BTM BOK v.0.1

Business Technology Management

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BTM FORUM | Leaders of the Digital Transformation

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1 Overview

Business Technology Management (BTM) Body of Knowledge (BOK) is a guide for professional development and learning of key roles, core competencies, best practices, and supporting references.

Whether in private, public, or non-profit sectors, organizations everywhere are being transformed by the innovative use of technology and are required to rethink their business models and IT investments. This creates an unprecedented demand for a new generation of leaders with hybrid skillsets, requiring Information Systems (IS) and Information Technology (IT) professions, traditionally separated in business and computing schools, to grow beyond their fragmented and competing specializations.

To overcome these challenges, IT Association of Canada (ITAC) developed the BTM initiative to promote a renewed sense of community and help map the many career paths crossing business and technology functions. It grew into a global community, BTM Forum / Forum GTA (https://www.btm-forum.org/), to build new certifications, accreditation, and practice references to support digital transformation leaders.

As the BTM Forum's core reference, BTM BOK (https://www.btm-forum.org/standards/bok) will become a resourceful web site to guide practitioners at all levels of competency: associate, professional, manager, entrepreneur, and executive. It does not replace existing BOKs, but instead provide a generic core model centered on business value and technological innovation, a guide to additional knowledge and sources relevant to enter new BTM positions. It is also fully open, customizable, and reusable, with a version in XMI consumable with APIs to seamlessly integrate its contents in various Talent Management systems, e.g., custom BTM-compliant job descriptions, automated matching of CVs and job competencies, learning path recommendations given prior experience for recognized BTM careers, etc.

BTM BOK reuses primarily 100+ Share-Alike references under CC BY-SA 3.0, EPL 1.0, and EUPL 1.2, with some under freer licenses such as CC-BY, Apache, and MIT. It is developed through an open community effort to help map its contents to several open and proprietary BOKs. It is supported by numerous citations to academic and professional literature, guiding learners to most trusted sources. It is delivered to the community in 3 formats allowing anyone to browse, read, download, edit, reuse, and republish:

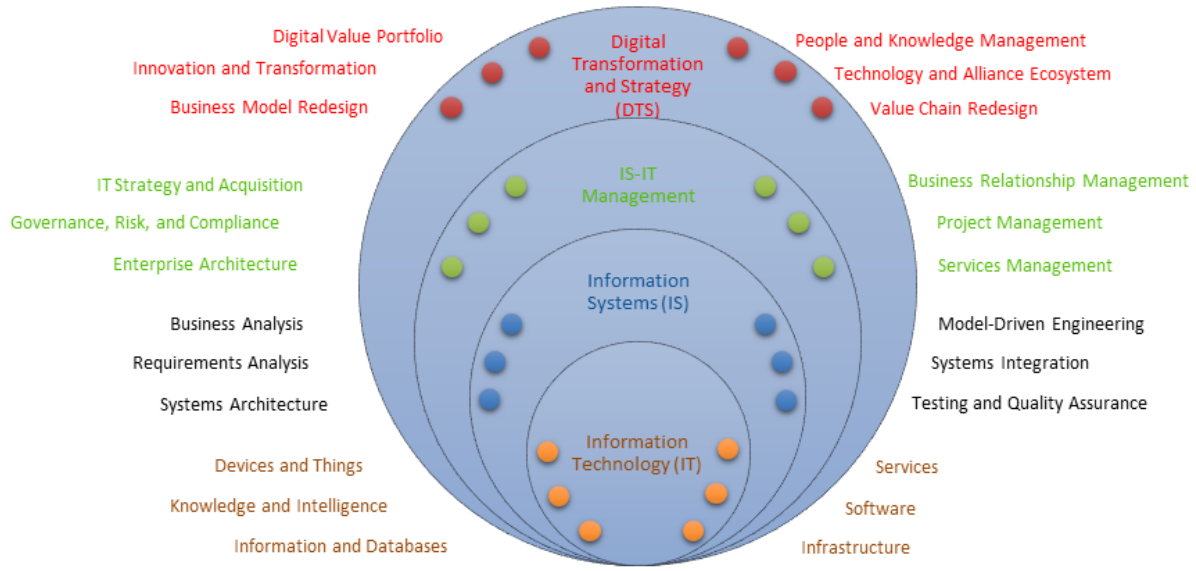
1. All can freely download the present guide (links on the BTM BOK web page, no registration required) in PDF as well as DOCX for free open editing. We also provide a ZIP containing all figures in PNG, along with editable versions in VSDX and some in addition with PPTX versions.
2. It can be consulted for free through a detailed menu within an Eclipse Process Framework (EPF) Wiki (https://www.btm-forum.org/boks/). The community can also signup to edit, contribute contents, and join our BTM group on Zotero (https://www.zotero.org/groups/1145457/btm) to add references to external sources and insert/cite them within various pages of our wiki.
3. More complex editing and customization is possible by importing the contents of the EPF Wiki, including the latest contributed contents regularly vetted by an editorial team, hosted on GitLab (https://gitlab.com/BTMprof/btmbok) with all files packaged within an EPF Method Library (https://www.eclipse.org/epf/). It is editable within EPF Composer, with an invitation to share back your edits on GitLab within the group, and/or fork your Method Library, and/or publish in your own way your BTM BOK derivatives, e.g., your own EPF Wiki, but without the brand name.

1.1 Purpose

BTM as a "brand" is a new professional designation seeking to unify IS and IT graduates within a stronger community of practice, sharing a distinctive, vibrant, and engaging identity. The BTM name, and its French version Gestion des technologies d'affaire (GTA), are registered trademarks in Canada, and in United States and 104 countries under the Madrid System. A dozen Canadian colleges and universities have rebranded their programs, and more stakeholders worldwide are invited to join the BTM Forum / Forum GTA.

BTM as a "concept" can be understood as a fundamental redefinition of the IS-IT profession, shifting from an "information" to a broader "business" focus, supported by the integration of 4 "streams" of expertise (Figure 1). It builds on Digital Transformation and Strategy (DTS) as the set of key decisions to develop an IT-enabled business at the most strategic level of an organization. It also blurs boundaries and integrates DTS with more traditional expertise in IS-IT Management, IS, and IT. BTM doesn't replace but instead enriches all "streams" of our profession, providing more fluid, collaborative, and agile approaches to help accomplish digital transformation.

Figure 1: BTM Scope and Integration of DTS, IS-IT Management, IS, and IT



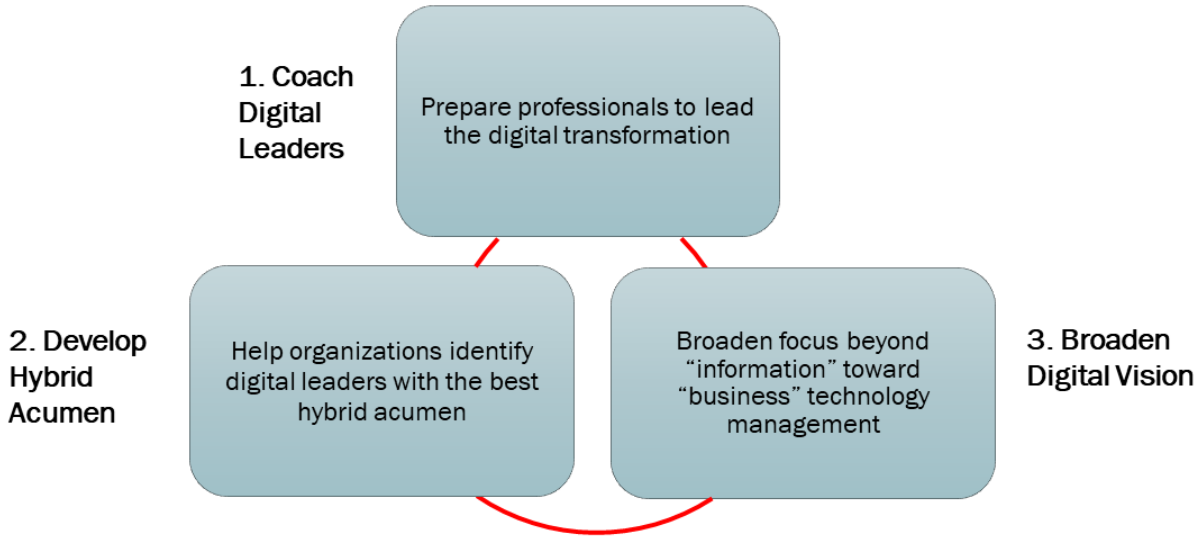
The scope of BTM practices have been studied by various researchers in IS-IT disciplines, primarily in business, computing, or engineering schools. Their integration helps redefine the nature of the profession and its impact, emphasizing distinctive professional abilities for digital leadership, such as:

- Focusing on innovation and digital business value, in addition to leading traditional IS-IT services
- Helping leaders to accelerate digital transformation, in addition to improving IS-IT management
- Ensuring digital leaders share a distinctively hybrid business-technology-management acumen

1.1.1 Objectives

BTM BOK as a "knowledge tool" aims to support IS-IT professionals to develop a unified BTM expertise, and help all stakeholders at all levels to work together more seamlessly within a coherent profession (Figure 2). It is primarily used to help coach the next generation of ***Leaders of the Digital Transformation***, slogan describing its founding organization, BTM Forum. It also serves to define the distinctive approaches to help strengthen the hybrid business-technology-management acumen, which builds upon existing practices, and provide guidance on their common core knowledge base. It also serves to broaden the vision of digital transformation from an information to a business focus.

Figure 2: BTM BOK Objectives



The BTM vision is fueled by an emerging consensus within the profession on converging observations:

1. BTM specializations, such as business analysis, project management, enterprise architecture, data analytics, etc., share the same hybrid acumen in business and technology.
2. BTM specializations are essential to lead the digital transformation, with more diverse (still undefined) career paths crossing beyond traditional roles, reaching increasingly at management, entrepreneurial, and executive levels.
3. BTM is still concerned with supporting operations but is more than ever the centerpiece of digital business strategies in all sectors, with renewed focus on innovation and value creation.

