



Digital Systems & Technology

Creating an Agile Enterprise Architecture

With the proliferation of digital, the function of enterprise architecture is more critical than ever. Getting there requires a strong, agile enterprise architectural foundation that can embrace a fail-fast/fail-safe approach to the IT charter of stronger business alignment, while ensuring that services are delivered fast and friction-free to meet the needs of today's dynamic business objectives.

Executive summary

Enterprise architecture (EA) is often described as the practice of implementing analyses to holistically design and execute successful enterprise strategies that reflect the desired

business vision and outcomes.^{1,2} Traditionally, EA has been the entity that enterprises adopt to ensure better alignment between business and IT, while optimizing IT costs. Given the

A use-case prioritization approach coupled with cognizance of analytics maturity offers clear direction on business and technology strategy when building a use-case implementation roadmap.

dynamic nature of today's digital economy, replete with higher volatility, uncertainty, complexity, and disruptions, the value of EA is not to simply deliver IT value but rather how it can enhance business value by enabling faster and more agile responses to market opportunities and threats.³ As a result, IT organizations must revisit the basic tenets of EA including its charter, services offered, value of the services delivered, and the underlying organizational and operating model of what is called Agile EA.

This white paper presents the concept of Agile EA, explains why this new model is needed, the key elements that either need to be changed or newly adopted, and the key guidelines to realize the model.

EA is often misunderstood and used interchangeably with solution architecture, which typically applies only to a single project or project release,

assisting in the translation of requirements into a solution vision, high-level business and/or IT system specifications, and a portfolio of implementation tasks. Therefore, Agile EA can be conflated with an architecture definition for Agile projects, even though there are fundamental differences between the two.

There are various approaches such as minimum viable architecture (MVA), just-in-time (JIT) architecture, just-enough architecture, evolutionary architecture and others that define architectures for Agile projects while practicing solution architecture. This paper, however, focuses on Agile EA, an emerging model for the enterprise architecture that can help organizations quickly and effectively create a digital foundation that can meet business needs today, and anticipate and deliver on tomorrow's requirements.

Agile enterprise architecture: A primer

There are numerous reasons for IT organizations to pursue Agile enterprise architecture, as well as a rationale to move forward. They include:

- **Why:** Increase responsiveness to align with faster change cycles.
- **What:** EA's organizational model and focus area (competency center to service center) provides measures of success (i.e., from reference architectures to reference implementations).
- **How:** Restructure EA units based on services rather than architecture domains, establish EA service catalog, simplify architecture artifacts and deliverables with just-enough information, and define impact-based key performance indicators (KPIs) to measure and communicate the value of the EA function.

In its effort to ensure the right alignment with enterprise vision and drivers, EA has traditionally adopted a compliance-centric approach through stage-gated interventions for providing architecture assurances. However, this model doesn't scale enough in today's fail-fast/fail-safe era where architecture assurances are expected to be provided just-in-time, digital strategy decisions must be made as swiftly as possible, and fit-for-purpose technologies are preferred over standardized technologies. Similarly, long cycles are typically spent defining an enterprise technology or domain roadmap by analyzing the current state and proposing a high-level future state with or without intermediate transitional states.

At a time of rapidly changing technology, coupled with rapidly evolving user or customer expectations, it becomes increasingly difficult to define a future state architecture that adequately addresses the concerns of all stakeholders.

Crucial Agile EA drivers include:

- Manage stakeholder expectations to fail-fast and fail-safe.
- Scale on demand to provide architecture services.
- Reduce cycle time and adopt an incremental delivery of architecture services.
- Adapt to rapid changes in the technology landscape.
- Communicate the value of adopting fit-for-purpose over standardization of technologies.

In addition, an Agile EA can help IT to:

- Meet evolving user or customer expectations.
- Improve focus on insights over information (for example, application portfolio insights over application portfolio information).

Competing when change is the only constant

The need for EA is usually a response to the technology trends prevalent at that point in time. A technology-centric model was in vogue when IT began focusing on technological standardization and infrastructure optimization. The rise of common off the shelf (COTS) products, custom solutions, and open standards then gave way to a portfolio-centric model.

