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Modernizing BSS/OSS:

A standards-based guide to build vs. buy decisions for CSPs

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Executive summary

Communications Service Providers (CSPs) are at a strategic inflection point. As the industry shifts with traditional telecommunications companies (telcos) evolving into technology-driven companies (tech-cos), the modernization of BSS/OSS systems is no longer optional; it's foundational. The real question is not whether to modernize but how.

The whitepaper explores a clear, standards-based framework to guide "build vs. buy" decisions. Drawing on TM Forum's frameworks and real-world implementations, we outline how CSPs can balance operational efficiency with strategic differentiation.

Key insights include:

- A hybrid approach offers the best of both worlds, including buy for scale and build for differentiation.

- CSPs adopting this model achieve significant ROI on targeted "build" initiatives and substantial TCO savings through smart "buy" strategies.

- TM Forum standards dramatically reduce integration costs, accelerating time to market and enabling modular transformation.

Modernization succeeds when technology choices align with business goals, organizational readiness, and the right partnerships. In the following sections, let's explore how CSPs can apply these principles to actionable strategies to drive future-ready transformation.

Framework-driven OSS/BSS modernization: Accelerating the tech-co journey

Modernizing OSS/BSS is central to helping telcos become agile, customer-focused tech-cos. But it's a complex, long-term journey that demands strategic evaluation of organizational goals, capabilities, and evolving market dynamics.

A key decision in this process is whether to build a custom OSS/BSS solution, buy an off-the-shelf platform, or adopt a hybrid approach. Each path has trade-offs, including balancing speed, control, cost, and scalability. The right choice depends on where the organization stands today and where it aspires to be in the tech-co evolution.

The role of industry standards

Standard frameworks provide essential guidance to telecommunication providers navigating BSS/OSS modernization. The TM Forum has developed comprehensive frameworks that bring structure and standardization to transformation initiatives:

eTOM Business Process Framework:

The enhanced Telecom Operations Map (eTOM) framework provides a structured approach to telecom operations, categorizing processes into three key domains, including strategy, infrastructure, and product (SIP) operations and enterprise management. It serves as a foundation for process standardization, vendor selection, gap analysis, and performance benchmarking, enabling CSPs to streamline workflows and improve efficiency. While eTOM defines 'what' processes are required for telecom operations, it works with other frameworks that address 'which' applications to use and 'how' data should be shared, ensuring seamless integration across the ecosystem.

TM Forum ODA Framework:

The Open Digital Architecture (ODA) is a modular, cloud-native framework that accelerates digital transformation for CSPs. It is built on key principles such as decomposing monolithic applications, API-first design, cloud-native implementation, zero-touch operations, and AI-driven automation. By leveraging standardized Open APIs, ODA ensures seamless integration, reduces complexity, and minimizes vendor lock-in. With industry frameworks like eTOM, Telecom Application Map (TAM), and shared information/data model (SID), ODA enables automation, innovation, and efficient service delivery.

The TM Forum offers additional standards and frameworks that support various stages of modernization, providing CSPs with a clear roadmap for seamless transformation. These guidelines help streamline decision-making, ensuring a structured and efficient journey toward digital excellence.
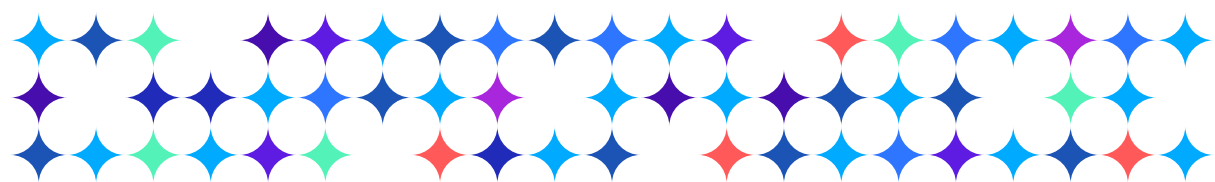
Key considerations for the build vs. buy decision

Before embarking on the OSS/BSS modernization journey, it's essential to evaluate critical factors that influence the build vs. buy decision. The following considerations help ensure a strategic, cost-effective, and future-ready approach by leveraging industry frameworks and best practices.