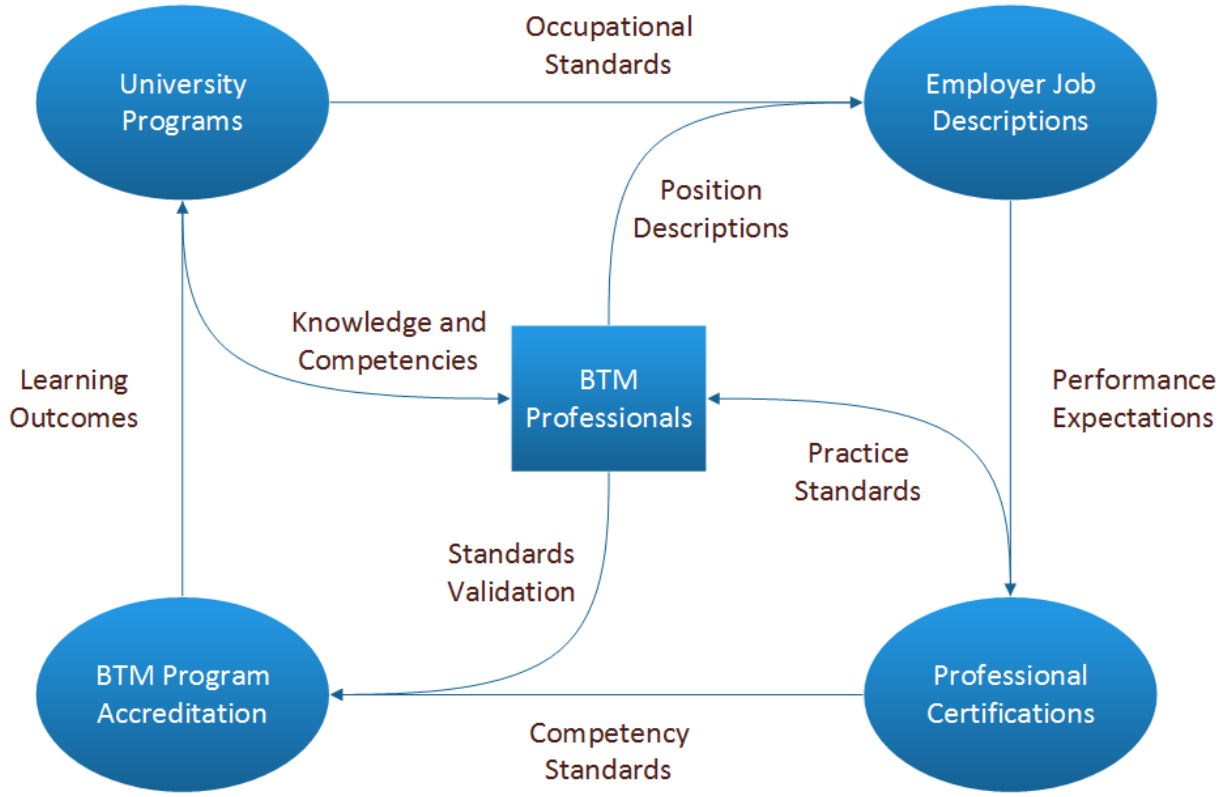
BTM BOK as a "professional guide" aims at addressing these trends, creating seamless bridges between key specializations, identifying expected competencies, and offering learning guidelines to develop new BTM expertise. It can be used as a guide for individual and team-based professional development and learning. It describes the key roles, core competencies, best practices, and supporting references of this emerging profession. It references and builds upon several existing open BOKs and complements them by offering integration pathways between specializations. It seeks to provide a simple logic to integrate complex practices around the core mission of digital transformation.

1.1.2 Profession

BTM as a "profession" must be viewed beyond its existing job roles loosely based on undergraduate educational credentials. It must be defined by people committed to meeting standards, setting personal goals to learn and master their tradecraft, and passing on this commitment to later generations.

BTM BOK as a "knowledge initiative" seeks to harmonize all facets of how professionals lead their community learning dynamics (Figure 3). It integrates academic research communities with professional practice specializations. It helps transforming IS-IT into an Evidence-Based Profession (EBP), with seamless integration of knowledge development, testing, validation, learning, practice, and feedback.

Figure 3: BTM Professionals and Community Learning Dynamics



BTM needs a critical mass of people who rank as valuable experts, mastering a broad skillset honed with minimum experience requirements, and recognized by promotion through ranks as these skills become in high demand. They can best identify with the profession if it develops a vibrant and future-minded spirit, with promising and well-paid positions. Reputation is also key, as candidates must first know the profession for its well-defined value-adding services to organizations and society. They are motivated to join when job roles are clear, with realistic and progressive competency requirements, and easy access to a self-sustaining and self-regulating (even if not legally-binding) professional board and job market.

BTM is therefore an "emerging profession", one that is rapidly meeting these conditions for critical mass, as job roles are undergoing radical shifts, with new requirements for position descriptions, organizational structures, and professional certifications and standards.

BTM practitioners are also changing the way they used to enter the profession. Typically, graduates earned a BBA in IS and/or an MBA, especially following an IT undergraduate degree. They then pursued relatively predictable career paths, often combining several certifications. For example, a frequent profile of IS grads included roles in Business Analysis, Project Management, and IT Services Management as they were promoted through the ranks within a typical corporate IT division.

Major shifts in BTM careers are challenging both employees and employers in developing a more integrated vision of the profession. BTM experts are increasingly from diverse educational credentials, often combining IT expertise gained during work experience within a non-technical profession. BTM profiles also combine a wider mix of positions in corporate, consulting, and start-up environments. They often get broader responsibilities throughout the Digital Adoption lifecycle, leading digital innovation, transformation, or optimization projects. BTM BOK aims to reflect these changes and help professionals gain better positions in leading digital transformation initiatives in all sectors.

1.1.3 Adoption

BTM and BTM BOK are offered as "free advice" resources and can help guide several groups (Table 1). Adoption is not a uniform process, hence the importance of keeping BTM BOK open and free, ensuring greater diversity of customization. BTM professional groups benefit differently but in a converging way from BTM and BTM BOK adoption. Their respective interests can convergence and help spur the adoption of the BTM BOK, and in turn ensure the growth of BTM as a "change initiative".

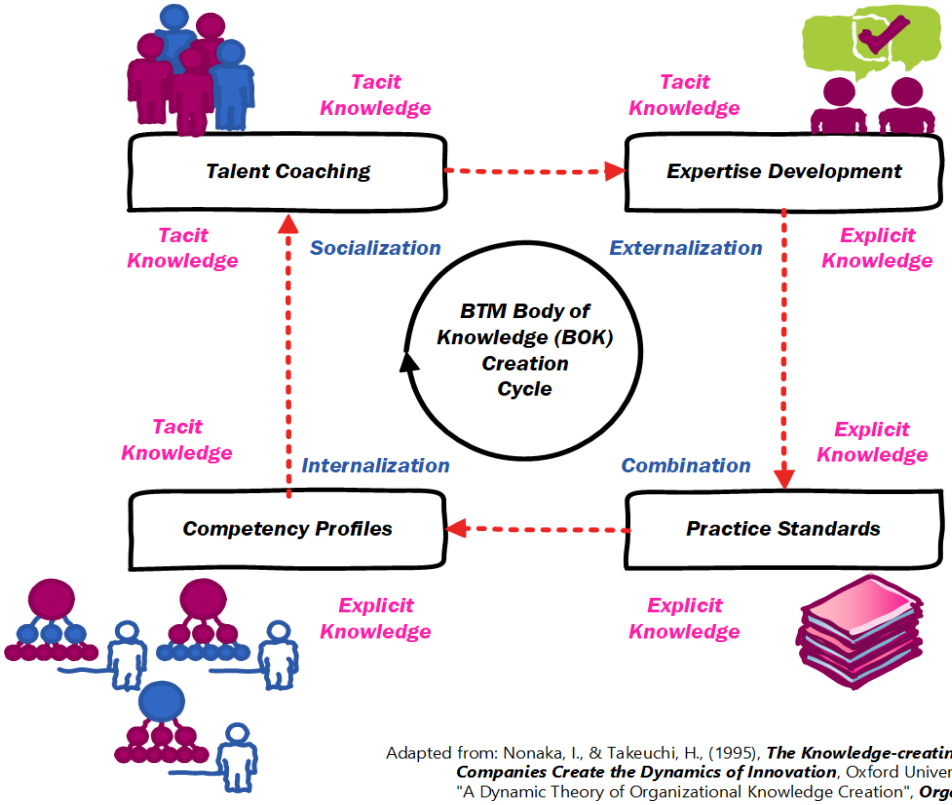
Table 1: BTM Benefits

Benefits for …	**... from BTM BOK**	**... from BTM Certifications**	**... from BTM Community**
Professionals	**Students:** clear guidance on career paths/growth	**Practitioners:** add new business/management skills	**Careers:** easy recognition of skill level by open network
Associations	**Specializations:** formal integration of several BOKs	**Multi-Certified:** complement certifications, no competition	**Membership:** recruit new members, wider visibility
Academia	**Faculty:** implement research across all specializations	**Schools:** clear accreditation and curriculum guidance	**Enrollment:** attract talent to get best jobs (cf., CPA, PEng)
Employers	**Managers:** formal transdisciplinary job profiles	**Promotion:** standards for promoting through ranks	**Markets:** well-defined talent pools, easier skills discovery
Industry	**Innovation:** more open, cross-specialization ideas	**Vendors:** all specializations have same tech. acumen	**Start-ups:** facilitate careers in-and-out of corporate
Society	**Government:** specializations share same principles	**Business:** higher org. to address complex ethics cases	**Economy:** fill talent gap, accelerate digital adoption

BTM BOK creation cycle depends primarily on the organic emergence of expertise from professional practice (Figure 4). One of the best ways to represent this is in the form of a knowledge creation cycle feeding into organizational learning. Expertise development and research, within an Evidence Based

Profession (EBP) is the primary source of formal or explicit expertise. It is reused and integrated freely within open practice standards, which in turn inspire the competency profiles of various community end-users. These references are further customized and refined through talent coaching, which in turn completes and resets the cycle as new expertise is externalized and shared within the community. BTM BOK adoption is therefore a continuous development and integration process, one where the opportunities for extracting value opens new possibilities at every step.

Figure 4: BTM BOK Creation and Adoption Cycle



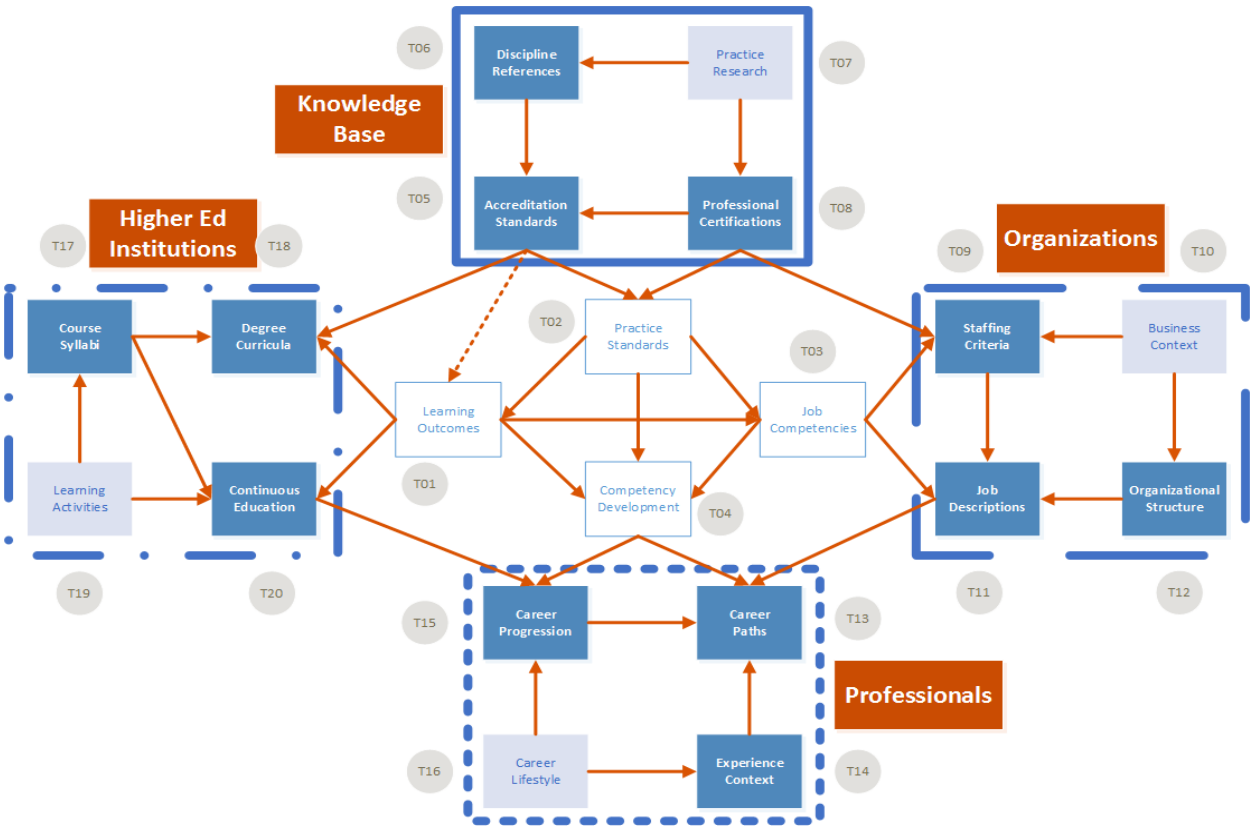
Adapted from: Nonaka, I., & Takeuchi, H., (1995), ***The Knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation***, Oxford University Press; see also Nonaka, I., (1994), "A Dynamic Theory of Organizational Knowledge Creation", ***Organization Science***, 5 (1): 14-37.

