a "1:1" relationship. For example a business feature like "register a new client", decomposition will look as follows:

(1) Business feature or requirement definition.

(2) Feature version management.

(3) Business actor's definition.

(4) Use case or business case modelling.

(5) Atomic business service modelling.

(6) Business (process) model implementation.

(7) Critical success factor discovery or selection.

4.9 Business Architecture and Modeling

Business architecture and modeling strategy for the selection, modeling strategy and training framework, is to establish a modeling pattern that plugs-in a standardized business architecture's framework like the open group's architecture framework and the unified modeling language methodology. For the architecture and business modeling pattern a generic tool must be used, that makes the transformation project independent from any vendor, it should be used to model the following business activities:

(1) Business cases or "use case" modelling, that is a starting point for any new artefact generation; where these models should generate all the other artefacts, using the "1:1" concept.

(2) The "1:1" mapping concept application, which is based on the use case design results, then all the other artefacts are generated, where the main element in this process is the business process model.

(3) The use case model will map to a business process model diagram, which links to a set of atomic business services, as shown in Figure 10. The atomic business services are developed or selected to serve one or more business processes. Where a business process modelling uses: (a) the business information needed to support one or more atomic business service, (b) the data that is consumed by the set of atomic business service, (c) an initial representation of the business information that is present within the business transformation project architecture and therefore forms a basis for elaboration and refinement (TOGAF, Catalog, 2011).

(4) The business transformation and enterprise architecture patterns, are chosen parts of one or more models representing a complete business environment's architecture, focusing on those aspects that address the concerns of one or more business enterprise's major business scenarios. These patterns can provide support in designing new business activities, and in composing various views based on them.Relevant business architecture patterns may be identified in the work on business scenarios.The notion of "forces" equates in many ways to the model strategy qualities that business transformation project architects seek to optimize, and the concerns they seek to address, in designing business transformation architecture patterns. For example: security, robustness, reliability, fault-tolerance, manageability, efficiency, performance, throughput, bandwidth requirements, space utilization, scalability (incremental growth on-demand), extensibility, evolvability, maintainability, Modularity, independence, re-usability, openness, composability (plug-and-play), portability, Completeness and correctness, Ease-of-construction, Ease-of-use, etc., ... (OpenGroup, TOGAF Patterns, 2006).

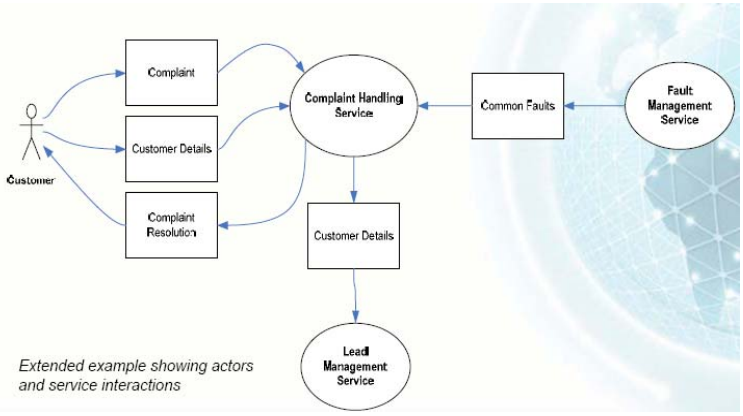

Figure 10 A Business Model and Atomic Business Service Interaction (TOGAF, Catalog, 2011).

The objectives of business transformation project architecture patterns (or the open group's architecture framework's "Phase B" are to: (1) model the final business architecture pattern that describes how the business transformation project needs to operate to achieve the business goals, and to respond to the strategic drivers set out in the architecture vision, so that it addresses the request for business architecture blueprint and business transformation project's stakeholder concerns; (2) identify the optimal business architecture roadmap components, and (3) develop the business rules for the implementation phase (TOGAF, Business Architecture, 2011).

4.10 Business Data Modeling Pattern

The complex description of business data models and related modelling patterns, does not do depend on the types of databases that are used; but the diversity of data-sources generates major problems in business transformation projects, especially in its implementation phase. Atomic business data services for the business infrastructure focuses primarily on the encapsulation of the data schema (Pavel, 2011). The "1:1" mapping concept is to applied for business data management and access, where the business requirement corresponds to a data entitty or a "business data view", if the data can be encapsulated in a single entitty.