Telco assessment methodology

This structured methodology enables telecommunication providers to make well-informed build versus buy decisions across multiple domains. It ensures strategic alignment, validates technical feasibility, and enhances operational efficiency. Telcos should apply this methodology across business, application, data, technology, and digital maturity to guide decision-making and accelerate transformation outcomes.

Business domain assessment:

Map business processes to TM Forum's level three and four eTOM standards to assess process maturity, identify gaps between current and target states, and capture strategic business requirements for a seamless transformation.

Application domain assessment:

Conduct a comprehensive application inventory and capability mapping leveraging TM Forum's TAM framework. Evaluate interfaces and integrations, analyze technical debt, and assess architecture patterns to streamline and optimize the application ecosystems.
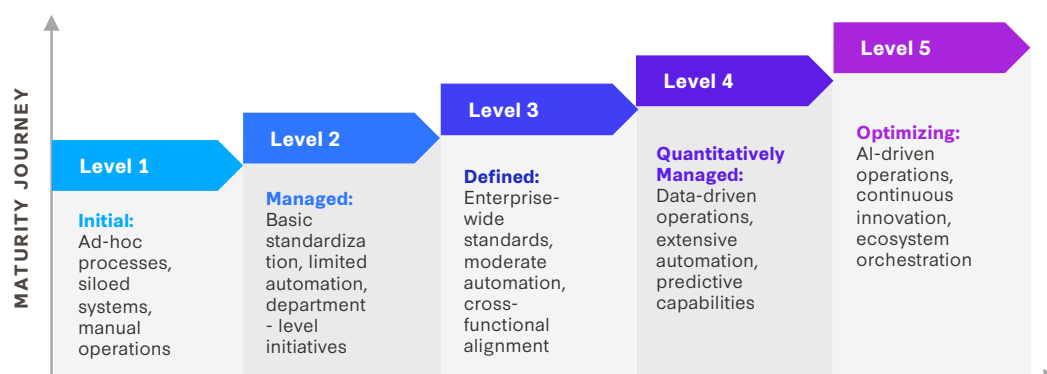
Data domain assessment:

Align the data models with TM Forum's SID framework. Evaluate data quality, governance practices, and analytics maturity while establishing a robust master data management strategy.

Technology domain assessment:

Assess cloud readiness, API maturity, automation capabilities, and DevOps adoption to ensure a scalable, resilient, future-ready technology environment.

Digital maturity assessment framework:

A structured framework can evaluate digital maturity across seven key dimensions, each assessed against five defined maturity levels.

MATURITY JOURNEY

Level 1
Initial: Ad-hoc processes, siloed systems, manual operations

Level 2
Managed: Basic standardization, limited automation, department - level initiatives

Level 3
Defined: Enterprise-wide standards, moderate automation, cross-functional alignment

Level 4
Quantitatively Managed: Data-driven operations, extensive automation, predictive capabilities

Level 5
Optimizing: AI-driven operations, continuous innovation, ecosystem orchestration

1. **Strategic vision:** Digital strategy alignment, executive sponsorship, transformation goals
2. **Customer experience:** Omnichannel capabilities, personalization, journey optimization
3. **Operations:** Process automation, operational efficiency, SLA management
4. **Technology:** Architecture modernization, cloud adoption, technical debt
5. **Data and analytics:** Data strategy, insight generation, AI/ML capabilities
6. **Organization and culture:** Digital skills, agile ways of working, innovation culture
7. **Partner ecosystem:** API economy readiness, partner onboarding, ecosystem monetization

Persona-based telco analysis

Analyse telco personas based on classifications, strategic focus, operating model, and technology readiness to customize the build vs. buy strategy. This ensures transformation decisions are aligned with each telco's unique objectives.

Telco classification - Telecom operators can be broadly classified based on their infrastructure maturity, service scope, and market focus. Understanding these categories helps tailor transformation strategies to meet each operator's unique needs and constraints.

- **Greenfield operators:** Cloud-native newcomers prioritizing agility and cost-efficiency.
- **Brownfield operators:** Legacy CSPs balancing modernization with existing infrastructure.
- **Tier one, two, or three operators:** Large-scale, regional, or niche providers with varying budgets and reach.
- **Mobile Virtual Network Operators (MVNOs):** Lease network infrastructure, focusing on partner integration and differentiation.
- **Converged providers:** Offer mobile, broadband, and enterprise services, requiring seamless integration.