1.1.4 Customization

BTM BOK customization is essentially an "exploratory/experimental" process like R&D. It is encouraged through the open availability of its contents in various editable and reusable formats. These open assets can have compounded value as they get reused throughout several customization opportunities, leading to a "specification-driven" approach where changes in assets get recovered throughout their continuously updated reuse endpoints (Figure 5).

It can be leveraged among professionals for career development and certification, within organizations of all sectors for HRM and best practice benchmarking, by higher education institutions for program accreditation, and by knowledge base authors who can import and reuse as long as they share-alike their own derivatives. Reintegration of derivatives within BTM BOK is dependent on active participation in community discussions, and exploratory efforts of like-minded professionals.

Figure 5: BTM BOK Customization Opportunities



1.1.5 Community

BTM as a "professional community" is served by many associations competing to attract members, where hybrid skills are not yet fully understood as they are based on complex digital transformations (Table 2). Most BTM specializations are supported by separate professional organizations, offering several certification levels, often guided by a BOK uniting best practices in their field. Professional groups include: AIIM, ARMA, DAMA, IASA, IIBA, ISACA, (ISC)2, itSMF, PMI. Academic groups also include: AIS, ACM, IEEE, IFIP, IRMA. Standards organizations also contribute guidelines: OASIS, OMG, Open Group.

While these more established groups draw most of the BTM professional membership, there is yet to be an organization that would forge an alliance between all associations, of all kinds, to develop a common framework for the whole profession. A good example is the Open Project Management Method (OMP2) community, initially based in Europe, and rapidly attracting attention from around the globe, with the establishment in 2019 of the PM2 Alliance, a partner of BTM Forum with a much larger established base.

There is a need to create a space where both proprietary and open source organizations can leverage their converging interests in growing the IS-IT profession. As such BTM BOK can welcome proprietary groups can actively release their assets in the open and fusion their vision with those of open groups.

Table 2: BTM-Related Professional Groups

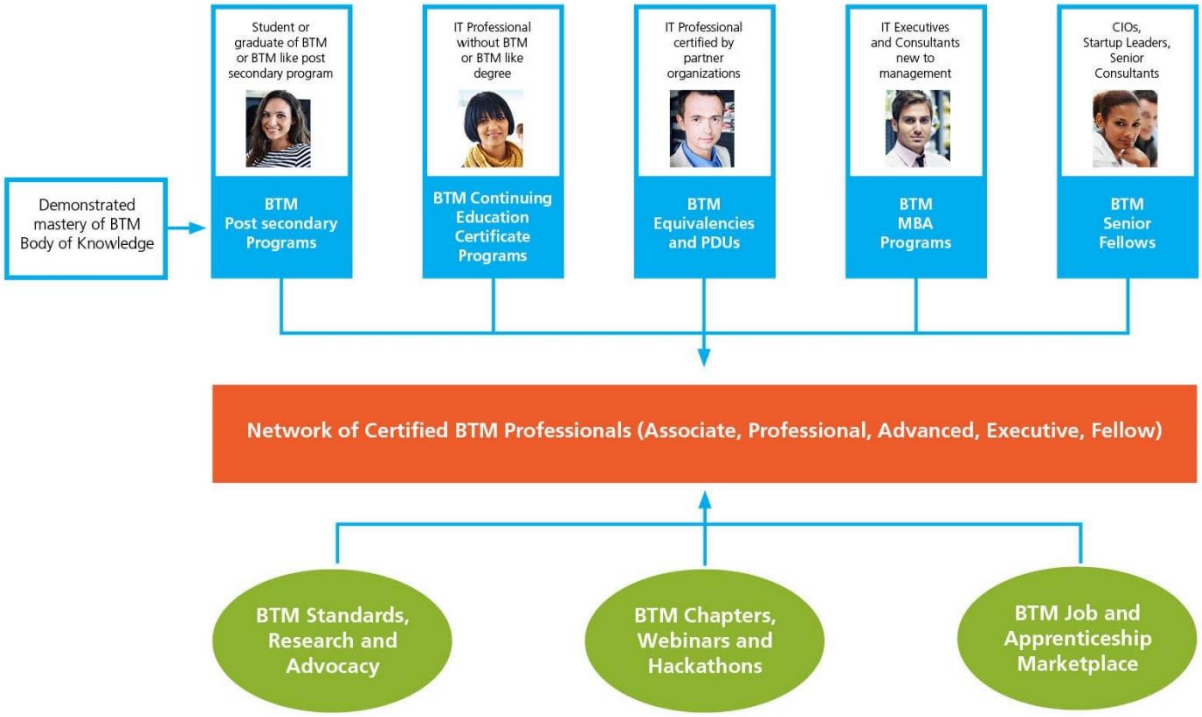
Scope	Organizations	Standards	Certifications
1. Industry	ITAC, ICTC, CATA, CANWIT, DPI	N/A	N/A
2. Profession	SFIA	SFIA	N/A
3. Discipline	ACM, AIS, IEEE	MIS Curriculum	N/A
4. Technology	CIPS, IP3P, ABET, IEEE, CompTIA	CBOK, Seoul Accord, SWEBOK	ISP, ITCP, CSDP, CompTIA
5. Management	CIOCAN, SIM	Propose a BOK for BTM3	Future CIO Mentorship, APC
6. Governance	ISACA, PMI	COBIT, Val-IT	CGEIT, CRISC, PMI-RMP
7. Security	ISACA, ISC2, GIAC	COBIT, CISSP	CISA, CISM, CISSP, GIAC ISP
8. Services	itSMF, Verism	ITIL	ITIL Certified
9. Projects	EC, PMI, BCS, Scrum, PM2	EC OPM2, PMBOK, PRINCE2	PMP, PMI-ACP, ISPM, Scrum
10. Consulting	CMC Institute	CMC BOK	CMC
11. Analysts	IIBA	BABOK	CBAP
12. Processes	OMG, CMMI, ABPMP, ATMAE	OCEB2 & CMMI Prog., BP BOK	OCEB2, CMMI, ABPMP, ATMAE
13. Innovation	PDMA, IAOIP/ISPIM, GIMI	NPDP, Cert. Inno. Prof., IM BOK	NPDP, CPI
14. Quality	ASQ, QAI, IQPC	CSQE, Lean, Six Sigma, QAI BOKs	CSQE, Lean, Six Sigma, QAI Cert.
15. Data	EDM Council, DAMA	Data Mgmt. Cap. Model, DMBOK	DCAM, CDMP
16. Intelligence	TDWI, INFORMS	Cert. BI Pro., Cert. Analytics Pro.	CBIP, CAP
17. Architects	IASA, Open Group, AEA	ITA BOK, TOGAF	CITA
18. Web	CIW, WOW, EC-Council	CIW & WOW Cert., Ethical Hacker	CIW & WOW E-Commerce, CEH

BTM Forum can act as a "catalyst organization" as opposed to a traditional professional association, as it can serve as a neutral ground for members of several associations to work toward a joint strategy:

1. **Mission:** help lead the digital transformation in all sectors by federating efforts of associations.
2. **Members:** attract multi-certified people with broad skillset in business and technology.
3. **Mandate:** create a common language and an engaging vision for the profession to unite.
4. **Standards:** provide open source complements that can be reused by existing specializations.
5. **Accreditation:** facilitate convergence among IS and IT programs globally to facilitate mobility.
6. **Benchmark:** identify best practices and their integration for digital transformation.
7. **Certification:** promote professionals through ranks from junior to senior levels.

To ensure the widest engagement of BTM practitioners, BTM Forum is focused community-led services built upon free, libre and open source reference standards (Figure 6). While it was initiated in Canada, by the IT Association of Canada (ITAC), BTM Forum has a global mandate to serve as an emerging community to structure the profession, integrating virtual and local groups, and help catalyze energies of widely distributed professionals. The association aims to engage professionals to acquire a hybrid skillset, get commitment from employers to model their jobs and careers after this standard, and create accreditation and certification processes that are truly people-centric and knowledge-driven, avoiding the rubber-stamping nature of so many such organizations.