4.11 Business Knowledge Management Pattern

The business processes has to persist business knowledge and today there are the following artefacts:

(1) The business process oriented knowledge management framework will be applied for the business transformation project's knowledge management component that will help in the selection, modeling strategy establishment and training activities which will use just-in-time knowledge assistance. It will also help the business transformation managers in updating and delivering the acquired knowledge on: a) business users requirements and experiences, b) the holistic business transformation project strategy models and experiences, c) the human factor (mainly related to resistance management), d) business process modeling patterns, e) atomic business services classifications and f) the business transformation projects implementation phase design and status.

(2) The DECOR (Delivery of Context -Sensitive Organizational Knowledge) that supports business process oriented knowledge management can be used by the business transformation project pattern. As shown in Figure 11. DÉCOR that implements, integrates, and maintains an enterprise solution for business-process oriented knowledge management, including a business process analysis method and tool, a business-process oriented intelligent knowledge archive system, and a workflow enactment (Abecker, Papavassiliou, Mentzas, Müller, 2014). The DÉCOR approach to business process oriented knowledge management is based upon the extension of business process modelling paradigm, that includes the automation of knowledge access mechanisms, complementary knowledge management sub-processes, and business rules processes (Papavassiliou, Ntioudis, Mentzas, Abecker, 2002).

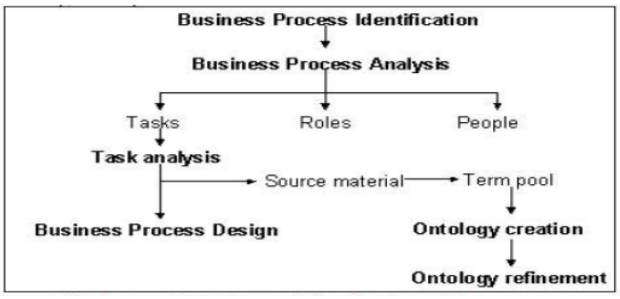

Figure 11 Overview of Business Process Knowledge Interaction (Papavassiliou, Ntioudis, Mentzas, Abecker, 2002)

(3) Business processes and business process oriented knowledge management services**,** are offered by the DECOR framework; it offers to the business transformation manager and his business transformation project team a just-in-time business knowledge and information atomic services (Abecker, Papavassiliou, Mentzas, Müller, 2014).

4.12 Critical Success Factors and Risks Estimations

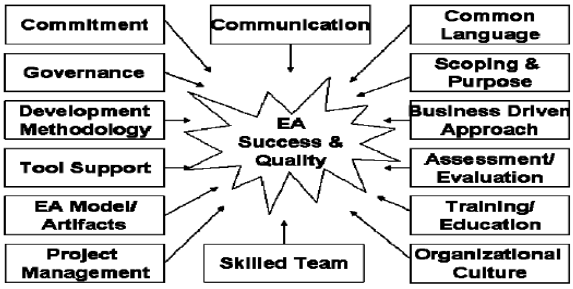

Figure 12 Initial Set of Potential Critical Success Factors for Enterprise Architecture (Ylimäki, 2006)

Understanding the business transformations, business environments, enterprise architecture and the related critical success factors, can affect the business transformation project's success, survival and competitiveness. The critical success factors correct implementation fallouts, and that is an important step towards a successful business transformation project finalization. The business transformation manager has to hammer the "Business Transformation Risks and Mitigation Activities". S/he has to identify the possible business transformation project's risks related to the "Business Architecture Vision" and implementation, then he has to assess the initial weighting of risks, that is in fact the decision system's reasoning tree's root node (e.g., catastrophic, critical, marginal, or negligible) and the number of needed iterations can be configured. The business transformation manager has also to assign a mitigation strategy for each business transformation project risk that is related to a specific critical success factors. The selection, modelling establishment strategy and training adopts the open group's architecture framework's risk management framework, that has two levels of risks to be managed: (1) the "Initial Level of Risk": risk categorization prior to determine and implement mitigating actions; (2) the "Residual Level of Risk": risk categorization after implementation of mitigating actions (if any risks exist) (TOGAF, Risk Management, 2014). Critical success factors for business transformation projects are a set of potential key domains factors selected by the transformed business company to be the most critical factors for the business transformation project. This choice is based on its business objectives and the success factors for the implementation phase. These factors, when carefully chosen by the business transformation manger using the "1:1" concept; should enable the achievement of a high-quality enterprise architecture decision support system, which will make the implementation phase predictable and hence successful (Ylimäki, 2006).