Maturing EA frameworks and the evolution of industry-specific capability models necessitated a capability-centric model. Today, IT is focused primarily on digital innovation, automation, DevSecOps, and Agile delivery methodologies, which calls for an Agile EA model.⁴

It is thus natural that the transition to Agile EA necessitates changes in key dimensions of an EA function (See Figure 1):

I EA's focus areas. With the technology-centric approach to EA, the focus was on technology optimization. This led to standardization of the technology portfolio and improvement of business-IT alignment (in the capability-centric approach). With Agile EA, the focus of the practice shifts toward core modernization and innovation at scale, while enabling IT standardization and compliance through automation.

The evolution of EA

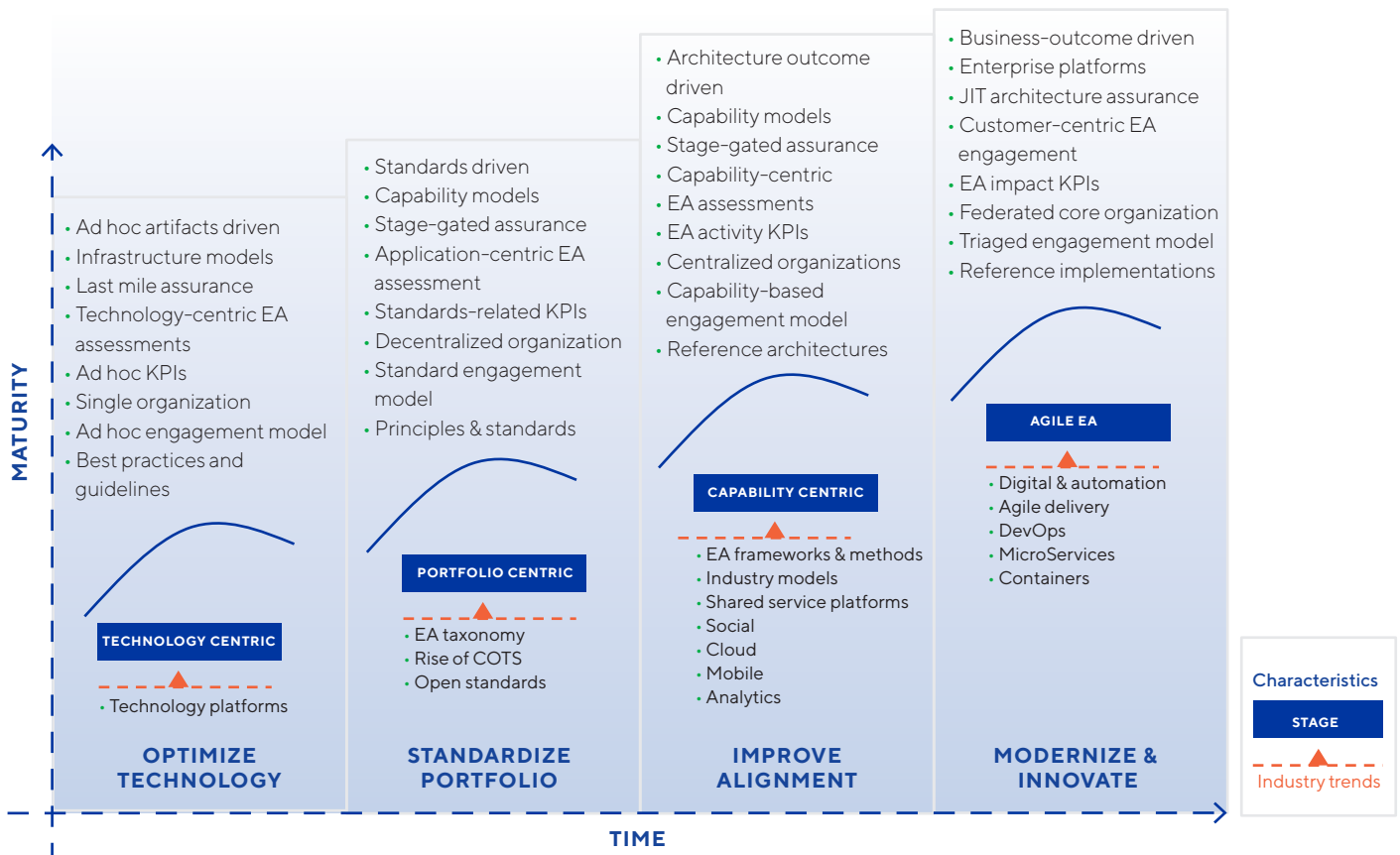


Figure 1

An Agile EA model will be business outcome-driven, service-centric, nimble and, more importantly, focus and scale to modernize and innovate. Customer-centric initiatives along with enterprise platforms will gain prominence.