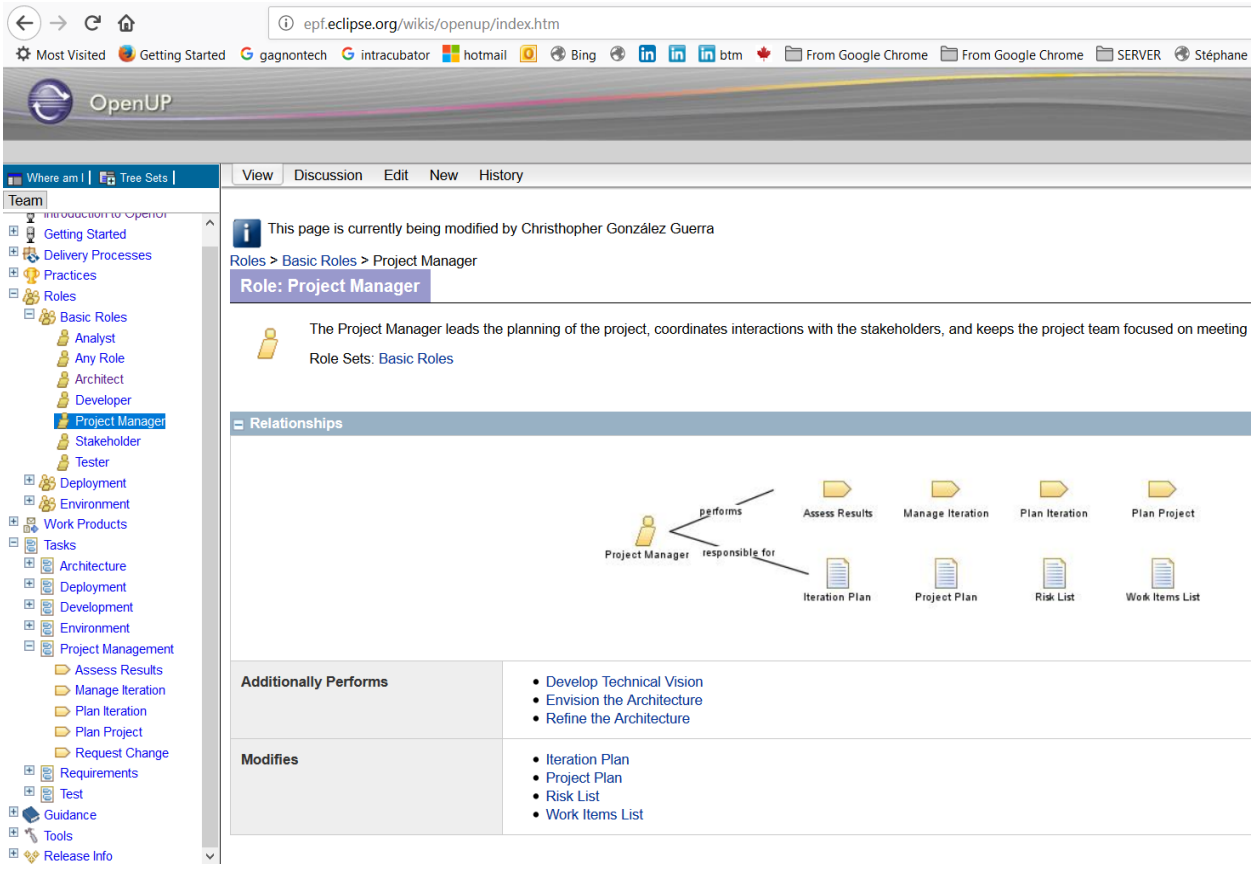
Figure 6: BTM Community Engagement



1.2 Contents

BTM BOK contents can be navigated within a single Eclipse Process Framework (EPF) Wiki (Figure 7). The resulting contents are structured along a simple menu-driven navigation, allowing to quickly pinpoint contents of interest, as well as map thoroughly the relationships between all components. It is developed through an open community effort to simplify the relationships between several BOKs. It is supported by multiple citations to academic and professional literature, helping learners find the most trusted sources. It is also highly open and customizable, with API to reuse its contents in various Talent Management functions (e.g., custom BTM-compliant job descriptions, automated matching of CVs and job competencies, learning path recommendations given experience for recognized BTM careers, etc.).

Figure 7: BTM BOK Wiki Similar to Open Unified Process (OpenUP)



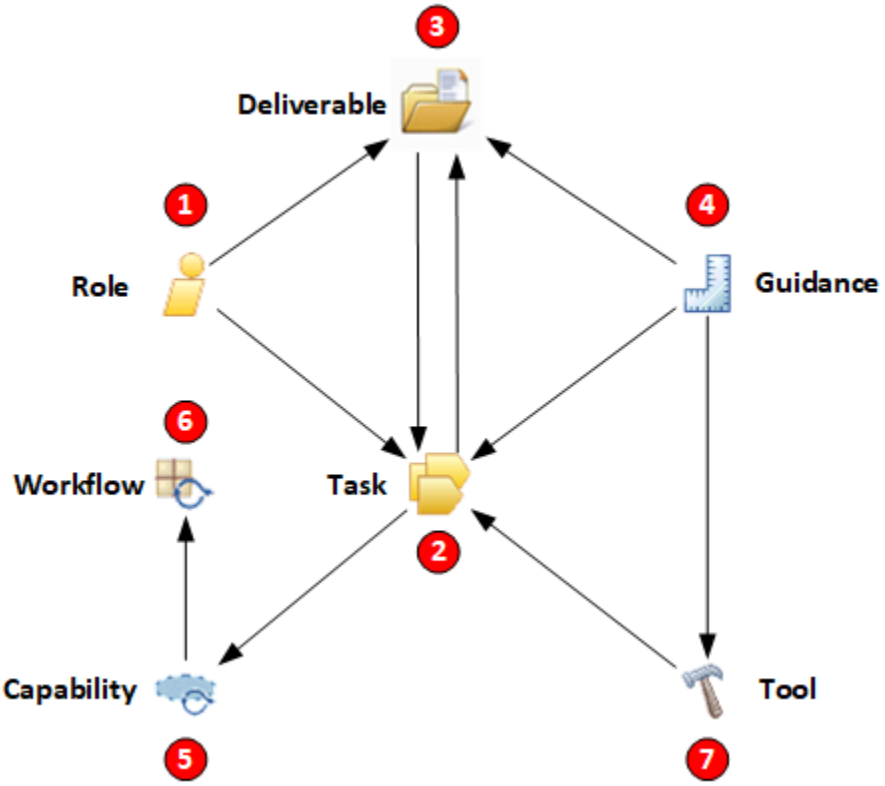
1.2.1 Metamodel

BTM BOK metamodel helps structure contents around a generic frame for multidisciplinary professional practice. It uses a standard by the Object Management Group (OMG), the Software and Systems Process Engineering Metamodel (SPEM 2.0) (https://www.omg.org/spec/SPEM/2.0/PDF). In the future it shall evolve toward a more flexible, state-based standard, namely the OMG Essence Kernel and Language for Software Engineering Process (https://www.omg.org/spec/Essence/1.2/PDF). This transition will be initiated as soon as open source tools are available to support this more advanced standard.

The SPEM 2.0 metamodel allows us to draw the key elements of BTM BOK within a coherent framework, and identify all required interdependencies among them to clearly position BTM professionals within their expertise domains and processes (Figure 8).

1. **Role**: outline of job functions and qualifications, related to tasks and deliverables accountability.
2. **Task**: outline of role(s)-centered activities, with step-by-step, and deliverables as inputs-outputs.
3. **Deliverable**: artefacts delivering value for digital transformation, with templates and guidelines.
4. **Guidance**: glossaries, practices, and roadmaps to perform tasks, deliverables, and use tools.
5. **Capability**: combination of tasks as a short “way or work” or set of “states” to reach a milestone.
6. **Workflow**: combination of capabilities across iterations of varying scales to reach stage-gates.
7. **Tool**: documentation of techniques and *-wares used to perform tasks and support teamwork.

Figure 8: BTM BOK Metamodel



1.2.2 Structure

BTM BOK structure aims to be systematic, simple and easy to remember for anyone regardless of prior experience. It includes 7 chapters that build upon one another, feeding into professional practice references (Ch. 3) as the source of standards (Ch. 7), converging for career guidance (Ch.6) (Figure 9). It should not be promoted as an exhaustive overview, simply a starting point for team-based discussions in improving practice. BTM BOK chapters are written for modeling and further customization, with ample space for improvement. The 7 chapters vary in scope and are in constant state of progress, as contents will come from both FLOS references and new material contributed by the community (Table 3).

Figure 9: BTM BOK Structure

Table 3: BTM BOK Chapters

Ch.	Title	Color	Meaning	Progress	Contents	Purpose
1	Overview	Cyan	Sky/Vision	100%	Original	BTM knowledge base and structure
2	Transformation	Red	Intense	100%	Original	BTM leadership role and decisions
3	Practice	Green	Good/Go	0%	100+ FLOS	BTM job roles, tasks, capabilities
4	Discipline	Blue	Formal	0%	100+ FLOS	BTM research-based foundations
5	Lifecycle	Orange	Caution	0%	Surveys/Cases	BTM use contexts and constraints
6	Career	Purple	Dream	0%	Surveys/Cases	BTM job entry and progression
7	Standards	Gold	Valuable	0%	Community	BTM best practice and references

BTM BOK Ch.1 Overview (Table 4) explains the endeavour and how to best use it and contribute too.

Table 4: BTM BOK Ch. 1 Overview

Ch.	Title	Scope
1.1	Purpose	
1.1.1	Objectives	
1.1.2	Profession	
1.1.3	Adoption	
1.1.4	Customization	
1.1.5	Community	
1.2	Contents	
1.2.1	Metamodel	
1.2.2	Structure	
1.2.3	Components	
1.2.4	Dependencies	
1.2.5	Sources	
1.3	Methodology	
1.3.1	Licenses	
1.3.2	References	
1.3.3	Editing	
1.3.4	Contribution	
1.3.5	Authors	

BTM BOK Ch.2 Transformation (Table 5) is a general introduction to the field of digital leadership.

Table 5: BTM BOK Ch. 2 Transformation

Ch.	Title	Scope
2.1	Opportunity	
2.1.1	Scan	
2.1.2	Discover	
2.1.3	Prioritize	
2.1.4	Finance	
2.1.5	Benefit	
2.2	Decision	
2.2.1	Who	
2.2.2	What	
2.2.3	Why	
2.2.4	Where	
2.2.5	How	
2.3	Accountability	
2.3.1	Steer	
2.3.2	Explore	
2.3.3	Align	
2.3.4	Implement	
2.3.5	Optimize	

BTM BOK Ch.3 Practice (Table 6) classifies the 15 areas by the "level" or **layer** of the organization they impact on: **fabric** as where and why of digital transformation, **team** as who and how of digital transformation, and **outcome** as what and how much of digital transformation. Each practice is presented by the same 4th level sub-sections, referring to the 7 key elements of our metamodel: role, task, deliverable, guidance, capability, workflow, and tool.

Practices are in no way exclusive and can in fact serve as placeholders to include many more professional roles that are often spanning several areas (e.g., Business Analysis appears often as a role in Architecture, Engineering, and Process practices). As well, some practices are more an amalgam of various trends and strategic approaches by most companies (e.g., Value and People practices refer to how digital products and services are designed and conceived, as well as how various groups within and outside an organization can effectively use them, how their behavior is impacted, etc.). Finally, while some practices can be viewed as too broad and almost encompassing a whole discipline (e.g., Engineering and Project practices), they are in fact named after a feature that serves to unite their converging approaches, namely the service and value they provide to digital transformation.

Table 6: BTM BOK Ch. 3 Practice

Ch.	Title	Scope
3.1	Fabric	
3.1.1	Governance	
3.1.2	Compliance	
3.1.3	Architecture	
3.1.4	Security	
3.1.5	Platform	
3.2	Team	
3.2.1	People	
3.2.2	Project	
3.2.3	Agility	
3.2.4	Engineering	
3.2.5	Integration	
3.3	Outcome	
3.3.1	Value	
3.3.2	Process	
3.3.3	Rule	
3.3.4	Data	
3.3.5	Intelligence	

BTM BOK Ch.4 Discipline (

Table 7) offers a list of foundational academic disciplines and research areas, all within the logic of an Evidence-Based Profession (EBP). Once fully developed, each discipline shall be presented by 4th level sub-sections, referring to the 5 key elements of their application by practitioners: definition of core concepts, relevance to digital transformation, theory and foundations most relevant to practice, application specific to BTM, and evidence of effectiveness from empirical research. These contents are taken directly from generic FLOS textbooks and are therefore edited and reshaped for the purpose of best serving digital transformation, yet still conforming to formal academic references.

Table 7: BTM BOK Ch. 4 Discipline

Ch.	Title	Scope
4.1	Business	
4.1.1	Strategy	
4.1.2	Marketing	
4.1.3	Operation	
4.1.4	Innovation	
4.1.5	Performance	
4.2	Management	
4.2.1	Talent	
4.2.2	Learning	
4.2.3	Change	
4.2.4	Leadership	
4.2.5	Entrepreneurship	
4.3	Technology	
4.3.1	System	
4.3.2	Software	
4.3.3	Cloud	
4.3.4	IoT	
4.3.5	AI	

BTM BOK Ch.5 Lifecycle (Table 8) offers various organizational contexts where practices must be customized. They vary according the scope of process deliverables, namely the type of functional role of IT. Lifecycles can also be focused on a specific value or general business or strategic outcome. Finally, they vary widely as per the type of economic sector, especially due to technology requirements.

