

## Benefits of Enterprise Architecture for Small & Micro Extended [X] Enterprises (SMiXE)

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### Abstract

Enterprise Architecture (EA) has started to play a strategic role in today's highly competitive global environment where efficiency, quality and cost cutting are the norms and shelf life of products manufactured is shrinking. For adapting, surviving and growing in this technologically savvy era, enterprises need to have mapped and wrapped themselves with their core strength and strategic advantages, its here Enterprise Architecture (EA) will play an important role. Benefits of—Enterprise Architecture for SMiXE's – Small & Micro Extended Enterprises<sup>l</sup>, in automobile industry are investigated in this paper for providing a viable EA solution to SMiXE.

**Keywords**—Enterprise Architecture, Automobile Industry, Original Equipment Manufacturer (OEM), First Tier Supplier (FTS), 2nd Tier Supplier, Subcontractors, Job Work.

### I. INTRODUCTION

As per Ross J., Weil P., Roberston D., [3] – and effective foundation for business execution depends on a solid foundation of a well defined Enterprise Architecture – which provides tight alignment between business objectives & Information Technology (IT) capabilities.

Here we will be referring “SMiXE – Small & Micro Extended Enterprises” as Small & Micro Enterprises which work as extended arms or as **Subcontractor's** [8][9][10] or as “**2nd Tier Supplier**” and “**3rd Tier Supplier**” [5] for the Large Enterprises which are normally the “FTS – First(1st) Tier Supplier” [5], who are suppliers to the biggest enterprise in the value chain, which are the “OEM's – Original

**Equipment Manufacturer<sup>l</sup>** [5]. Automotive industry globally is multi tier in nature, where the top most Tier or layer is referred as OEM [5] which are the large corporate like Maruti Suzuki, Honda Motors, Ford, General Motors, BMW, Hero Motors, Bajaj Auto etc., whose main job is to Design Products, Branding, Assembly of Products, Quality Control and Distribution. Below OEM [5] are FTS [5] who supply Assemblies, Sub-Assemblies and Components to the OEM's, facilitating the Assembly, Branding and Distribution of their Products at JIT (Just in Time).

The FTS [5] have a created a similar unorganised structure [10] of “**2nd Tier Supplier**” and “**3rd Tier Suppliers**” [5], referred by us as “SMiXE – Small &

**Micro Extended Enterprises**”, below them, for supplying smaller sub assemblies, components, sub-components and accessories on Job Work or Piece Rate basis. SMiXE operates on no Technological, Technical and Financial support from the FTS's or from OEM's that is needed for them to successfully operate in today's globally competitive and harsh business environment. SMiXE normally do not have any product of their own or any other substantial revenue stream.

Currently most (almost 80%) of the SMiXE do not use any Computerised or IT Systems, which can enable them to enhance their business functionality, efficiency, productivity and quality at an affordable cost, but paradoxically almost 99% of the SMiXE either own one or more computer (Hardware), either for email/internet access and some (about 20%) of the SMiXE either use some kind of accounting package for maintaining their Sale, Purchase and Receipts, Payments related accounting data. Though the SMiXE are either small or micro in size, their nature of functioning is as complex and complicated as any bigger enterprises or companies.

### II. SIGNIFICANCE AND CONTRIBUTION

Why SMiXE ?, before answering this questions, lets peak into the history of Indian automobile industry [12], which started in the mid 19th century, when Hindustan Motors introduced Ambassador their flagship brand and Vespa their Scooter, which was latter accompanied by Premier's Fiat and Mahindra

