



MICRO FUNCTIONS – BUILDING BLOCKS FOR FINANCIAL SERVICES IN THE OPEN WORLD

Introduction

We live in a world of constant change. From the Industrial Revolution in the 1800s, to the Information revolution in the 1900s to a new world of Digital revolution in the 2000s, the world indeed has come a long way. When we look at the way the financial services industry has evolved over the past decades, we see that paper and ink has given way to pixels and bytes, which has accelerated the pace of change that Banks and other institutions have had to deal with in their business models.

Technology and data have become the centre of the Financial world. With the advent of the latest wave of technology changes - Micro Services, Blockchain AI, ML, Open API, IoT, etc. - the possibilities are immense that we will be able to build the digital back bone of the Financial services industry in an interesting and interconnected way.

The business side of banking has seen rapid change and innovation with the emergence of innovation such as securitization, structured products, index investing, peer to peer lending, etc. However, so far we have not seen the Banking business integrate the changes in the technology space to create the building blocks for the future of finance. Not much thought has been given to how the future digital nervous system of financial world, will be built using micro services, APIs and other new technology innovations.



3-strata view of the Financial Services ecosystem

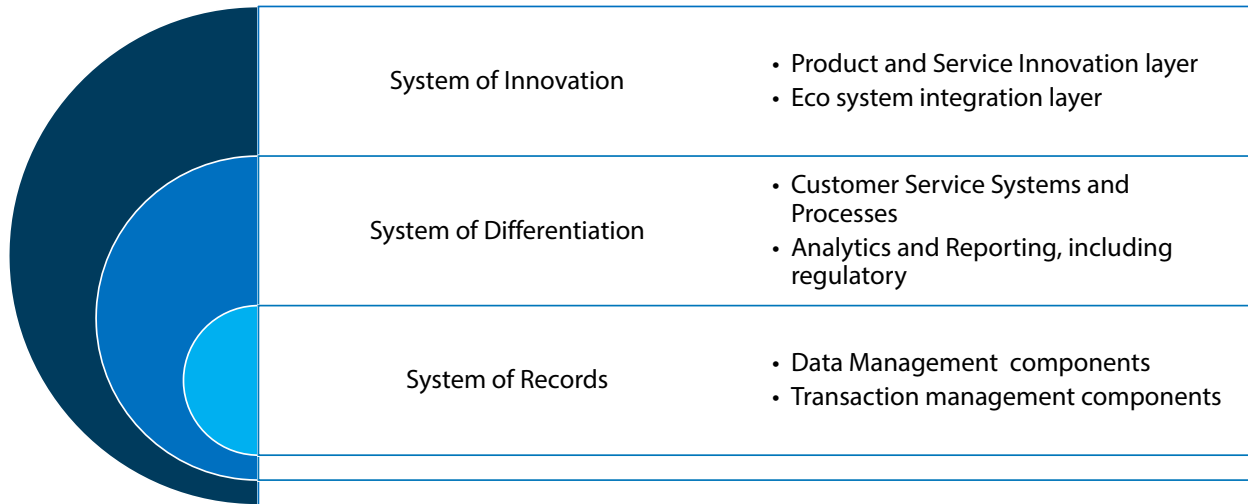
When we look at how the future of architecture of Financial services will be – we believe there are 3 major strata that will play a key role -

a) System of Records – The technology backbone that allows all the transactions, record keeping and reporting to functions seamlessly. This stratum is fluid, dynamic and responds primarily to the higher

value adds needed by the business on differentiation and innovation.

b) System of Differentiation – This techno-functional stratum –comprises of customer servicing, analytics and the various automation modules. It is the stratum that helps a Financial services institution to differentiate itself in the marketplace. This stratum feeds off the changes in client behaviour, emergence of new models & competitors and regulatory compliance needs.

c) System of Innovation – This the top and outward facing stratum that focuses on the future, which looks at changes in the business and technology that can cater to unstated client needs, develop new products and customer service models including interfacing with other players in the ecosystem. A proper utilization of this stratum can catapult a Financial Service institute to the top of its league tables.



Micro functions – basic building blocks of the business architecture

As we further delve into how the business architecture of Financial Services can be constructed so as to create a flexible, transparent and nimble backbone for the financial world, it is clear that there is a need for creating new constructs that can cater to future needs. We believe Micro Functions can play a key role in creating these building blocks. These Micro Functions can even be exposed as APIs so they can be leveraged across the partner and client ecosystem of a bank or financial services institutions.

Let us look at micro functions and understand them better:

a) What are micro functions?