I Key characteristics. An Agile EA model will be business outcome-driven, service-centric, nimble and, more importantly, focus and scale to modernize and innovate. Customer-centric initiatives along with enterprise platforms will gain prominence. A just-in-time architecture assurance approach will be preferred over a stage-gated compliance approach. Enterprise architects will be mapped to strategic enterprise initiatives rather than lines of business or portfolios as done traditionally.

I The organizational model. Rather than being a centralized and consolidated group within the organization, EA will shift to a federated structure with a core organization and a triaged engagement model. The federation can be on the basis of the functional divisions within the organization. A federated model helps to achieve the needed scalability. This also decouples the need for EA practitioners to be masters of all technologies and domains. The distributed team can focus on their individual strengths and capabilities, based on the functional division. Another important attribute is structuring the units of an EA function based on the service lines rather than based on disciplines of EA.

I The measurement criteria. The typical key result areas (KRA), which measure the effectiveness of an EA function, have traditionally been defined based on the activities such as *defining* standards, as well as *developing*

EA roadmaps, reference architectures, patterns and guidelines. This has shifted to impact-driven KPIs, with an emphasis on the business value realized through modernization or use of any of the EA assets, reduced cycle time for solution development, and/or consolidation – or rationalization – of systems or technologies.

I The tools. EA tools are used for strategic decision-making provided through capturing vital enterprise context background, along with content development and analysis capabilities across the business, information, technology and solution architectures.⁵ However, the focus has shifted from capturing information to proving that the IT investments are delivering the greatest return on investment and helping the organization meet its strategic goals. A more integrated relationship between IT and finance is needed. Traditional EA tools need to either evolve or complement other tools to provide holistic technology business management (TBM) that offers IT financial planning and insight.^{6,7}

Agile EA takes a complete relook at the current key EA functions as well as any new functions required for EA to scale up to meet the demands of digital business and automation that fuels it. Figure 2 (see next page) highlights some of the key differences.

Comparing the traditional and Agile EA model

Dimension	Traditional EA	Agile EA
Strategy	Firm up strategies as part of the planning exercise and implement later.	Evolve strategies and plans incrementally and iteratively.
Architecture assurance	Architecture review boards or committees carry out stage-gated approval process.	Enable JIT architecture assurance through self-service and stand-up meetings for most projects.
Technology governance	Define and manage technology standards through validation of points of view (PoV) by enterprise review boards.	Back fit-for-purpose technology standards by proof of technology reference Implementations.
Fiduciary responsibility	Need EA oversight for all projects and manage any deviations by exception.	Need EA oversight for most risky or important projects categorized by risk tiers.
Organization	Perceive as a competency center. Organize centralized architecture team around the various disciplines of EA, namely business, information, application and infrastructure.	Perceive as a services organization. Organize federated architecture team with the core team based on the architecture services provided.
Innovation	Focus on stability, risk reduction or cost savings. Develop PoVs and reusable solution accelerators.	Focus on flexibility and scalability, learning-by-doing and experimentation. Institute an innovation ecosystem that includes platforms and events such as hackathons, etc.
Technology management	Document-based reference architectures describe what should be done.	Reference implementations demonstrate how it should be done.
Operations	Focus on managing the operations of the EA functions – budget, people, talent management, etc.	Diversified focus includes service delivery and periodic standups with portfolio groups and stakeholders.
Portfolio management	Managing the portfolio is a core function of EA.	Managing the portfolio becomes a shared responsibility across the different line of business with EA acting as the custodian.
Value measurement	Activity based For example, the number of EA roadmaps or reference architectures developed.	Impact based For example, potential cost savings due to technology standardization and mean-time to market new products.
Knowledge management & communication	Leverage EAM tools and a document workspace or a portal that houses the architecture assets like reference architectures, business-led technology roadmaps, etc. Use periodic rosters and dashboards for communication with portfolio teams and other stakeholders.	Enable collaboration as well as seamless dissemination of information through digital workspaces or communication channels with a dedicated architecture wiki. Store and share reference implementations with an integrated code repository. Set up a diverse community of practitioners (CoP) to effectively collaborate and communicate.