Table 8: BTM BOK Ch. 5 Lifecycle

Ch.	Title	Scope
5.1	Scope	
5.1.1	Administration	
5.1.2	Solution	
5.1.3	Support	
5.1.4	Facility	
5.1.5	Enterprise	
5.2	Focus	
5.2.1	Behavior	
5.2.2	Functionality	
5.2.3	Reengineering	
5.2.4	Optimization	
5.2.5	Diversification	
5.3	Sector	
5.3.1	Resource	
5.3.2	Infrastructure	
5.3.3	Product	
5.3.4	Service	
5.3.5	Public	

BTM BOK Ch.6 Career (Table 9) is used to help guide people and groups in leading digital transformation.

Table 9: BTM BOK Ch. 6 Career

Ch.	Title	Scope
6.1	Goal	
6.1.1	Specialist	
6.1.2	Complement	
6.1.3	Generalist	
6.1.4	Senior	
6.1.5	Occasional	
6.2	Path	
6.2.1	Corporate	
6.2.2	Embedded	
6.2.3	Small	
6.2.4	Startup	
6.2.5	Consulting	
6.3	Progression	
6.3.1	Beginning	
6.3.2	Diversity	
6.3.3	Education	
6.3.4	Experience	
6.3.5	Promotion	

BTM BOK Ch.7 Standard (Table 10) synthesizes practices, disciplines, and lifecycles for implementation.

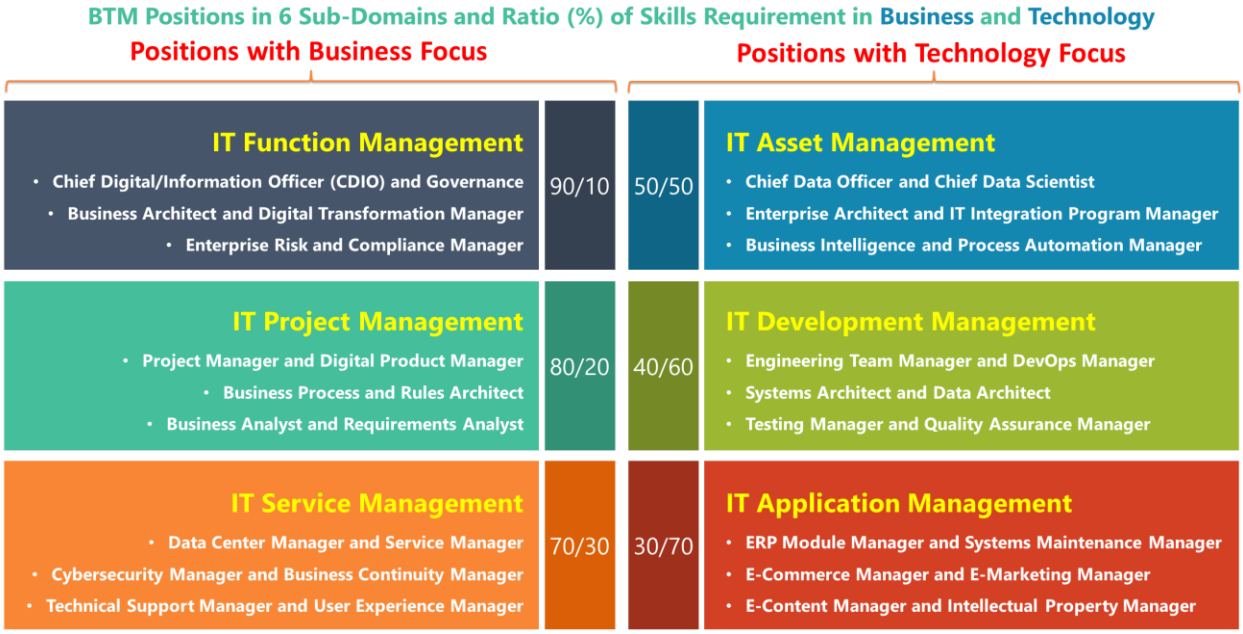
Table 10: BTM BOK Ch. 7 Standard

Ch.	Title	Scope
7.1	Accreditation	
7.1.1	Diploma	
7.1.2	Certificate	
7.1.3	Bachelor	
7.1.4	Master	
7.1.5	Doctorate	
7.2	Benchmark	
7.2.1	Forerunner	
7.2.2	Challenger	
7.2.3	Innovator	
7.2.4	Optimizer	
7.2.5	Disruptor	
7.3	Certification	
7.3.1	Associate	
7.3.2	Professional	
7.3.3	Manager	
7.3.4	Entrepreneur	
7.3.5	Executive	

1.2.3 Components

BTM BOK components are the core building blocks of professional practice (Ch.3). They outline the activities, job roles, and positions of BTM professionals at all levels. These profiles can be classified as per their relative mix or ratio of skills requirements in business and technology (Figure 10).

Figure 10: BTM Positions with Business and Technology Focus

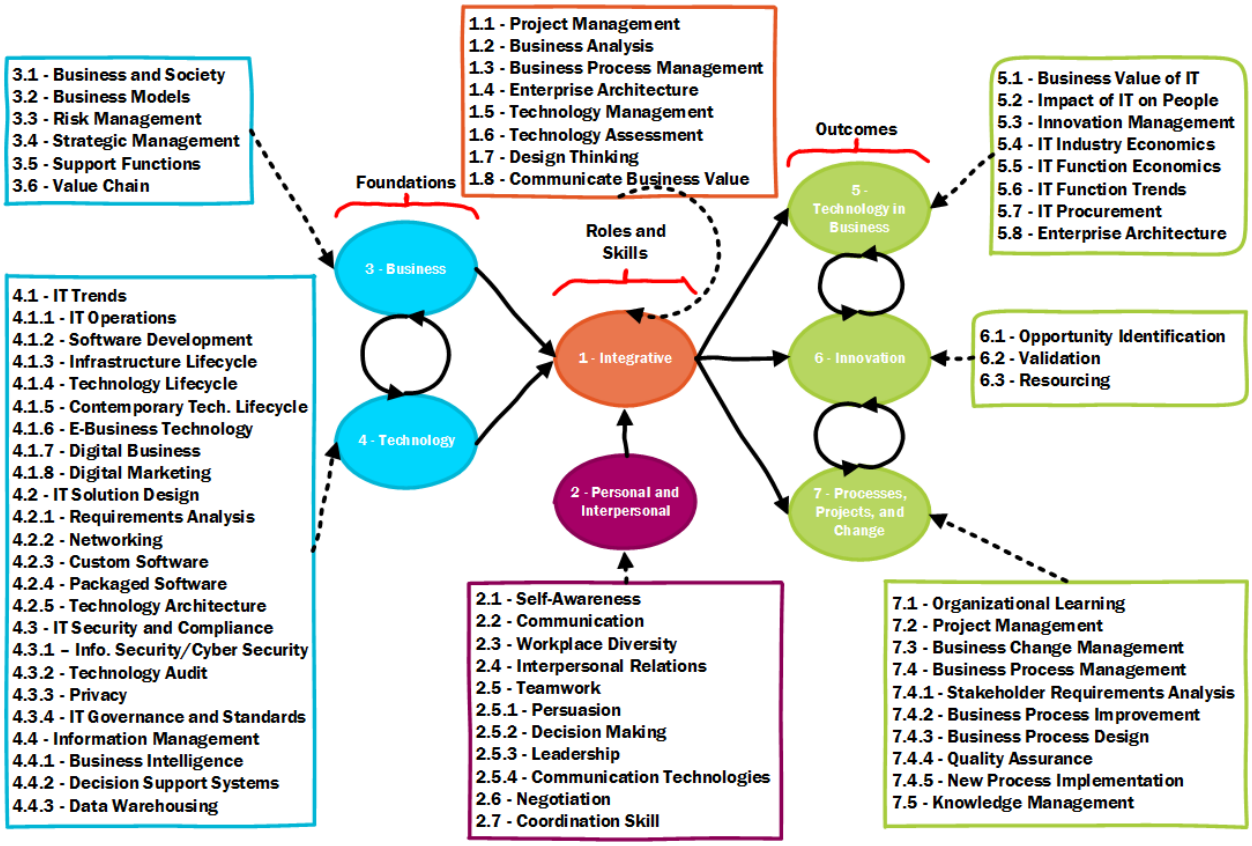


In addition to professional practices, BTM BOK references several foundational disciplines and contextualized lifecycles, each specifying further how practices serve as framework to guide digital transformation. They can be traced back to initial BTM specifications, namely BTM Learning Outcomes (LOs), with edition 1.0 in 2009 comprising 32 items, and edition 2.0 in 2016 with 75 items classified under 6 domains (Figure 11). This integrative model is built around 7 knowledge areas in 3 types, namely Integrative (I) areas or Roles and Skills, Foundation (F) areas, and Core (C) areas or Outcomes:

1. **Integrative (I1 - I8):** BTM serves to integrate core competencies and produces a “deliverable” of direct relevance. They refer to key roles and opportunities for digital transformation leadership.
2. **Personal and Interpersonal (F1):** Ability to make a meaningful contribution depends upon one’s self-knowledge and ability to have constructive, long term, interactions with others.
3. **Business (F2):** To be effective in the workplace one must have both the broad context of business – its role and place in society – and a working knowledge of how business operates.
4. **Technology (F3):** BTM graduates must understand information and communications technologies, their current capabilities, and future trends.
5. **Technology in Business (C1):** This knowledge area is designed to synthesize the knowledge and competencies gained in the foundational knowledge areas to create an additional competency in understanding: the potential (economic, personal, societal), the risks of, and the governance, acquisition, and management of ICTs in and for business.

6. **Innovation (C2):** BTM graduates are expected to be innovative in the workplace. Innovators should be able to identify new opportunities, validate and resource them.
7. **Processes, Project and Change (C3):** BTM graduates will gain the foundations that enable them to help create well-designed business processes, well-managed projects, and support for the individuals and groups undergoing change.

Figure 11: BTM BOK Building Upon BTM Learning Outcomes 2.0



BTM LOs are further aligned (Table 11) with a more widely adopted specification, the ACM/AIS 2010 IS Curriculum, one of a dozen such standards in IS-IT education (https://computingcurricula.com/). Its key feature is to outline 7 core knowledge areas for undergraduate IT management education, along with foundational knowledge and computing general knowledge, synthesized in its Appendix 4 as a BOK:

1. **IS-1**: IS Management and Leadership (ITM)
2. **IS-2:** Data and Information Management (DIM)
3. **IS-3:** Systems Analysis & Design (SAD)
4. **IS-4:** IS Project Management (PM)
5. **IS-5:** Enterprise Architecture (EA)
6. **IS-6:** User Experience (UX)
7. **IS-7:** Professional Issues in IS (Pro.)
8. **FK:** Foundational Knowledge, mostly taken from Organizational Behavior (OB)
9. **CG:** Computing General, mostly taken from Computer Science (CS)

These combined specifications synthesize current trends in BTM, from a practice viewpoint (BTM LOs) and an instructional viewpoint (ACM/AIS). They provide broader guides that can help users to interpret and extend BTM BOK contents, especially along the 9 core knowledge areas of the IS Curriculum.