While micro functions can come in many shapes and sizes, for purposes of our understanding it can be defined as - An atomic business transaction that can be executed either on a standalone basis or in conjunction with other such transactions. A Micro function internally might map to multiple transactions or micro services on the technology side. Any audit or security or logging function is not part of the atomic

business function unless defined as a separate Micro Function.

b) How are micro functions different from micro services?

The definition of micro functions leads us to ponder on the difference between a micro function and micro services. A Micro service is typically a technical function that may or may not be part of a business transaction and can also be part of multiple business transactions. A Micro function, on the other hand, can internally be executed via multiple micro services. While micro functions can be chained together to form a higher value accruing business transaction, each micro function is atomic and specific to a particular business requirement.

Typically, micro functions will be at system of records level. Strata of chained micro functions can be created to satisfy needs at the level of system of differentiation and system of innovation.

c) Why to go for micro functions?

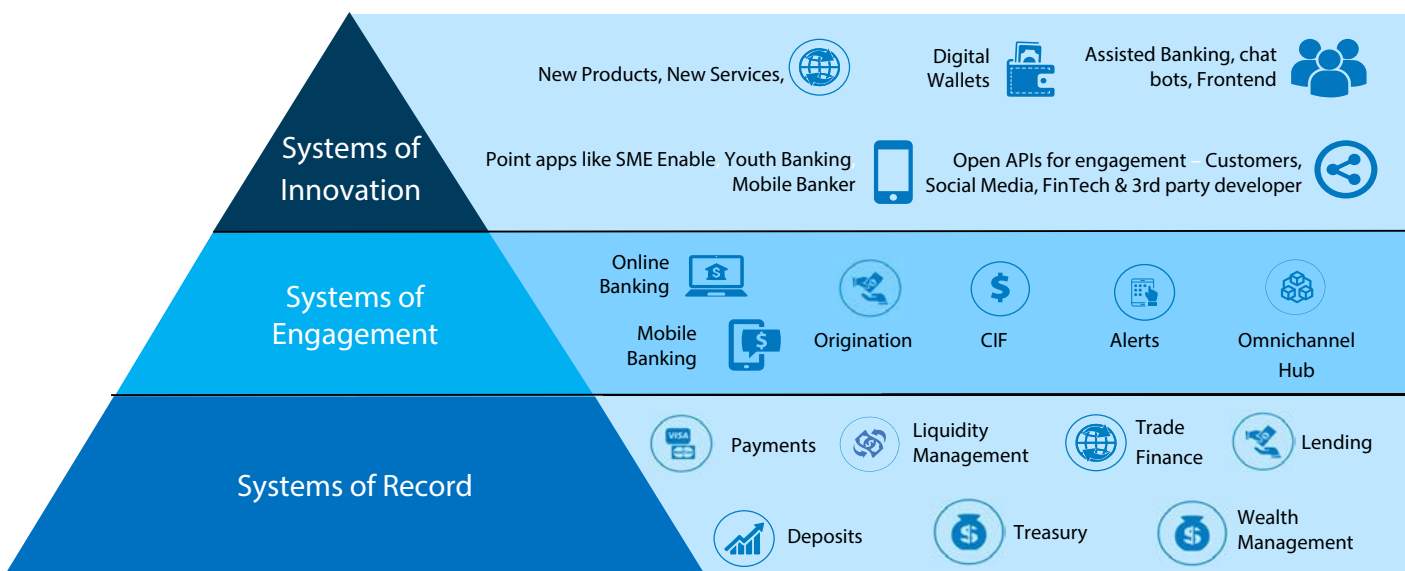
As we look further into how the micro functions based business architecture can be created, we see that at a basic level, Micro functions are an attempt

to create a common set of business services that

- Reduce costs by encapsulating common functions
- Increase reusability at a business use case level
- Create a common framework to take care of system of records
- Free up resources to focus on higher value generating business use cases
- Enable new monetisation avenues for system of records
- Enable new alliances via creation of new APIs and offerings based on micro functions

Micro functions help the business team to visualize their applications as a combination of atomic functions that can be further chained in various ways to enable quicker innovation and faster time to market.

This leads us to try to visualize how such a micro functions based business architecture could be created. The figure below attempts to put together the picture of how micro functions at the system of records level can provide the building blocks at the system of differentiation and system of innovation levels.