& Mahindra’s (M&M) Jeep and in two wheeler by Bajaj, Escorts, Kinetic, LML etc, they had a niche market for the rich. In late 1980’s India’s first people car Maruti in collaboration with Suzuki Motors, Japan and affordable motorcycles by Hero, Bajaj, Escorts in collaboration with Honda, Kawasaki, Yamaha were launched in the market, which got the ball rolling for the Indian automobile market, and post liberalization the market grew from a mere 1-2 Lakh car per annum to 27-28 Lakh car per annum in year 2012-13 [13][14][15][16] and the two wheelers from mere 2-3 Lakh per annum to more than 1 crore 38 lakh per annum in year 2012-13 [13][14][15][16]. This created major automobile clusters in India – primarily located in north at Gurgaon in NCR (Maruti, Hero Motors, Honda, Yamaha etc.), in west at Pune, Aurangabad & Nashik belt (Tata Motors, M&M, Bajaj Motors, GM, Volkswagen etc) and down south in Chennai (Hyundai, Renault, Nissan, BMW, Ford etc) & Bangalore (Toyota, TVS Motors etc). This created a huge requirement for Auto Component Manufacturer (see Fig 1 below) in the “2<sup>nd</sup> Tier Supplier” and “3<sup>rd</sup> Tier Suppliers” category to which we are referring as **SMiXE**, who have mushroomed around this clusters which provide employment roughly to more than 25 lakh people and have a estimated combined turnover of couple of billion dollars. But they are highly fragmented; most of the owners are not technically & financially sound. Their strength is “they have become so good at doing their task at a very low cost” and the sad thing is “at the cost of everything else which includes environment, pollution, job security, unethical business practices ... etc. etc....the list is really long”

Turnover - Auto Component Industry: 2009-13



Fig. 1 Shows Turnover of Auto Component Industry from 2009-2013[17]

Enterprise Architecture (EA) over last 25 years has evolved from being an IT centric function to becoming a “Business Enabler” and if used effectively can be a “Business Differentiator”, giving SMiXE an “Edge” over its competitors. Achieving growth in SMiXE is the “Achilles Heel” for

maximum number of enterprises, due to lack of following factors:

- [1] Business Skills [From process point of view].
- [2] Good Industry Practices.
- [3] Quality & Standards.
- [4] Inadequate Capital.

In Contrast their desire for growth is tremendous and given them the right platform for achieving “Growth” they can reach there. Our endeavour here is to study the benefits that an Enterprise Architecture (EA) can provide to SMiXE for them to efficiently manage all the aspects of their enterprises using “Technological Sophistication” and will act as a “Technology Enabler” for them to grow their enterprise to the next Phase/Stage of growth.

#### A. Why Enterprise Architecture(EA)

Enterprise Architecture (EA) is the organizing logic for business process & information technology (IT) infrastructure, reflecting the integration & standardization requirements of the company’s operating model [3]. EA provides a long term view of company’s process, systems and technologies so that individual IT systems can build current and future capabilities for them and not just meet their immediate needs. These capabilities can be harnessed by them to achieve growth by overcoming the above mentioned factors (see Achilles Heel paragraph). IT system being based on Good Industry Practices and well defined quality & standards will also create a positive social impact on the society. Fig 2 below shows a table comparing between IT solutions which are developed based on different approach (which was a gradual evolution over decades)

Sr No	Comparison Parameters	Manual System	Standalone IT Solutions	Loosely Integrated IT Solutions	EA Based IT Solutions
1	Simplified Operations	Low	Low	Medium	High
2	Integration	None	None	Low	High
3	Transparency	None	None	Low	High
4	Standardization	None	Low	Medium	High
5	IT Efficiency	None	Low	Medium	High

	y				
6	Operational Efficiency	Medium	Low	Medium	High
7	Functional Optimization	None	Low	Medium	High
8	Strategic Agility	None	None	None	High

Fig. 2 Above Table Shows the Benefits of using EA

### III. LITERATURE OVERVIEW

As per Ross J., Weill P., Robertson D.,[3] – an effective foundation for business execution depends on tight alignment between business objectives & information technology (IT) capabilities. Most enterprises put in business process & IT systems using a straight forward logic. First management defines a strategic direction then the IT people in conjunction with business management design a IT enabled solution to support the initiative & finally the IT people deliver the application, data and technology to implement the solutions. This process starts over each time management defines another strategic initiative.

The biggest problem with the above strategy is:

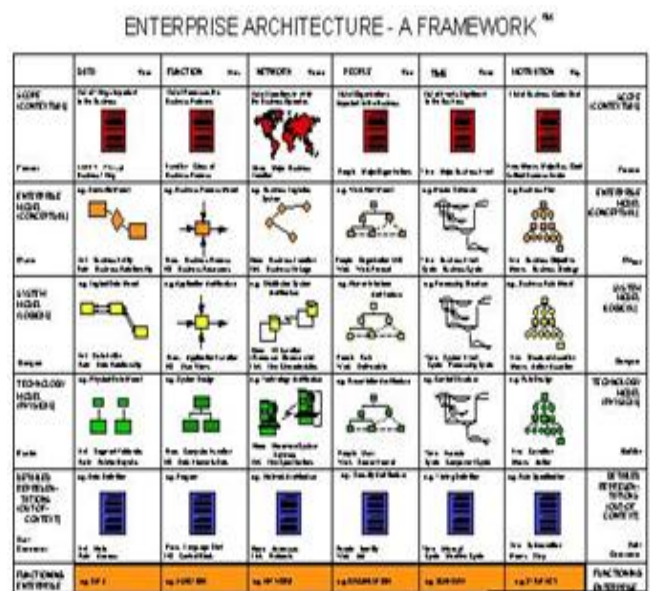
- [5] Enterprises build IT solutions rather than IT capabilities.
- [6] Business process gets implemented in piecemeal, sequential process resulting in separate solutions each implemented on a different technology.
- [7] As IT is always used as a reaction to the latest initiative, later on IT becomes a bottleneck IT never becomes an asset shaping future strategic opportunities.

We will be referring to following three Enterprise Architecture (EA) Frameworks for our EA initiative:

- Zachman Framework for Enterprise Architecture[1]
- TOGAF–The Open Group Architecture Framework[4]
- Enterprise Architecture Planning EAP [2]

**A. Zachman Framework for Enterprise Architecture[1]:** Was invented by, John Zackman for IBM. According to Zachman J.A [1], while employing Enterprise Architecture the idea is to engineer the Enterprise first, before you manufacture it (implement it) whereas traditionally, we manufactured the Enterprise (implemented) before we had it engineered (e.g. the legacy system). The Zachman framework provides a means of classifying

an organization’s architecture, as a proactive business tool, which can be used to model an organization’s existing functions, elements and process and help us manage business changes. The Zachman architecture framework is to view it as a classification scheme represented visually as a table or matrix, with columns and rows. Each cell within the matrix provides a unique model or representation of the enterprise. Each cell in the table must be aligned with the cells immediately above & below it. All the cells in each row also must be aligned with each other. Each cell is unique combining the cells in one row forms a complete description of the enterprise from that view.



John A. Zachman, Zachman International/0101201-0031

Fig. 2 A sample line graph using colors which contrast well both on screen and on a black-and-white hardcopy

### B. TOGAF – The Open Group Architecture Framework [4]:

Best known by its acronym TOGAF [4]. TOGAF [4] is owned by The Open Group and is one of the most widely accepted methods for developing enterprise architecture (EA). TOGAF [4] is an open framework providing a practical, definitive and proven step by step approach for developing and maintaining EA through its Architecture Development Method (ADM).

TOGAF ADM is a iterative process, which provides step by step guidelines for defining business needs and developing a architecture that meets those needs using the elements of TOGAF. TOGAF [4] supports four architecture domains that are currently accepted as subsets of overall enterprise architecture, all of which TOGAF is designed to support, which are as follows:

[8] Business Architecture – Describes the process the business uses to meet its goals. It includes business strategy, governance, organization and key business processes.

[9] Data Architecture – Describes how the enterprise data stores are organized and accessed. Including everything from an organizations logical, physical data assets and data management resources.

[10] Application Architecture – Describes how specific applications are designed and how they interact with each other. Provides a blueprint for the individual applications to be deployed, their interactions, and their relationships to the core business processes of the organization.

Technical Architecture – Describes the hardware and software infrastructure that supports applications and their interactions. Which includes logical software and hardware capabilities that are required for deployment of business, data and application services. This includes IT infrastructure, middleware, networks, communications, processing standards etc.