Strategic focus - Telcos pursue diverse strategic priorities to stay competitive and relevant. These focus areas, ranging from product innovation to customer experience and cost efficiency, shape how they invest, operate, and transform.

- Product-centric includes innovation-led, revenue-driven service differentiation.
- Customer-centric includes prioritizing personalization, omnichannel support, and experience.
- Cost optimization-centric reduces CAPEX/OPEX via automation and virtualization.

Operational model - A telco's operational model defines how technology is deployed, acquired, and implemented, directly impacting agility, scalability, and time-to-value.

- **Deployment:** Cloud-native, on-premises, or hybrid
- **Acquisition:** Software as a Service (SaaS), licensed, or custom development
- **Implementation:** Low-code/no-code vs. custom-built solutions
- **Timeline:** Aggressive (6 months), moderate (12 months), or phased (18+ months)

Technology readiness - Technology readiness reflects a telco's capability to adopt, integrate, and scale digital initiatives.

- **Digital adoption:** Basic, intermediate, or advanced
- **API maturity:** Ad-hoc, managed, or industrialized API ecosystems
- **Automation:** Manual, semi-automated, or fully automated operations

This structured assessment approach helps CSPs align transformation investments with business goals, ensuring long-term growth and competitiveness.
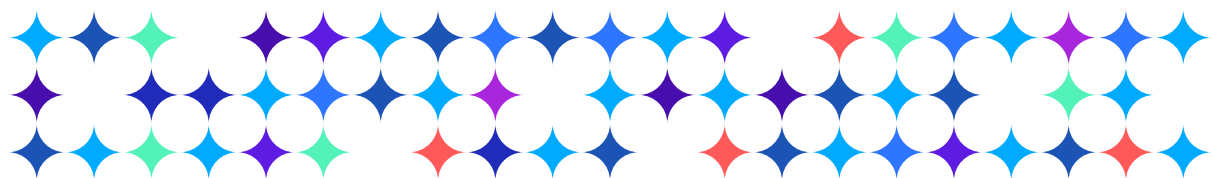
Systems classification framework

A critical foundation for build vs. buy decisions is a clear understanding of system types and their strategic value. Telecommunication systems are classified into four categories:

Classification	Definition	Example	Build vs. buy consideration	TM Forum alignment	Investment recommendation
Systems of Record (SOR)	Core transaction processing systems that serve as authoritative data sources	Billing, CRM, inventory management, ERP	Typically standardized with industry best practices	Core component systems in ODA	Prioritize buy (SaaS when possible) with over 100% ROI within 5 years of a successful implementation
Systems of Engagement (SOE)	Customer and partner-facing interfaces enabling digital interactions	Self-service portals, mobile apps, chatbots, and partner APIs	Often custom-built for differentiated customer experience	Engagement components in ODA	Prioritize build for strategic differentiation with over 150% typical five year ROI
Systems of Insight (SOI)	Analytics and intelligence platforms converting data into actionable insights	Customer and network analytics, AI/ML platforms	Hybrid approach with custom models on standard platforms	Intelligence management in ODA	Hybrid approach optimal with commercial platforms and custom models
Systems of Connection (SOC)	Integration and orchestration platforms connecting other systems	API gateways, service orchestration, process automation	Standardized platforms with custom orchestration	Integration fabric in ODA	Buy integration platforms, build custom orchestration
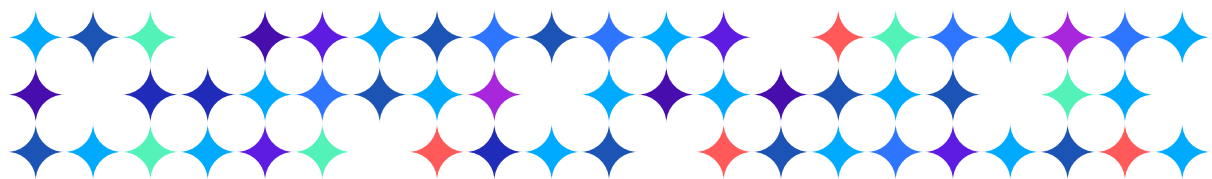
Build vs. buy decision framework

CSPs must decide between building custom solutions and buying off-the-shelf platforms. A structured framework helps evaluate these options across four strategic dimensions, guiding organizations toward choices that align with near-term goals and long-term tech-co ambitions.