A few illustrative Micro-functions across key lines of business in Financial Services. These micro functions will exist in the System of record stratum

Lending	Personal Finance Management	Payments	Deposits	Risk Management
Initiate Loan Origination	Create model portfolio for an individual	Transfer payment of \$ x from party a to party b	Initiate deposit creation	Provide Credit risk metrics for the portfolio
Process for delayed loan payment	Invest \$x as per the asset allocation	Provide status of payment with transaction id	Pre-closure of deposit	Provide VAR for the portfolio
Provide loan statement for tax purposes	Rebalance portfolio	Cancel payment transaction	Provide report of interest payments	Provide report of defaults (quarterly/annually/etc.)
Initiate loan default processes	Provide statement (annual/quarterly)	Initiate recurring payment	Provide tax statement for deposit	Provide standard deviation of the portfolio



Architecting Financial Services Industry to aid differentiation and innovation

We believe micro functions will bring in much needed transparency, inter-

operability and ease of operations to the Financial Services world. This will provide the much needed boost to financial services in industry to catapult to the front position in the wave of innovation that is sweeping the world, led by social media,

entertainment and the retail industry.

Let us pick an example of micro services will operate and further build on the system of differentiation and system of innovation. We will pick an example of the personal finance management space.

Customer Relationship Mgmt.	On/Off-Boarding	Portfolio Mgmt.	Servicing & Reporting	Back Office	Financial Mgmt. & Reporting
Contact Management	New A/C Documentation	Wealth Planning	A/C Maintenance	Tax Reporting	Compensation Tracking
Client Relationship	KYC process	Investment Policy	A/C Funding	Asset Set-up	Fees & Billing
Opportunity & List Mgmt,	A/C Close	Asset Allocation	Money Movement	Settlement Clearance	Financial & Mgmt,
Associate Compensation		Trading	Admin Review	MF Processing	
		Alternative Investments	Client Financials	Corporate Action Processing	
		Performance Measurement	Legal Statements	Accounting	
			CRC/ Relationship Report	Manage Books & Records.	
Key Areas					
Risk Management	Data Management	Policies	Statements	MIS Reporting	

While all of the key functions would be micro-functions. In our view, the key micro functions that could be industry standards in this space would be in the below business processes:

- a) Client On boarding /KYC
- b) Provide Investment policy
- c) Determine risk profile
- d) Create model portfolio based on Investment policy
- e) Modify asset allocation based on Investment policy
- f) Rebalance portfolio

Once these micro functions are available, the financial institutions can build the next scaffolding in the system of differentiation. These functions would

- a) Calculate fees and billing (based on performance and policies)

- b) Calculate taxes
- c) Provide performance reports
- d) Provide alternate asset allocation options
- e) Monte-carlo simulation based on asset allocation
- f) Estate planning tools
- g) Access to research and investment opportunities across asset classes and geographies

The system of differentiation brings in the ability to build on the micro-functions that have been developed in the system of records. These functions will vary by institution and the products they have on offer.

The final stratum is that of system of innovation. This layer provides new asset classes, tools for investment and access to research that aid the client in accessing

state of the art functions and tools. Key aspects of this stratum are

- a) Robo-advisory tools based on the Investment policy and the investment options available
- b) Investment in alpha generation opportunities
- c) Options reduce risk, diversify and long term returns through new investment options

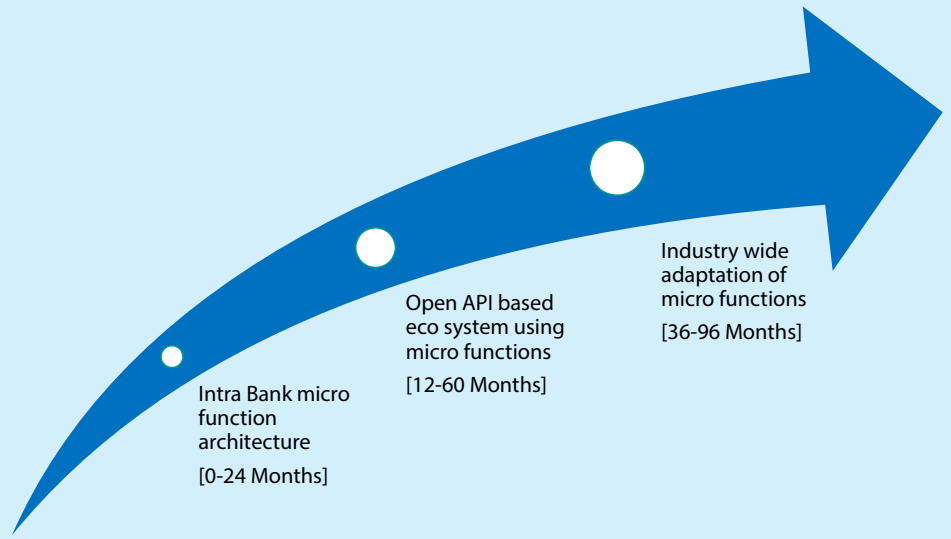
There will be opportunities to cross sell and provide multiple options and opportunities to modify asset allocation to generate alpha and reduce risk for their clientele.