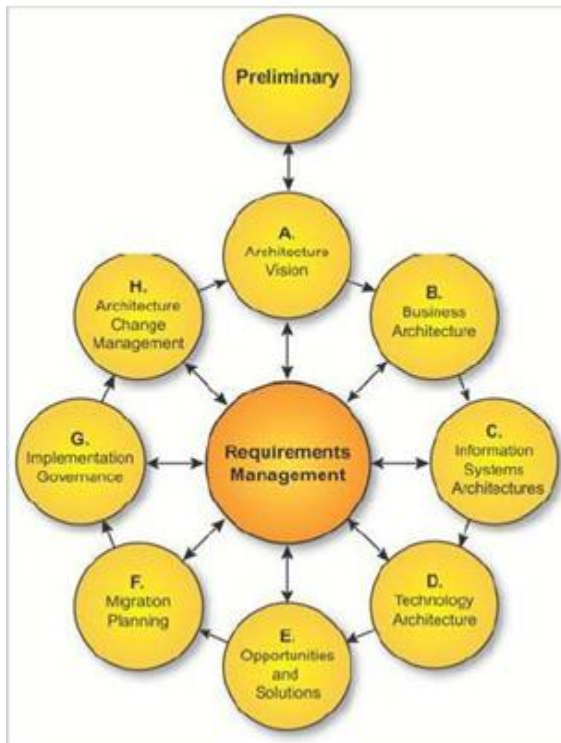


Fig. 3 A sample line graph using colors which contrast well both on screen and on a black-and-white hardcopy

### C. Enterprise Architecture Planning EAP [2]:

EAP uses a data driven approach versus a process driven approach towards Enterprise Architecture (EA). EAP considers both a short term operational and a long term strategic focus on the use

of information and technology to support the business. EAP has following four important components:

- 1) *Functional Business Model*: Architectures are founded on a functional business model, and a functional business model is a knowledge base of what the business is and what information is used to conduct the business. The functional business model reflects the business and offers a stable foundation upon which architecture can be defined.
- 2) *Data Model*: EAP defines data before applications. In EAP, we first define all the data needed to support the business, and then we define the applications needed to manage that data.
- 3) *Implementation Plan*: EAP uses data dependency to determine the implementation plan. Data dependency is based on a fundamental principal that says we should develop the application that creates data before the applications that need to use that data.

## IV. IV. DISCUSSION

Enterprises are normally classified as Large, Medium, Small & Micro, based on parameters following:

- [12] Capital Invested.
- [13] Balance Sheet.
- [14] Size Of Organization/Enterprise.
- [15] Number Of Employees.
- [16] Number Of Machines & Tools etc.

Based on the above parameters the “**FTS – First(1<sup>st</sup>) Tier Supplier** [5]” are bigger by a factor of 25 to 100 times, when compared to the “**SMiXE – Small & Micro Extended Enterprises**”.

But if you look at the **FTS** [5] and **SMiXE** from an Operational Point of view, and in terms of **Function Point** [11], from an Information Technology point of view, both have similar complexity levels, with varied level of transactional data and complexity in Business Processes.

As stated above, the use of sophisticated IT systems is negligible in **SMiXE** as compared to **FTS** [5], who use world class IT systems in their organization, which are based on a well defined **Enterprise Architecture** [1][2][3][4]. Following are some of the reason why their use is negligible in **SMiXE**:

- [17] Cost of ownership, of these IT systems is very high.
- [18] Long and costly implementation required.
- [19] Dedicated IT team is required to manage it.

[20] Standard IT systems, have a highly process oriented approach, which acts as bottleneck for the **SMiXE**.

[21] Adapting to changes in business environment or business process requires lengthy and costly IT time and resources.

Above mentioned factors make it extremely difficult for the **SMiXE** to go for the existing sophisticated IT systems, as by their very “**Nature & Need**”, **SMiXE** have to be very “**Agile, Cost Competitive and Adaptive**” by their “**Nature**”, as all **OEM**’s (Global & Local) are being forced to adapt new and improved environment friendly and fuel efficient standards.

The environment in which they (**SMiXE**) exist and to the very market (“**Need**”) that they cater is very dynamic, that it changes every eighteen to twenty four months (Globally automobile manufacturers or **OEM**’s launch new vehicle with turbulence technology).

This has created a highly cost competitive environment in the automobile industry where cost cutting is the norm, in order for the **OEM**’s and the **FTS**’s to survive profitably, this cost cuts are forced down on the **SMiXE**, with not much of a choice.

## V. CONCLUSIONS

Enterprise Architecture (EA) for **SMiXE** will provide maximum benefits to the user at a minimum cost. As most of them still do not use any IT systems on a well defined EA, our Endeavour will be first such serious attempt, towards studying the benefits of Enterprise Architecture (EA) for **SMiXE**.

Proposed Enterprise Architecture (EA) for **SMiXE** will benefit them by providing, a tight integration between business needs of **SMiXE** and their IT needs. Impact of which will be reflected positively on their Performance, Growth and Bottom Line.

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