Figure 2

The EA function’s organizational model

Most EA organizations are structured around business, data (or information), application (or solution) and technology (or infrastructure) architecture domains. In addition to these domains, certain organizations will have a dedicated unit for managing the IT portfolio through standard EA management tools and an operations unit that takes care of all operational activities of the function that includes budgeting, reporting, etc.

Extending the widely popular Conway’s law, which states that organizations produce designs based on their structure, the activities or functions of an EA organization are predominantly based on their internal structure.⁸ This kind of an organizational

structure requires bringing together architects from different units to deliver an architecture service, such as EA roadmaps, assessments or assurance. Hence, the services tend to cut across operating units. Invariably, this leads to managing and balancing the competing priorities of different EA units and addressing internal bandwidth limitations. Thus, each unit tends to deliver services that are isolated in nature, resulting in low business outcome or value.

To enable EA as a services organization, IT should be structured based on the service lines or service categories rather than architecture domains as is widely adopted today (see Figure 3).

The evolution of the EA organizational model

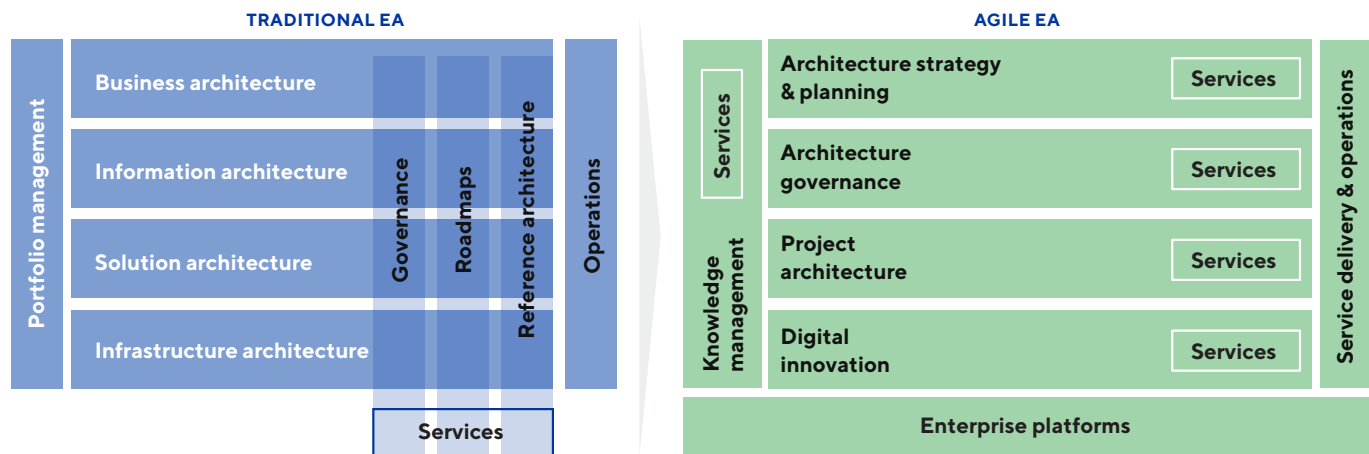


Figure 3

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Reference implementations on emerging technologies by the digital innovation unit will aid in compressing the time to define business-led technology roadmaps or project architecture services.

Each of these services (units) will be a multi-disciplinary team having their own set of user experience (UX) architects, business architects, information architects, solution architects, and technology architects. This aligns well with the Agile philosophy of independent, autonomous teams to reduce dependencies and improve the velocity of the solution or product delivery. Each unit will have a designated service line lead that is responsible for defining and executing architecture services within that service line or category.

Services (units) within the EA organization may include:

- I Architecture strategy and planning.** Custodian of the overall vision and direction. This unit works with business and IT leads (CIOs and CFOs) to ensure business and IT alignment on a strategic level. It is also responsible for enterprise-wide roadmaps.
- I Architectural governance.** Ensures that projects and delivery follow a common standard.
- I Project architecture.** Tasked with defining solutions related to a given project, or set of requirements.
- I Digital innovation.** Tasked with developing reference implementations that can serve as the golden standard for use in the organization.
- I Enterprise platforms.** Tasked with monitoring the evolution of platforms such as customer

relationship management (CRM), enterprise resource planning (ERP), document management, etc., and advising the impacted functions on upcoming changes.