Table 11: BTM Leaning Outcomes Aligned with IS 2010 Curriculum

Code	BTM Learning Outcomes	IS-1	IS-2	IS-3	IS-4	IS-5	IS-6	IS-7	FK	CG
1	**Integrative**	**ITM**	**DIM**	**SAD**	**PM**	**EA**	**UX**	**Pro.**	**OB**	**CS**
1.1	Project Management				1					
1.2	Business Analysis			1						
1.3	Business Process Management			1						
1.4	Enterprise Architecture					1				
1.5	Technology Management	1								
1.6	Technology Assessment	1								
1.7	Design Thinking			1		1	1			
1.8	Communicate Business Value	1						1	1	
2	**Personal and Interpersonal**	**ITM**	**DIM**	**SAD**	**PM**	**EA**	**UX**	**Pro.**	**OB**	**CS**
2.1	Self-Awareness								1	
2.2	Communication								1	
2.3	Workplace Diversity							1	1	
2.4	Interpersonal Relations								1	
2.5	Teamwork				1				1	
2.5.1	Persuasion								1	
2.5.2	Decision Making	1							1	
2.5.3	Leadership	1							1	
2.5.4	Communication Technologies								1	
2.6	Negotiation								1	
2.7	Coordination Skill								1	
3	**Business**	**ITM**	**DIM**	**SAD**	**PM**	**EA**	**UX**	**Pro.**	**OB**	**CS**
3.1	Business and Society	1						1		
3.2	Business Models	1								
3.3	Risk Management	1			1	1				
3.4	Strategic Management	1				1				
3.5	Support Functions	1								
3.6	Value Chain	1								
4	**Technology**	**ITM**	**DIM**	**SAD**	**PM**	**EA**	**UX**	**Pro.**	**OB**	**CS**
4.1	IT Trends	1								1
4.1.1	IT Operations	1								1
4.1.2	Software Development	1		1	1					1
4.1.3	Infrastructure Lifecycle					1				1
4.1.4	Technology Lifecycle					1				1
4.1.5	Contemporary Technology Lifecycle					1				1
4.1.6	E-Business Technology	1				1				1

4.1.7	Digital Business	1				1				1
4.1.8	Digital Marketing	1								1
4.2	IT Solution Design			1		1	1			1
4.2.1	Requirements Analysis			1			1			1
4.2.2	Networking					1				1
4.2.3	Custom Software					1				1
4.2.4	Packaged Software					1				1
4.2.5	Technology Architecture					1				1
4.3	IT Security and Compliance	1								1
4.3.1	Information Security or Cybersec.	1								1
4.3.2	Technology Audit	1								1
4.3.3	Privacy	1					1			1
4.3.4	IT Governance and Standards	1								1
4.4	Information Management		1							1
4.4.1	Business Intelligence		1							1
4.4.2	Decision Support Systems		1							1
4.4.3	Data Warehousing		1							1
5	**Technology in Business**	**ITM**	**DIM**	**SAD**	**PM**	**EA**	**UX**	**Pro.**	**OB**	**CS**
5.1	Business Value of IT	1								
5.2	Impact of IT on People	1					1	1	1	
5.3	Innovation Management	1		1	1	1				
5.4	IT Industry Economics	1						1		
5.5	IT Function Economics	1						1		
5.6	IT Function Trends	1						1		
5.7	IT Procurement	1								
5.8	Enterprise Architecture					1				
6	**Innovation**	**ITM**	**DIM**	**SAD**	**PM**	**EA**	**UX**	**Pro.**	**OB**	**CS**
6.1	Opportunity Identification	1				1				
6.2	Validation	1			1					
6.3	Resourcing	1			1					
7	**Processes, Projects, and Change**	**ITM**	**DIM**	**SAD**	**PM**	**EA**	**UX**	**Pro.**	**OB**	**CS**
7.1	Organizational Learning								1	
7.2	Project Management				1					
7.3	Business Change Management	1		1		1	1		1	
7.4	Business Process Management			1		1	1			
7.4.1	Stakeholder Requirements Analysis			1					1	
7.4.2	Business Process Improvement			1	1					
7.4.3	Business Process Design			1		1	1			
7.4.4	Quality Assurance			1	1					
7.4.5	New Process Implementation		1	1		1	1		1	
7.5	Knowledge Management	1	1	1					1	

1.2.4 Dependencies

BTM BOK contents can be reduced to a set of 15 core practice or competency areas. They can be aligned broadly along core issues of digital transformation, with a "dynamic" model representing constant change and fluid state of BTM initiatives (Figure 12). BTM practitioners are accountable for transformation **tasks**, and are bound by a primary **dependency**, among many more forms of collaboration to develop shared foundations and practices (Table 12).

The **layer** they refer to is relative to the level of granularity of digital transformation. The fabric layer refers to organizational context, mostly the structure, hierarchy, regulatory environment, infrastructure, information, and other assets of the organization. The team layer is not just for project teams but also any operational group as well as groups of employees and managers working within cross-functional processes. The outcome layer is focused on tangible value, on actual IS-IT products and systems, along with the relevant information, intelligence, and rules that are embedded within business processes.

Figure 12: BTM BOK Practices and Dependencies

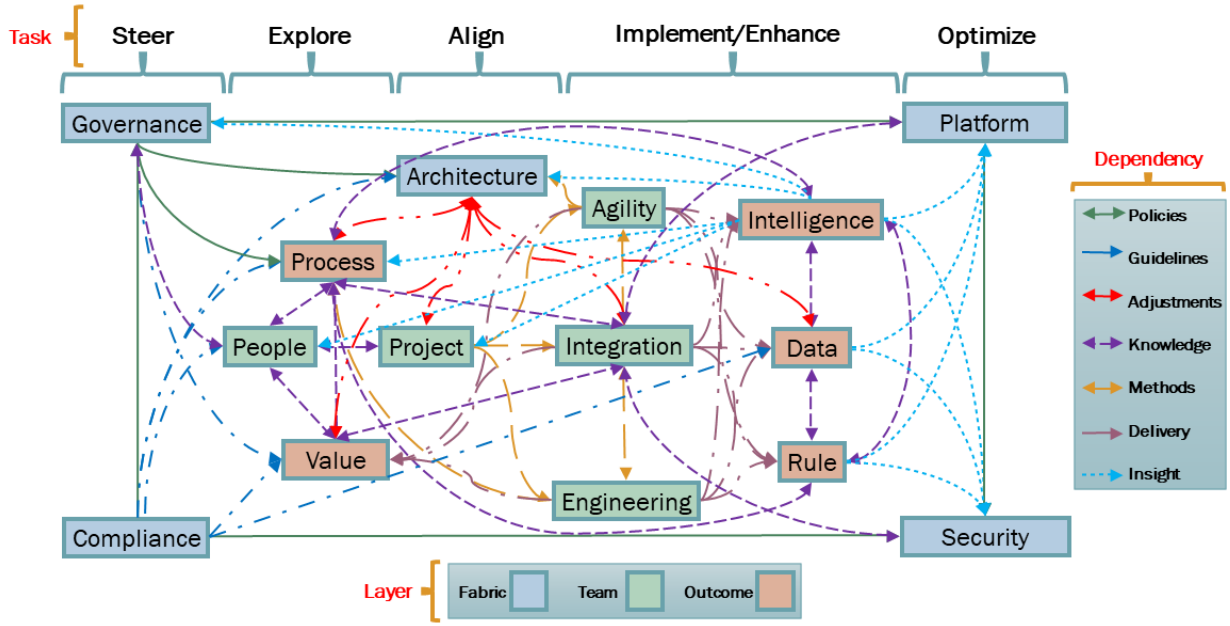


Table 12: BTM BOK Dependencies Between Practices

Line	Dependency	BTM Practices Integrated Through Organizational Fabric, Teams, and Project Outcomes
1.	Policies	Strategic leadership to steer, explore, and align business and technology decisions
2.	Guidelines	Business-driven decision deployment across the fabric, compliance and risk assurance
3.	Adjustments	Coevolution of enterprise architecture and optimizing assets, models, and reuse
4.	Knowledge	Models, practices, and expertise implemented and embedded in processes and fabric
5.	Methods	Agile team leadership from requirements to implementation, focus on integration
6.	Delivery	Value-driven design and integration, DevOps for people-centric product-process-platform
7.	Insight	Intelligence reuse in business and technology fabric, implementation into rules and AI

1.2.5 Sources

BTM BOK sources are primarily from existing FLOS publications and projects (Figure 13). These are directly integrated within Ch.3 Practice and Ch.4 Discipline as constituting materials, which is further edited to ensure continuous integration and harmonization. FLOS sources can also be further adapted and enhanced, especially through mappings between various standards items to help find a common and converging language between specifications, both open and proprietary (e.g., harmonizing the Project Manager role as described in Architecture, Engineering, and Project practices).

As well, BTM BOK development is an open process where co-authors and community end-users both jointly edit chapter contents, as well as customize them and provide feed back. These can occur more sporadically to ensure structure doesn't evolve too fast, such as Ch.1, 2, and 7. However, in Ch.3-4-5-6, there is a continuous integration and continuous deployment process that enables constant feedback to be adequately harmonized, vetted, and republished for further reuse. As well, BTM BOK assets are reused in a variety of community activities, ranging from BTM Forum functions to value-added services.

Finally, BTM BOK sources can be extensively reused by proprietary standards, that correspond roughly to various Ch.3 Practice sub-sections (Table 13). They serve as external references as BTM BOK doesn't pretend to compete with any of them. BTM Forum aims to publish assets enabling their convergence.