In short, we see that Micro functions bring in much needed re-usability, data integrity and easy of operations to Financial Services. They provide the stepping stone for the industry to create the building blocks of the future.

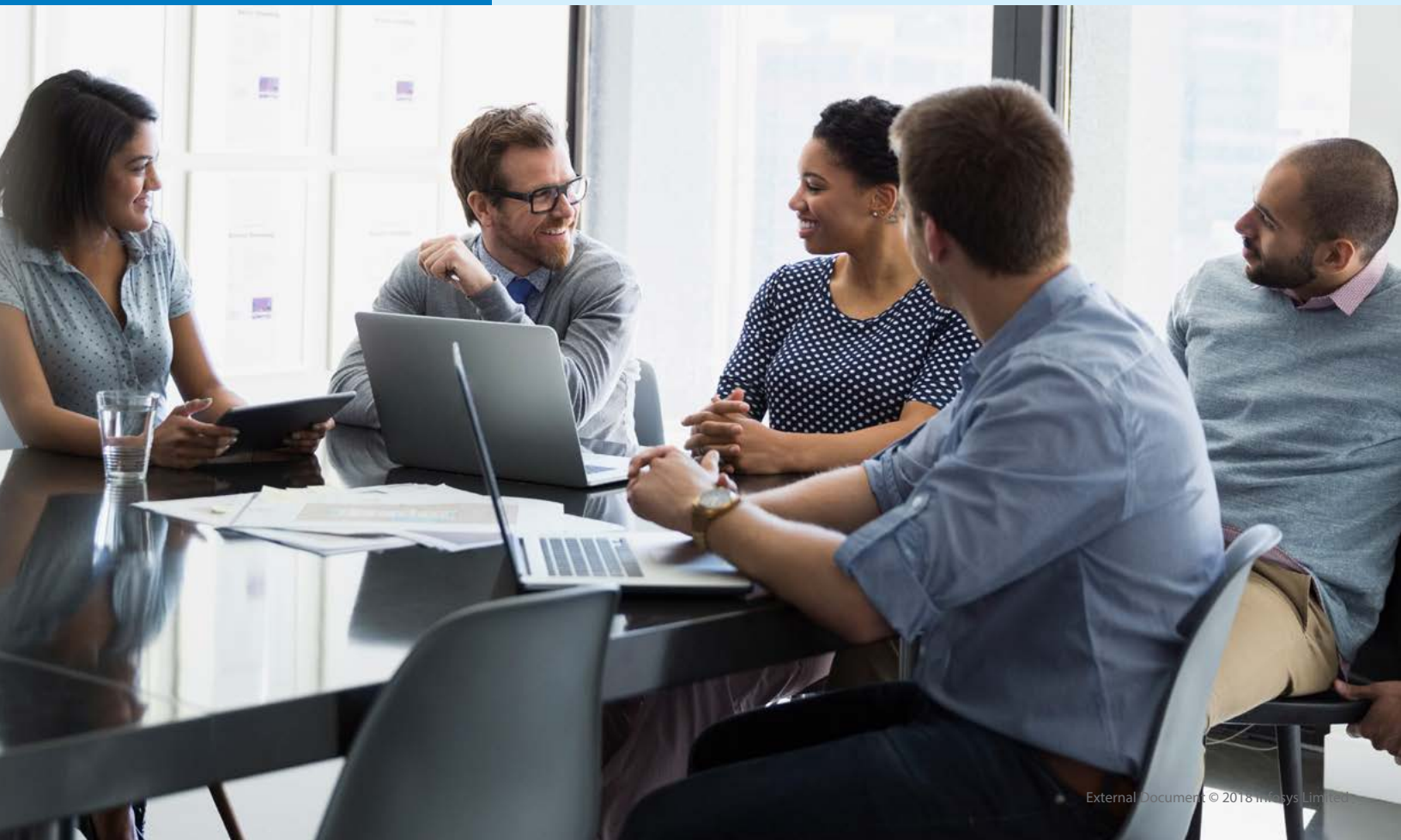
Conclusion

As we look to the future, we believe the adaptation of such an architecture will happen in multiple stages. There is a lot of ground work that needs to be done and consensus built within the organization and in the industry on adaption of such paradigm. This will take time as it will be driven by business imperatives, management commitment and regulatory oversight required for such a broad based transformation. Based on our experience in the industry, we see the movement to a micro functions based business architecture in three stages. These stages will also overlap as Banks and Institutions over a period migrate to the new business architecture

- a. Intra company micro function architecture
- b. Open API based micro function architecture
- c. Industry wide standardized micro function architecture



The future looks promising, as the industry builds micro functions and opens up key banking functions to the outside world, we can visualize the next Amazon, Netflix or Salesforce spring from the Financial Services industry.



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