4.13 Business Transformation Readiness

The business transformation manager who has a profile of an architect of adaptive business environments profile, must have in-depth knowledge of the open group's architecture framework's "Business Transformation Readiness Assessment"; which means that s/he has the capacity to execute all the business information technology tasks required by the business transformation project, including the holistic management skills, modeling background, tools management, business processes, and hands-on management capability for the implementation phase. In the last years, there has been successful execution of a similar complex undertaking, and there are appropriate standardized processes, methods, modeling skills, and a heuristics based model for deciding what

skills and activities are needed. The business transformation manager must also design the enterprise capacity to execute; which is the ability of the enterprise to perform all the business transformation project's tasks, in areas not related to information technologies, including the ability to making decisions, using the built-in tree reasoning model, within the limited time constraints. The business transformation manager has to demonstrate the ability to manage such a business transformation project decision systems, related issues and business requirements and there a need for knowledge and skills (OpenGroup, TOGAF, 2014).

4.14 Business Integration and Inter-operability

Business integration insures that the business company easily executes real-world integration in the business eco-system and in turn insures its business sustainability. The following artefacts modelling enables the business integration process:

(1) Atomic or micro services inter-operability pattern.

(2) Holistic and standardized enterprise and hence business architecture methodology pattern.

(3) An anti-locked-in tools and environment strategy setup.

(4) Unified modelling language and business process modelling conversion and inter-operability pattern.

(5) Unified process and enterprise architecture inter-operability pattern.

(6) A generic and inter-operable business process modelling and integration concept.

Business inter-resources operability is supported by the extensible markup interchange format, that makes the transformed business environment generic, standardized, independent of implementation tools, methods and consulting companies. Enterprise and business architecture of business transformation project tools support serializing business process models. The serialized and standardized format file contains both the model semantics as well as the diagram-interchange information (Sparxsystems, XMI, 2014). This standardized interchange format, supports the business integration process, that facilitates the use of the business interaction matrix; as shown in Figure 13, the business interaction matrix shows the mapping between the business services and various business functional domains (TOGAF, Catalog, 2011).

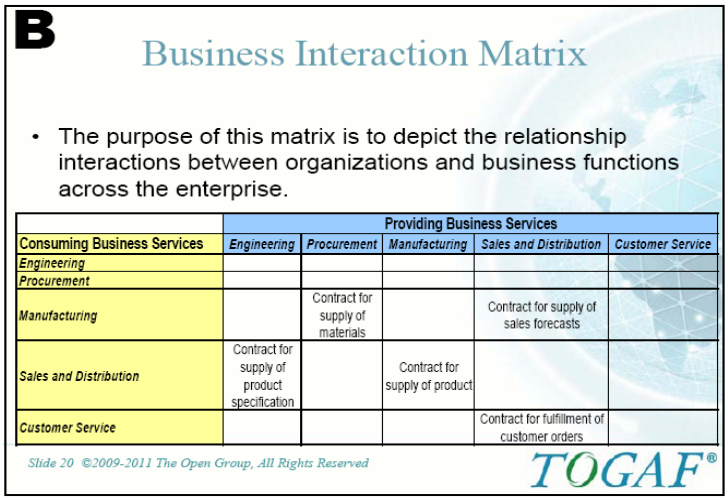

Figure 13 The Open Group's Architecture Framework Business Interaction Matrix (TOGAF, Catalog, 2011)

4.15 Business Infrastructure and Business Development Environments

Managing the enterprise and business modeling infrastructure, by the business transformation manager implies that he must be capable of modeling the transformed agile business environment's platform infrastructure

that is based on: (1) resources sharing; (2) high business availability; and (3) load-balancing. Business security is also important**,** where the business transformation manager has to have the skills needed to define the business transformation project standards on how to design and implement security concepts for business processes patterns, in a way to protect the business logic from being copied, so the company can avoid erosion. There are many modeling strategies to achieve that goal.

4.16 Tools for Business Architecture and Modeling

Business transformation managers who focus on delivering business outcomes must understand that the BTP's architecture & modeling tools, which comprise an important investment that can be wasted if not prepared correctly. Selecting and adapting any tool requires understanding also the vendor placement in the market. The tools capability is also a crucial factor. A tools roadmap is centralized and inter-operable across the entire organization and some recommendations are following (Gartner, ID:G00247547, 2014):

(1) In addition to modeling solutions, much of the actual technology is aging and must be transformed-modernized to ensure that it can meet the future business transformation directions; especially the load-balancing factor is important. The current technology environment is managed in separate projects; whereas the whole business transformation project must be managed in a holistic manner.

(2) Today's focus on business transformation project programs is not just implementing the traditional technical enterprise architecture or creating a repository of dispersed project artifacts that business transformation managers might find important, it is in fact much more about delivering concrete business outcomes that provide actionable models, diagnostics and business transformation recommendations.