Strategic alignment

Assess how the solution supports your broader business vision:

- How closely does the solution need to align with unique business objectives?
- Is this area a source of competitive differentiation?
- Does the organization have a strategic vision that requires custom capabilities?
- Will future business model evolution require flexible adaptation?

Operational impact

Evaluate execution feasibility and organizational readiness:

- What is the required time to market for the solution?
- Does the organization have the necessary skills and resources?
- How complex is the integration with existing systems?
- What operational model (DevOps, SRE) will support the solution?

Technical considerations

Ensure technical viability and future-proofing:

- What level of customization is required to meet business needs?
- How will the solution scale with business growth?
- Does the solution comply with relevant industry standards, including TM Forum, 3GPP (third generation partnership project)?
- What is the technology lifecycle management approach?

Financial analysis

Compare long-term financial implications:

- What is the total cost of ownership over 5-7 years?
- How does the ROI timeline compare between build and buy options?
- What are the financial risks associated with each approach?
- How does each option impact CapEx vs OpEx allocation?

This methodology offers telcos a comprehensive understanding of their transformation landscape by combining domain-specific assessments with a persona-based lens. It identifies where they stand and equips them to make confident, context-aware build vs. buy decisions. With this foundation in place, let's explore how these considerations translate across OSS and BSS application domains.

Modern BSS components

Modern BSS architectures comprise several key components, each with distinct build versus buy considerations:

① 1

Customer management systems

Capabilities include customer acquisition, retention, lifecycle management, self-service portals, omnichannel journey orchestration, and 360-degree customer view

- TM Forum alignment: Customer domain in Open Digital Architecture (ODA)
- Build vs. buy considerations:
  - Buy when the customer journeys are standard and the service portfolio is traditional
  - Build when customer segments are unique and engagement models are innovative
  - Market maturity: High maturity with established SaaS/Cloud solutions
  - Implementation complexity: Medium (integration with existing channels)
  - Cost considerations: $15-25 per subscriber annually for SaaS solutions

② 2

Product and offer management

Capabilities include centralized catalog, configure-price-quote, template-based product creation, and partner product integration

- TM Forum alignment: Product domain in ODA
- Build vs. buy considerations:
  - Buy when the product portfolio is standard and the business models are traditional
  - Build when bundling is complex, pricing is dynamic, and with ecosystem offerings
  - Market maturity: Medium maturity with evolving standards
  - Implementation complexity: High (data modeling, integration)
  - Cost considerations: ROI is typically realized within 18-24 months

③ 3

Revenue management

Capabilities include convergent charging, real-time rating and balance management, partner settlement, and policy-driven charging rules

- TM Forum alignment: Revenue management domain in ODA
- Build vs. buy considerations:
  - Buy when rating/charging is standard and business models are traditional
  - Build when monetization is innovative with complex partner ecosystems
  - Market maturity: High maturity for traditional, medium for digital
  - Implementation complexity: Very high (data migration, revenue assurance)
  - Cost considerations: Typically the largest BSS investment (30-40% of total cost)

④ 4

Order management

Capabilities include omnichannel order capture, order decomposition and orchestration, fallout management, and order lifecycle visibility

- TM Forum alignment: Fulfillment domain in ODA
- Build vs. buy considerations:
  - Buy when order processes are linear and product complexity is limited
  - Build when orchestration is complex and fulfillment processes is unique
  - Market maturity: Medium maturity with evolving standards
  - Implementation complexity: High (process integration, fallout handling)
  - Cost considerations: $3-8 per subscriber annually for SaaS solutions

Modern OSS components

Modern OSS architectures comprise several key components, each with distinct build versus buy considerations:

1

Resource inventory management

Capabilities include physical and logical resource representation, graph-based modeling, real-time synchronization, and lifecycle management

- TM Forum alignment: Resource domain in ODA
- Build vs. buy considerations:
  - Buy when network technology is standard and customization needs are limited
  - Build when there are multi-domain networks and complex service modeling
  - Market maturity: Medium maturity with evolving cloud solutions
  - Implementation complexity: Very high (data migration, synchronization)
  - Cost considerations: $2-5 per network element annually for SaaS solutions

2

Service orchestration

Capabilities include end to end service design and composition, automated activation and configuration, closed-loop assurance, and SLA monitoring