- I Knowledge management.** Governs and controls knowledge assets, such as EA repositories and other EA tools.
- I Service delivery and operations.** Functions as the program management office (PMO) and keeps track of available bandwidth and workload for different units. A large EA organization benefits from a dedicated delivery and operation unit in a way that the other services can concentrate on their core area.

Such a structure will allow for greater autonomy in delivering relevant EA services and also enable a closed loop of architecture services across different units. For instance, reference implementations on emerging technologies by the digital innovation unit will aid in compressing the time to define business-led technology roadmaps or project architecture services.

A dedicated knowledge management unit will be essential to govern and control the knowledge assets across other units from architecture strategy to digital innovation. The existing operations unit will be expanded to cover service delivery responsibilities within the Agile EA model, and strongly advocates EA to be a services organization rather than a body of architects.

Key benefits of this approach include:

- Independent, self-sufficient teams with reduced coupling between units and increased cohesion.
- Independently scale based on the services.
- The ability to exploit different sourcing models for various services. For example, managed services for architecture assurance services or time-boxed consulting for business-led technology roadmaps or assessments, etc.

Key limitations include:

- Challenges with effective utilization of resources to avoid resource redundancies.
- Inability to foster a community based on architecture domains.
- Difficulty avoiding walls between units to effectively integrate services across service lines.

EA as a services organization

One of the common perceptions about EA as an organization is that it is merely a competency center comprising a collection of talented architects. This setup often leads to an unsustainable and non-scalable model, as identifying, retaining and scaling appropriate talent is highly difficult. It also leads to non-standardization of services due to *my-way-of-doing* things; and a tendency to involve EAs in more tactical project activities over strategic enterprise initiatives, citing urgent needs and increased dependencies on people rather than process. Collectively, this results in ineffective communication of the EA function's value.

As an alternative to a competency center model, the EA function should be established as a services organization that provides a wide range of services to different stakeholders in the enterprise as defined in its charter. With this approach, the

value or impact of an EA function is determined first by the kind of services it provides and if the services can be easily mapped to the enterprise's strategic priorities. The services that are relevant to an organization may vary, based on the needs and priority of the stakeholders and the organization. Having said that, each service should have a clearly articulated service definition that includes a clear definition of ready (inputs), definition of done (deliverables/outputs) and the process. The service definition should also include the necessary metrics by which the effectiveness of the service can be measured, and the metrics can be effectively used to tie it to enterprise-level business outcomes and KPIs.

IT organizations should institute a formal customer satisfaction survey to solicit stakeholder feedback upon completion of a service. Each service should

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Complementing the organizational model, EA services can be broadly classified into the following categories:

- I Innovation services.** These revolve around identifying and questioning the status quo, and exploring new opportunities in business and technology, thereby finding new ways to close the gaps between strategy and execution. With an Agile EA, the focus shifts from getting things right the first time to learning by doing. The innovations themselves are ecosystem focused (outside in), rather than being organizationally focused (inside out). The focus of innovation thus shifts from optimizing internal business drivers to adapting to newer market demands. Some services include enterprise hackathons, reference implementations on emerging technologies, strengths, weaknesses, opportunities, and threats (SWOT) and market analysis, blue ocean strategies, customer segmentation, product differentiation and business model innovation.
- I Strategic services.** These pivot around definition and formulation of long-term enterprise strategy and transformation from the current state. Typical services include domain or business-led technology roadmap definition, modernization or transformation strategy definition, technology migration assessment and framework definition, channel strategy definition, etc. Techniques such as design thinking and value stream mapping (VSM) will be employed as part of strategic services.
- I Assurance and governance services.** These focus on ensuring that delivery is aligned with IT principles, standards, best practices and other guidelines set forth in the enterprise. Typical services include architecture assessment/ review, impact assessment, information and technology standards. In an Agile EA, the focus must shift from a central team managing the governance process in a phase-gated manner, to a federated model and just-in-time assurance. Reference models and processes can be developed to enable individual project teams to self-assess or self-certify in alignment with IT standards, practices and approved domain or technology roadmaps. Mechanisms like technology horizon/radar will be used to track and govern the use of various technologies.
- I Project architecture services.** These revolve around the delivery of architecture and design services in the context of a particular project. Typical services are architecture definition, solution envisioning and blueprinting, non-functional requirements (NFR) rationalization and architecture assessment. Agile EA model promotes the use of lightweight techniques like ThoughtWorks's Architecture Decision Records (ADRs).⁹
- I Knowledge management (KM) services.** These pivot around creation and management of architecture assets that can be effectively used for accelerating solution development or decision-making. KM services also include the development of business and IT capability models, reference models and IT portfolio management that can be leveraged for other services such as assurance or governance.