(3) Design business transformation projects' functional requirements for tool selection, design use cases, and task editing in a prototype to determine how those business requirements will be finalized. The prototype must include functional requirements that may become actual in the next 18 to 24 months as the business transformation project matures.

(4) From the selection, modeling strategy establishment and training's point of view, business transformation project management, would be based on the following concepts: 1) extreme programming and spiral model that correspond to the applicative action research and 2) project tasks are automatically generated from the modeling environment.

5. Conclusion

Today in 2014, a company's survival heavily depends on business automation, and the business executives must adapt to this major paradigm shift that affects not only how business is done but also how the information technology domain has been reshaped. The economic downturn has made restructuring through business transformation projects, a way of life at many companies; the gap between those who recognize the need for business transformations and those who think to be capable of insuring a business advantage through the maintenance of their actual business environment, is three times higher than it was two years earlier. This inability to implement the business transformation projects that businesses companies' executives know are crucial is often caused by inflexible monolithic business information systems and teams; that are the major cause of failure for business transformation projects. These rigid monolith business systems are, in reality, holding their business organizations hostage and in danger of business erosion. However it has been proved that agile businesses that align and apply holistic approach, their business requirements and business environments actions have 29 percent

higher earnings per share. Many organizations have limited this agility by building business information systems in silo-style that at the best are, fragile, complex and unchangeable. Linkages between them are inexistent. Business services are a category of services that capture the business functionalities and that are modeled to improve a given business scenario and can be monitored through iterative refinement of real-time business metrics (or factors). Automated monitoring of these metrics (or factors) can reflect improvements to the business modeling process to achieve the business objectives (IBM, SOA, 2014). The authors recommend that the first step of the traditional business environment unbundling starts with the splitting of the old business information system into various categories of business services. They also recommend that agility can be insured by the application of atomic business services to inter-connect an agile transformed business environment.

Today business transformation architecture that include the open group architecture framework are very much used, knowing that the federal enterprise architecture and the Gartner business transformation architecture framework, all have a business architecture dimension that specifically includes business modeling work and other modeling concepts similar to business capability modeling. Added to that, the Gartner business transformation architecture market request on business capability models is very high. The architecture capability framework and business capability modeling are techniques for modeling the organization's business reference model. This reference model is independent of the organization's structure, business processes and human. Business capabilities are modeling technics in which business transformation projects integrate information systems resources, business processes and the business environment to insure more value to customers. The benefit of this business modeling strategy, is that it insures that business modeling, atomic business strategy infrastructure and information technology business transformation managers to model on and prototype business possibilities, strategies and investments (OpenGroup, TOGAF, 2014). The authors recommend the application of a business process modeling strategy and pattern that will facilitate the implementation phase of the business transformation project.

For a skilled business transformation manager, who has to manage a business transformation project, business information technology is a commodity that is used to glue the various business components, to create a standardized and integrated business process oriented environment. For various business environments; like the machinist organizations, an integrated (glued) business transformation approach is needed. As the selection, modeling strategy establishment and training is specialized in the architect of adaptive business environment's selection and business modelling skills definition; therefore it recommends the integration of the open group's architecture framework's "Architecture Skills Framework" component; which defines the following possible roles for a business transformation manager: (1) architecture board members, (2) architecture sponsor, (3) architecture manager and (4) enterprise architecture (which can be considered as a superset of business, data, application and technology architecture). The authors recommend that the business transformation manager is a architect of adaptive business environments who is basically a very experienced cross-domain enterprise architect.

This research article's aim is to support business transformation managers in their business transformation projects undertaking using an selection, modeling strategy establishment and training "modeling pattern" that is based on atomic business services. This research and resulting framework has a business driven and a cross-functional approach where the technology is just a very important glue; and proposes the use of atomic business services, to bind the various components of the business environment. That gives it the needed business environment the needed leanness. It is applicable to various business environments; that are transformed into mechanist organizations; with a generic business driven approach. The authors recommend that the business

transformation manager designs a business modeling pattern for the business transformation project that is based on: (1) business processes and (2) atomic business services, and these two factors are very important to glue various companies into an eco-system, and that gives them the needed leanness.

This research paper defines the concept of modeling in the selection, modeling strategy establishment and training, which was previously known as the selection, modeling strategy and training. In fact the authors do not want to reinvent the wheel when talking about various standards, they just want to define a modeling pattern on how to use various business architecture and modeling concepts. In this modeling pattern the authors recommend a bottom up approach that is based on the choreography of atomic business services. This business modeling pattern should improve the business company's business outcome and is a business driven approach.

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