- TM Forum alignment: Service management domain in ODA
- Build vs. buy considerations:
  - Buy when the service catalog is pre-defined and activation workflows are standard
  - Build when service offerings are unique with complex dependencies
  - Market maturity: Medium maturity with significant innovation
  - Implementation complexity: High (integration with multiple domains)
  - Cost considerations: ROI is typically realized within 12-18 months

3

Network management and automation

Capabilities include zero-touch provisioning, intent-based operations, AI-driven maintenance, and closed-loop automation

- TM Forum alignment: Resource domain in ODA
- Build vs. buy considerations:
  - Buy when the network is homogeneous with standard operations
  - Build when the environment is multi-vendor with specialized requirements
  - Market maturity: Medium maturity with rapid innovation in AI/ML
  - Implementation complexity: High (vendor integration, process automation)
  - Cost considerations: 20-30% OpEx reduction potential

4

Field service management

Capabilities include AI-optimized scheduling, mobile workforce enablement, AR/VR-assisted operations, and real-time tracking

- TM Forum alignment: Resource domain in ODA
- Build vs. buy considerations:
  - Buy when field processes are standard with limited geography
  - Build when workforce rules are complex, with specialized industry requirements
  - Market maturity: High maturity with established cloud solutions
  - Implementation complexity: Medium (integration with inventory/CRM)
  - Cost considerations: 15-25% field efficiency improvement potential

BSS/OSS build vs. buy decision matrix

The BSS/OSS build versus buy decision matrix provides a framework for evaluating components based on business process uniqueness and competitive differentiation potential:
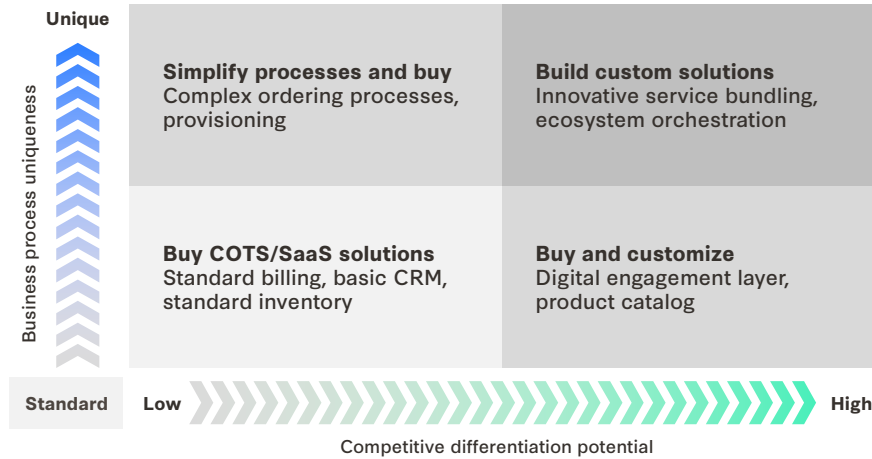
Buy COTS/SaaS solutions: Standard processes with low differentiation potential

- Examples: Standard billing, basic CRM, standard inventory

Buy and customize: Standard processes with higher differentiation potential

- Examples: Digital engagement layer, product catalog

Simplify processes and buy: Unique processes with low differentiation potential

- Examples: Complex ordering processes, provisioning

Build custom solutions: Unique processes with high differentiation potential

- Examples: Innovative service bundling, ecosystem orchestration

The hybrid approach: Balancing build and buy

Many telecommunications providers are adopting hybrid approaches that blend build and buy strategies, leveraging microservices architecture for component-level decisions, an API-first strategy for seamless integration, low-code platforms for rapid customization, and open-source foundations with proprietary enhancements.

Different operator types are applying this hybrid approach in distinct ways, shaped by their strategic priorities and business models:

Leading CSPs prioritize stability and scalability in their system architecture, with the majority implementing commercial off-the-shelf (COTS) platforms as their foundation. A significant portion of these systems are customized to address specific business requirements, while a smaller but strategic segment is fully custom-built to create competitive differentiation in the market.

Digital-first operators typically employ a hybrid tech stack approach, balancing SaaS platforms with custom-built solutions to drive innovation. According to industry practice, they often maintain a significant portion of custom-built systems that enable greater flexibility and differentiation in the market.