Figure 13: BTM BOK Sources, Integration, and Reuse

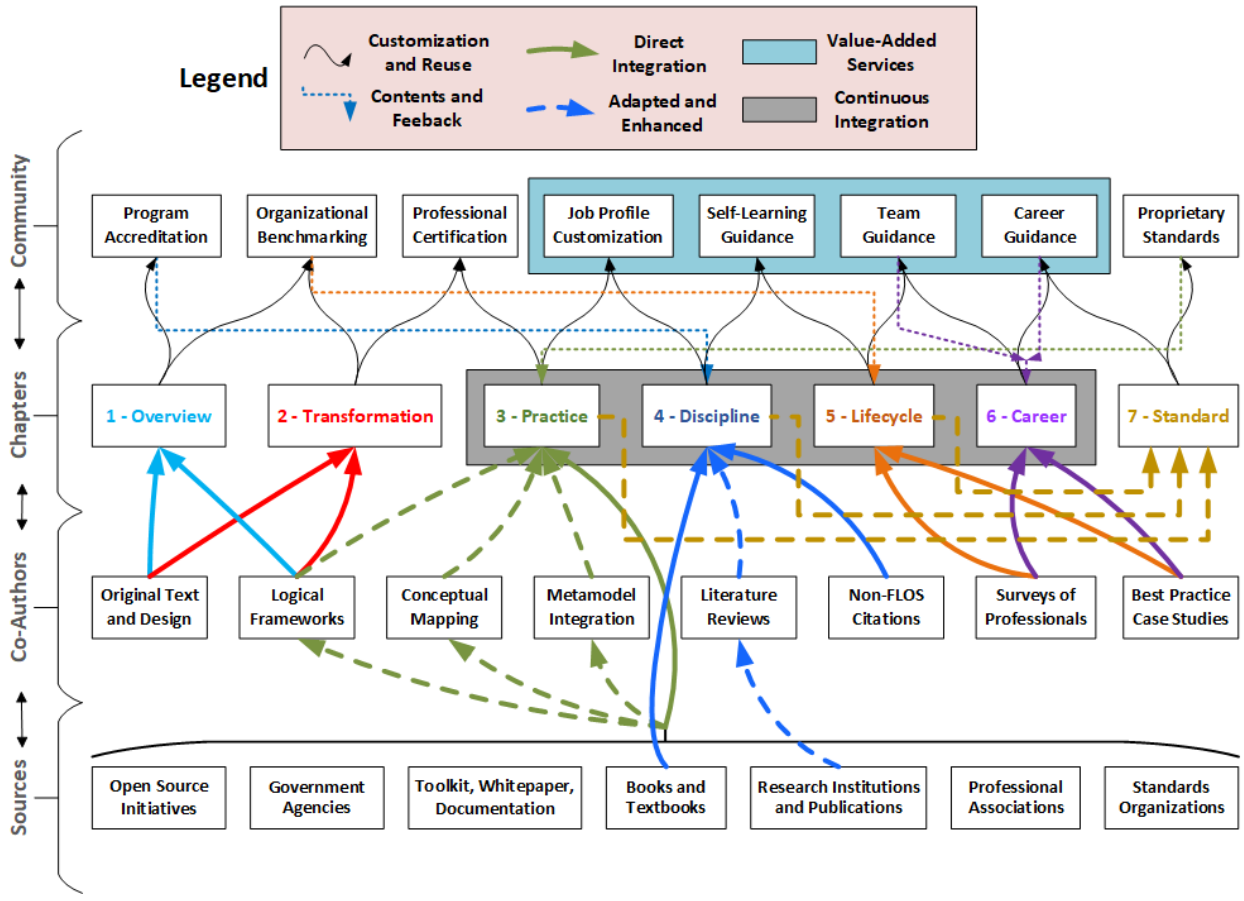


Table 13: BTM BOK-Related Proprietary Specifications

Entry Level	Specialization	Standard	Title
Associate	1. Business Analysis	BABOK	Business Analysis Body of Knowledge
Associate	2. Data Analytics	CAP	Certified Analytics Professional
Associate	3. Digital Marketing	OMCP	Online Marketing Certified Professional
Associate	4. Information Management	CIP	Certified Information Professional
Associate	5. Software Testing	CTFL	Certified Tester Foundation Level
Associate	6. User Experience	UXBOK	User Experience Body of Knowledge
Professional	7. Information Security	CISSP	Certified Information Systems Security Professional
Professional	8. Agile Methods	CSM	Certified Scrum Master
Professional	9. Software Quality	CSQE	Certified Software Quality Engineer
Professional	10. Data Management	DMBOK	Data Management Body of Knowledge
Professional	11. Technology Architecture	CITA	Certified IT Architect
Professional	12. Business Process Management	OCEB	OMG Certified Expert in BPM
Manager	13. Electronic Commerce	CECM	Certified E-Commerce Manager
Manager	14. Technology Management	IT4IT	Information Technology for Information Technology
Manager	15. Services Management	ITIL	Information Technology Infrastructure Library
Manager	16. Project Management	PMBOK	Project Management Body of Knowledge
Manager	17. Enterprise Architecture	TOGAF	The Open Group Architecture Framework
Executive	18. Management Consulting	CMC	Certified Management Consultant
Executive	19. Information Governance	COBIT	Control Objectives for Information and Related Tech.
Executive	20. Portfolio Management	Val-IT	Information Technology Value Management

1.3 Methodology

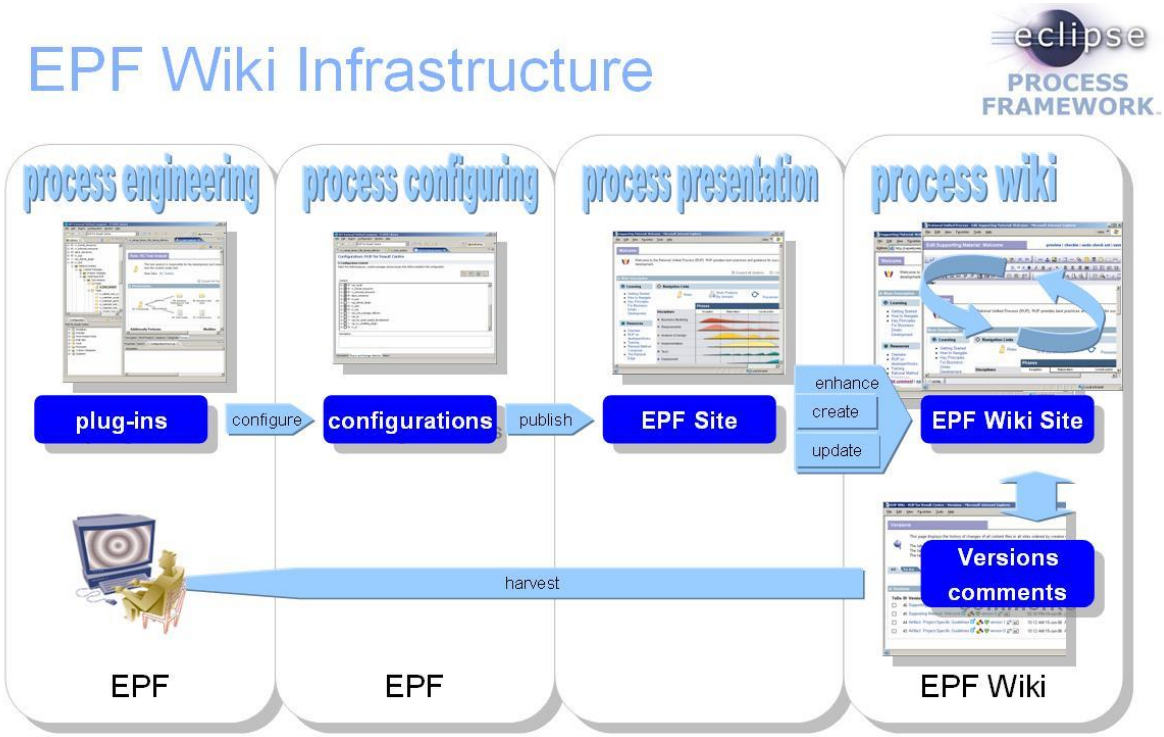
BTM BOK development methodology relies on the Eclipse Process Framework (EPF), which comes with readily developed practices, such as the Open Unified Process (OpenUP), Scrum, Extreme Programming, Agile Business Rules Development (ABRD), and DSDM. The main feature of EPF is the Composer, a set of extensions installed within the Eclipse Integrated Development Environment (IDE). They are published in a wiki to enable the collaborative editing of open assets, which are then reintegrated as new assets.

- http://www.eclipse.org/epf/composer_architecture/
- https://www.eclipse.org/epf/general/EPFComposerOverviewPart1.pdf
- https://www.eclipse.org/epf/general/EPFComposerOverviewPart2.pdf
- http://www.etsmtl.ca/Professeurs/rchampagne/documents/epftutorial/index.html

BTM BOK editorial teams are responsible for separate and parallel tasks (Figure 14):

- Use the EPF Composer to design the BTM BOK framework and integrate various external assets. It is used to develop the "plug-ins" that contain various BTM BOK assets, integrated within various "process configurations" describing BTM certification levels.
- Use the EPF Wiki to maintain and add contents and citations to external BOKs and references. It is used to host the EPF site that helps to navigate the BTM BOK assets and allows registered users to comment and edit the BTM BOK guide (limited to the team and assessors for first year).
- Use EPF Wiki API extensions to help reuse BTM BOK assets into key Talent Management tasks

Figure 14: BTM BOK Development Process Based on Eclipse Process Framework (EPF)



Source: https://github.com/siguremon/epfwiki/blob/master/doc/infrastructure.jpg

1.3.1 Licenses

The BTM BOK will serve as a generic core language to integrate several Free, Libre, Open Source (FLOS) specifications, methodologies, reference models, and standards (Table 14). These have been published under open commercial licenses, such as Creative Commons Attribution-ShareIAlike 3.0 Unported (CC BY-SA 3.0), Eclipse Public License 1.0 (EPL 1.0), and European Union Public License 1.2 (EULP 1.2), other more liberal licenses such as CC BY 4.0 International, Apache License, MIT License, etc. When assets contain separate contents with varying licenses, only the commercially reusable contents are used, to avoid limiting the reuse of our BOK by all organizations.

Table 14: BTM BOK Compatible Licenses

Creative Commons Attribution-ShareAlike 3.0 Unported (CC BY-SA 3.0)
• https://creativecommons.org/licenses/ • https://wiki.openmod-initiative.org/wiki/Choosing_a_license
Eclipse Public License (EPL 1.0)
• https://www.eclipse.org/org/documents/epl-v10.php
European Union Public Licence (EUPL 1.2)
• https://joinup.ec.europa.eu/collection/eupl/introduction-eupl-licence • https://joinup.ec.europa.eu/collection/eupl/eupl-text-11-12 • http://oss-watch.ac.uk/resources/eupl • https://joinup.ec.europa.eu/collection/eupl/eupl-compatible-open-source-licences
Comparison with Several Other Licenses
• https://en.wikipedia.org/wiki/Comparison_of_free_and_open-source_software_licenses • https://www.gnu.org/licenses/license-list.html

BTM BOK follows a FLOS strategy as we want to encourage reuse everywhere, ensuring the widest uptake and strongest critical mass of users. A rapid growth will generate interest also to attract the most motivated contributors as reuse becomes common practice. We also adopt licenses that require share-alike or copyleft, ensuring other groups that reuse our specs develop innovative ways that will help us promote our framework.

Our FLOS strategy benefits several groups who can find value in joining the BTM BOK initiative actively:

1. Adopters that implement the framework will be free to customize it, and then share it outside in their ecosystem, without any concern whether it is used in commercial or non-commercial settings.

2. Organizations with proprietary specifications will find value in reusing a free generic core language, helping to map their assets to those of others, keeping mappings stable even if others change.

3. Academia will be free to build courseware derived directly from the text/contents of open specs, without having to negotiate with license owners, and relying on free open textbooks to benefit students.

4. Governments will find value in open specs that can effectively be reused and republished as policy documentation, without owing any royalty nor be concerned about costs of maintaining specs.

5. Vendors will want to reuse our assets commercially, refocusing their budgets on R&D instead of costly methods and specs, leaving our assets without commercial alternatives and less competition.

Various organizations (non-profit or commercial) can find value in releasing its specifications as open license. There are more advantages than disadvantages in releasing your assets as CC BY-SA 3.0, EPL 1.0, EUPL 1.2, or any compatible licenses with the same features (i.e., ensure attribution, allow derivatives, allow reuse in commercial context, and require share-alike or copyleft).

If assets are sold and generate revenue, this approach is an immediate loss. This is however a concern for very few organizations, and primarily those that are oriented toward commercial service. Most successful organizations donate specs/methods to end-users to promote learning and help them sample the relevance of other products and services (e.g., certifications, training, software).

Yet most non-profit associations have kept their specs, methods, and standards as proprietary copyright. Many are competing aggressively without much benefit, as the differences between specs are becoming less and less perceptible. The cost of maintaining, expanding, and diversifying these assets is also increasing as specs are becoming more complex and require more quality assurance processes. These initiatives dilute the efforts of their membership, and any delays in releasing new versions also creates concerns about the vitality of the organization and its ability to create a viable strategy for its profession.

Releasing assets as open source ensures that you avoid the costs of proprietary specs, broaden and diversify the reach of your brand, and gain access to new channels to recruit users and contributors.

From a public interest perspective, the enduring competition creates a vacuum in the availability of specs that allow and encourage integration among standards. Hence CIOs and other digital executives are left without a proper mapping as to how to manage the digital transformation. A “do-it-yourself” approach may work for a while, but in-house specs are not cost-effective nor benefiting from outside contributions. This is also affecting organizations concerned with regulatory compliance, where relying on external standards is a requirement, one that cannot be fulfilled given the absence of such assets.