Development of an enterprise architecture wiki to disseminate architecture assets and collateral, application lineage, information lineage, and portfolio information is also part of this service category.

I Platform services. These are oriented around the development and management of enterprise platforms to accelerate the time to market for new solutions. This includes establishing enterprise platforms for DevSecOps, application platform as a service (aPaaS), identity and access management, standing up of innovation hubs or spaces on the cloud with or without enterprise connectivity to support innovation services such as enterprise hackathons, reference implementations, etc. (See our Digitally Cognizant blog post “How

DevSecOps Can Help Plug a \$6 Trillion Drain” for additional insights.)

I An organization may have varying levels of involvement for these categories of services, which further gives rise to the different EA models as illustrated in Figure 4.

A technology-centric EA practice will have a high level of maturity and involvement in assurance or compliance services, a medium involvement in platform, portfolio and project architecture services, and a low involvement in strategic and innovation services.

A capability-centric EA practice will have a high level of maturity and involvement in strategic and assurance services, a medium involvement in portfolio and innovation services, and a low

Essential elements of an EA model

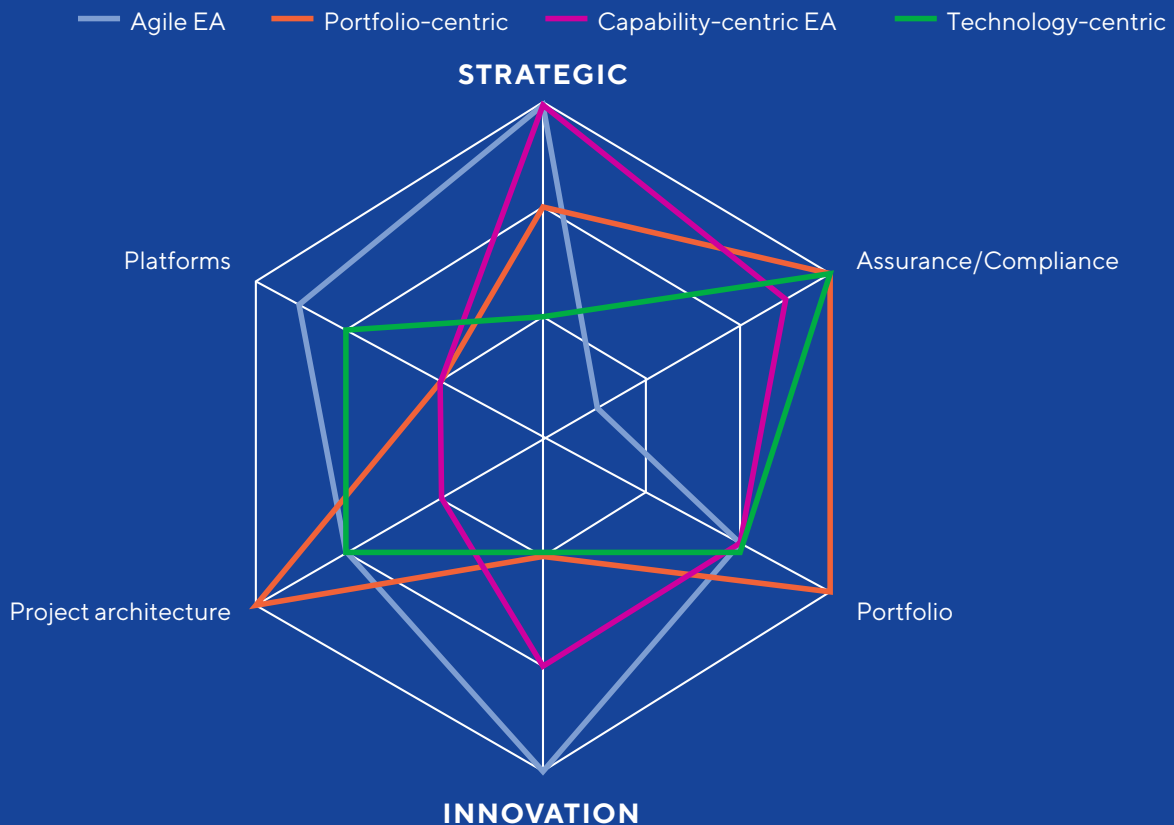


Figure 4

involvement in platform, project architecture, and innovation services.

A portfolio-centric EA practice will have a high level of maturity and involvement in portfolio, project architecture and assurance services, a medium involvement in strategic services, and a low involvement in platform and innovation services.

An Agile EA practice should demonstrate a high level of involvement in strategic, innovation and

platform services, medium level involvement in portfolio and project architecture services, and low level of involvement in assurance or compliance services. In Agile EA, we also foresee a major shift in how these services are delivered in the organization through automation and simplification.

Delivering on the change mandate

While it is clear that an Agile EA model will be relevant in the changing industry trends, transition to this model should be effected gradually across all dimensions of the EA function.