Mobile Virtual Network Operators (MVNOs) generally rely more heavily on SaaS solutions to minimize complexity and accelerate time-to-market. As shown by OEM vendors, in their 'Telco in a Box' BSS SaaS solutions enable MVNOs to launch new services in under three months compared to traditional transformations that can take 2-5 years, demonstrating how MVNOs prioritize speed and agility through greater SaaS adoption.
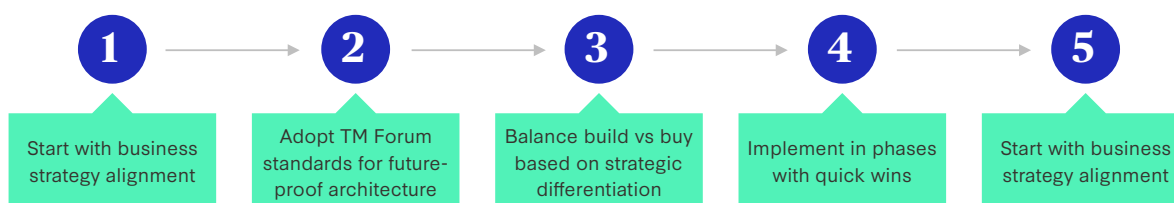
Benefits for build vs. buy

Benefit factor		Build	Buy
Operational benefits	Process automation	**35-40%** reduction in manual operations	**25-30%** reduction in manual operations
	Time-to-market	**30-40%** faster changes post-implementation	**50-60%** faster initially
	Service reliability	**99.5%** availability for newly built systems in first year	**99.9%** availability for newly built systems in first year
	Scalability cost	**15-20%** lower cost scaling beyond initial capacity	**25-30%** higher for commercial licensing
Business benefits	CX improvement	**20-25%** higher NPS	**10-15%** higher NPS
	New service revenue	**15-20%** higher new service adoption	**8-12%** higher new service adoption
	OpEx reduction	**10-15%** for custom solutions in first two years	**20-25%** OpEx reduction
	Digital channel shift	**40-50%** channel shift	**30-40%** with commercial implementations

* Baseline percentage values are based on observation

Conclusions and recommendations

Our comprehensive analysis of the BSS/OSS build versus buy paradigm reveals that successful transformation hinges on a strategic, phased approach that tightly aligns technology investments with business priorities. Based on our findings, we recommend a five-point approach for telecommunications providers:

1 → **2** → **3** → **4** → **5**

1	2	3	4	5
Start with business strategy alignment	Adopt TM Forum standards for future-proof architecture	Balance build vs buy based on strategic differentiation	Implement in phases with quick wins	Start with business strategy alignment

A successful transformation requires a strategic, phased approach that aligns technology with business objectives. Organizations must begin by clearly defining business outcomes and KPIs while ensuring that technology decisions support strategic priorities. Leveraging the TM Forum standards, including the ODA component-based approach and Open APIs, helps create a future-proof architecture with seamless integration.

Balancing build vs. buy decisions is key, with standardized Systems of Record being purchased, Systems of Engagement being custom-built for differentiation, and a hybrid approach applied to Systems of Insight and Connection based on business impact. Phased implementation, starting with quick wins, ensures measurable value, executive buy-in, and sustained momentum.

Finally, a robust data and integration strategy is essential, incorporating an API-first approach, strong governance, and scalable analytics. By following this structured roadmap, organizations can drive agility, innovation, and long-term success in their digital transformation journey.

About the author

Sushanta Nag
Senior Director, Telco Consulting

Sushanta Nag is a seasoned telecom consulting leader with over 25 years of global experience in driving large-scale BSS/OSS and digital transformation initiatives. With telecom domain expertise across customer engagement, solution consulting, application development and management (ADM), managed services, and digital enablement, Sushanta brings his consultative approach and execution excellence to consistently deliver measurable business outcomes across leading telecom markets worldwide.

References:

1. TM Forum. (2023). Open Digital Architecture (ODA). TM Forum.
    https://www.tmforum.org/oda/

2. TM Forum. (2022). Business Process Framework (eTOM). TM Forum.
    https://www.tmforum.org/oda/business/process-framework-etom/

3. TM Forum. (2022). Application Framework (TAM). TM Forum.
    https://www.tmforum.org/resources/posters/application-framework-tam-poster-release-18-5/

4. TM Forum. (2022). Information Framework (SID). TM Forum.
    https://www.tmforum.org/oda/information-systems/information-framework-sid/

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