The reason: An enterprise is and will remain multi-modal. An EA function should address all requirements, effectively. By rushing to adapt to the growing practice of Agile, eliminating a standards-based approach or missing the big picture (i.e., taking an enterprise view) in any decision-making will result in increased technical debt. It becomes even more important to have a holistic function (EA) that, on one hand, fulfills the vision, and ensures everything fits, while on the other hand does not impede progress and agility by being bureaucratic and process heavy.

Key recommendations to effectively transition the traditional EA to Agile EA model include:

■ EA organization structure:

- > Restructure EA units based on services rather than architecture domains.
- > Rebrand EA as a services organization.
- > Onboard a multi-disciplinary, autonomous team for each EA unit.

- > Eliminate portfolio management as a stand-alone service of function. Instead, enable self-service to include portfolio teams to manage their portfolio with EA acting as a custodian. Integrate portfolio management as part of other services (e.g., assurance services).

■ EA functional structure:

- > Publish an EA services catalog with a clear definition of each service with expected business outcomes, including definition of ready, definition of done, activities, tier-based service level agreements (SLAs), collaborating, and dependent services.
- > Reduce EA involvement in non-strategic services like assurance or compliance services and leverage partners for executing those services.
- > Increase EA involvement in modernization and innovation initiatives.

- > Take ownership in developing and managing enterprise platforms that can foster innovation and modernization initiatives.
 - > Strengthen the KM function to effectively develop and harvest knowledge assets as part of the services catalog.
 - > Leverage lightweight, self-service tools like wiki to develop and disseminate architecture assets and collateral.
 - > Simplify architecture artifacts and deliverables with just-enough information. For instance, adopt lightweight architecture decision records (ADRs) rather than a mammoth software architecture document (SAD).
 - > Rationalize and decommission low business value services.
- EA measurements and value/benefit proposition evangelizing:
 - > Define impact-based KPIs to measure and communicate the value of the EA function.
 - > Communicate the value of a service through tangible business outcomes.
 - > Segregate metrics and KPIs to track the effectiveness and performance of services respectively.
 - > Institute a satisfaction survey to solicit customer feedback upon completion of a service.

Looking ahead

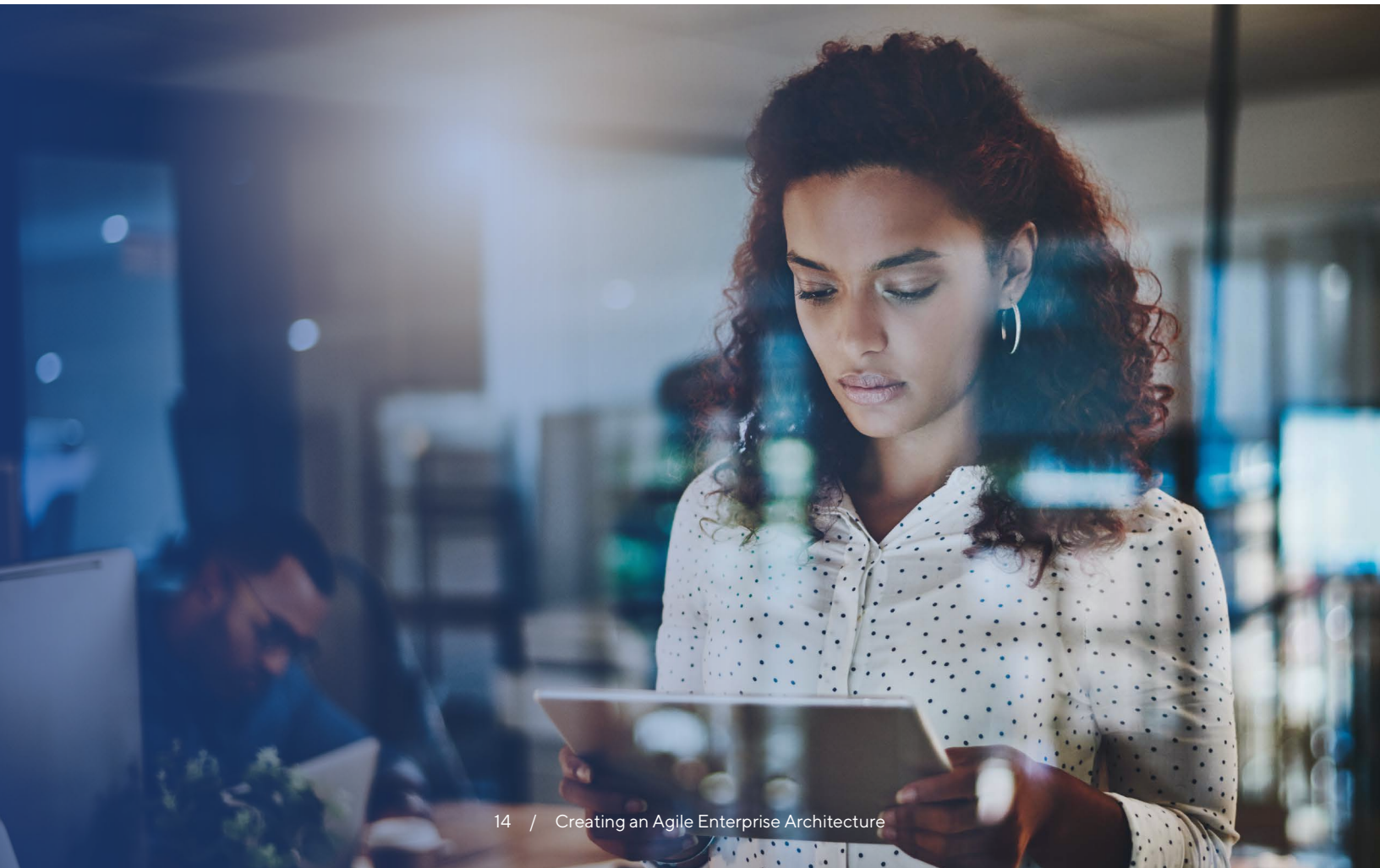
The crux of business agility is achieving strategic agility – sense emerging market opportunities early, and identify potential for long-term organizational agility. This will enable the organization to quickly adapt to emerging market challenges, and enhance operational agility through faster time to market, with minimum waste. IT agility serves as the principal driver for achieving business agility, and is the basis for running a competitive and viable business. IT agility is achieved using Agile development and methods that pivot on increased velocity to experiment, validate and scale. An Agile EA supports and guides the Agile development environment to maintain the organization’s focus with a faster, more effective cadence so that speed does not lead IT into unmanageable chaos.

The concept of Agile EA doesn’t imply supporting or defining an architecture for Agile projects. Rather, it should be how to evolve the traditional EA function to become nimbler and more capable of addressing the rapidly growing and changing expectations of various enterprise stakeholders. While this paper introduced the concept of Agile EA along with the fundamental differences of and changes from the traditional EA, the discussion is far from over. The nuances and subtleties of the various aspects of Agile EA have to be determined and incrementally evolved. In addition, there is no one-size-fits-all specifically when it comes to defining an EA function for an organization.

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Endnotes

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