The BTM BOK attempts to fill this vacuum by encouraging non-profit and commercial organizations to take a pioneering step in releasing assets, methods, and specs as CC BY-SA 3.0, EPL 1.0, EUPL 1.2, or similar licenses. By putting an end to costly competition, these organizations will be recognized as those that unlocked the present situation, creating loyalty on part of adopters and contributors. As well, end-users will no longer be forced to “choose who’s the best”, as no organization will make such claims, relying on the BTM BOK instead as a neutral ground to resolve what elements and contents of specs shall be promoted.

Participating organizations can benefit greatly by releasing their assets early on in BTM BOK development. Copyright owners are encouraged to benefit from the first-mover advantage, as "empty placeholders" throughout the BTM BOK will rapidly be filled by various organizations and contributors. Being a follower in this case leaves only the choice of "mapping" proprietary assets to the BTM BOK. A few years later, the odds are the cost of maintaining assets internally will become too large, and the choice of "reusing/integrating" some BTM BOK asset will become inevitable. The outcome will therefore be the same as joining the BTM BOK initiative early on, without first mover, nor any copyright mention.

To ensure a first-mover advantage, the BTM Forum will sign an alliance Memorandum of Understanding (MOU). It will first commit the BTM BOK development team in respecting the terms of the CC BY-SA 3.0, EPL 1.0, EUPL 1.2, or other compatible open licenses, hence ensuring the way in which an organization's brand is named in BTM BOK assets. It will also ensure that the organization remains in control of its brand and assets, as reuse does not in any way imply transfer of brand use, nor require any commitment on part of the organization.

However, for organization willing to make contribution, and benefit from the BTM BOK development team infrastructure and processes, the MOU can provide clauses for formal collaboration. It can ensure leadership roles of a certain portion of the BTM BOK assets development process, naming representatives to one or many of the 4 teams:

1. **T1 - Contributors:** delegate existing BOK task force members to take leadership of some parts of the BTM BOK.

2. **T2 - Integration:** engage directly with the BTM BOK staff/interns who will edit and map the various assets to one another.

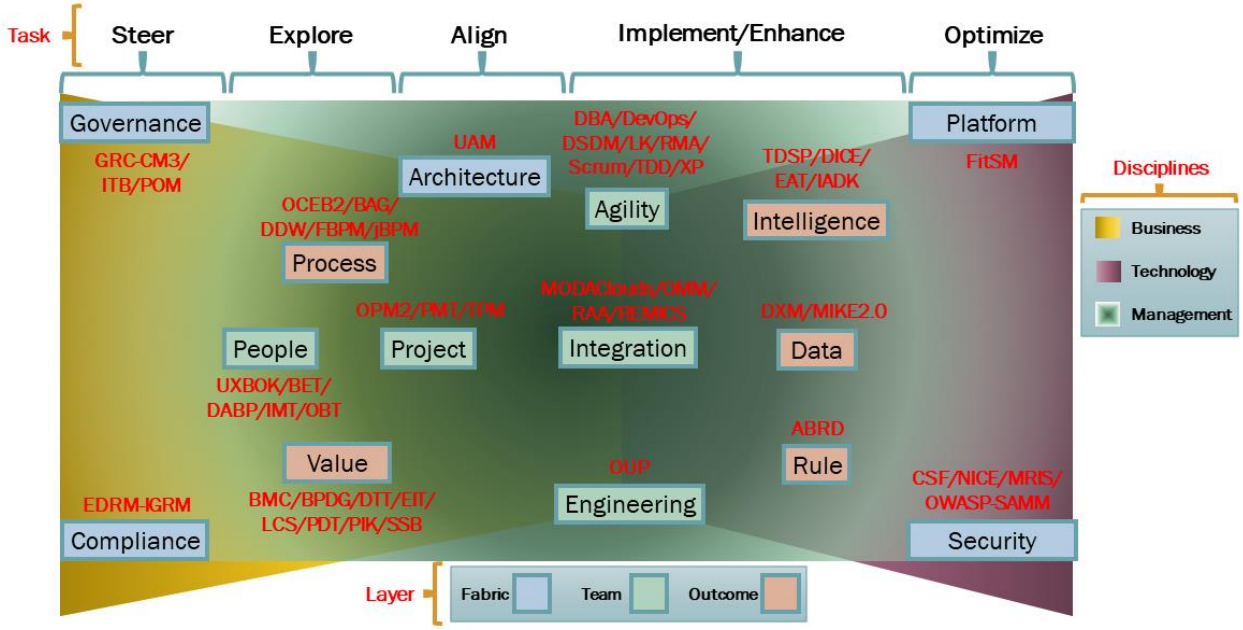
3. **T3 - Review:** delegate senior leaders and co-authors of existing BOKs for quality assurance of BTM BOK assets and conformity to original meaning/intent of reused BOKs.

4. **T4 - Oversight:** elect representatives of your specific profession or specialization to guide the BTM BOK development team in releasing assets that serve your community's interest.

1.3.2 References

BTM BOK FLOS assets cover initially 15 core practice or competency areas, with more to come soon, suggestions welcomed of digital transformation leadership, starting with those where references are readily available (Figure 15). Logical models are being explored, first classifying practices broadly along the 3 disciplines of the BTM profession: business, technology, and management.

Figure 15: BTM BOK Components and FLOS References



BTM BOK builds upon the widest set of FLOS assets available (

Table 15). We integrate 57 FLOS references (aiming to reach 100+), of which 17 are by vendors such as methods, toolkits, whitepapers, or documentation (VM), 15 are by authors of textbooks (TB), 11 are by open source authors or initiatives (OS), 7 are by research institutions (RI), 4 are by government agencies (GA), and 3 are by professional associations or standards organizations (PS).

This table is only a small part of the BTM BOK bibliography, which also reuses parts of 30+ of academic articles under CC BY or CC BY-SA, and references 100+ other academic references.

Reference points to the FLOS specifications, and indicates the name of the first author, the vendor, or the government agency in the case of a method linked to a book, textbook, toolkit, or whitepaper. We do not indicate the author in the case of open source initiatives, professional associations, non-profit organizations, standards organizations, or research institutions. License acronyms refer to standard identifiers (https://spdx.org/licenses/).

Table 15: BTM BOK Detailed FLOS References

Line	Domain	License	Type	Acronym	Reference
	Fabric				
1.	Architecture	EUPL 1.2	VM	UAM	Unified Architecture Method (UAM) by David W. Enstrom http://www.unified-am.com/
2.	Compliance	CC BY 3.0	RI	EDRM - IGRM	EDRM Information Governance Reference Model (IGRM) http://www.edrm.net/frameworks-and-standards/information-governance-reference-model/
3.	Governance	CC BY-SA 3.0	PS	GRC-CM3	Governance, Risk, and Compliance (GRC) Capability Model 3.0 (CM3) by OCEG https://go.oceg.org/grc-capability-model-red-book https://go.oceg.org/condensed-grc-capability-model-v3-0
4.		CC BY 4.0	TB	ITB	Introduction to Business (ITB) by OpenStax Authors https://cnx.org/contents/4e09771f-a8aa-40ce-9063-aa58cc24e77f
5.		CC BY 4.0	TB	POM	Principles of Management (POM) by OpenStax Authors https://openstax.org/details/books/principles-management
6.	Platform	Only parts CC BY 4.0	VM	FitSM	Free IT Service Management (FitSM) by ITEMO https://fitsm.itemo.org/
7.	Security	Public Domain	GA	CSF	CyberSecurity Framework (CSF) by US-NIST https://www.nist.gov/cyberframework https://www.nist.gov/itl/applied-cybersecurity
8.		Public Domain	GA	NICE	National Initiative for Cybersecurity Education (NICE) by US-NIST https://www.nist.gov/cyberframework https://www.nist.gov/itl/applied-cybersecurity/nice
9.		CC BY 4.0	TB	MRIS	Managing Risk and Information Security (MRIS) by Malcolm W. Harkins https://doi.org/10.1007/978-1-4842-1455-8
10.		CC BY-SA 4.0	OS	OWASP-SAMM	Open Web Application Security Project (OWASP) Software Assurance Maturity Model (SAMM) https://owaspsamm.org/
	Team				
11.	Agility	CC BY-SA 4.0	VM	DBA	Domains of Business Agility (DBA) by Business Agility Institute (Evan Leybourn, CEO) https://businessagility.institute/wp-content/uploads/2019/03/BAI-DomainsOfBusinessAgility-Book.pdf https://theagiledirector.com/article/2017/05/25/domains-of-business-agility-v2/
12.		CC BY-SA 4.0	OS	DevOps	DevOps Yoga https://devops.yoga
13.		CC BY-SA 4.0	VM	DevOps	DevOps Resources by IBM Red Hat https://opensource.com/resources/devops https://opensource.com/downloads/devops-transformation https://opensource.com/downloads/devops-hiring-guide https://opensource.com/downloads/devsecops

14.		CC BY-SA 4.0	OS	DevOps	DevOps Toolchain by Kharnagy https://commons.wikimedia.org/wiki/File:Devops-toolchain.svg
15.		CC BY 4.0	OS	DevOps	DevOps Workflow by Ardemius https://github.com/Ardemius/devops-workflow
16.		EPL 1.0	OS	DSDM	EPF Practices, Dynamic Systems Development Method (DSDM) https://www.eclipse.org/epf/downloads/configurations/pubconfig_downloads.php
17.		CC BY-SA 3.0 Australia	VM	LK	Lean Kanban (LK) Practitioner: A Lean Approach to Efficient Workflow Management (Student Guide) by Evan Leybourn https://theagiledirector.com/training/2013/04/05/lean-kanban-practitioner-a-lean-approach-to-efficient-work-and-workflow-management/ https://theagiledirector.com/images/LeanKanban.pdf
18.		CC BY 4.0	VM	RMA	Reference Methodology for Agility (RMA) by WSO2 https://wso2.com/methodology https://github.com/wso2/reference-methodology
19.		EPL 1.0	OS	Scrum	EPF Practices, Scrum https://www.eclipse.org/epf/downloads/configurations/pubconfig_downloads.php
20.		CC BY 3.0	TB	TDD	Test-Driven Development (TDD) https://github.com/grzesiek-galezowski/tdd-ebook
21.		EPL 1.0	OS	XP	EPF Practices, Extreme Programming (XP) https://www.eclipse.org/epf/downloads/configurations/pubconfig_downloads.php
22.	Engineering	EPL 1.0	OS	OUP	EPF Practices, Open Unified Process (OUP) https://www.eclipse.org/epf/downloads/configurations/pubconfig_downloads.php
23.	Integration	CC BY 4.0 and Apache-2.0	RI	MODA Clouds	MODAClouds MultiCloud DevOps Toolbox http://multiclouddevops.com/ Model-Driven Development and Operation of Multi-Cloud Applications: The MODAClouds Approach https://doi.org/10.1007/978-3-319-46031-4
24.		EPL 1.0 and CC BY-SA 3.0	RI	OMM	QualiPSo Open Maturity Model (OMM) http://qualipso.icmc.usp.br/OMM/ https://sourceforge.net/projects/qualipso-omm/
25.		CC BY 4.0	VM	RAA	Reference Architecture for Agility (RAA) by WSO2 https://wso2.com/architecture https://github.com/wso2/reference-architecture
26.		EPL 1.0	RI	REMICS	REuse and Migration of Legacy Applications to Interoperable Cloud Services (REMICS) https://github.com/SINTEF-9012/remics-library
27.	People	CC BY-SA 3.0	PS	UXBOK	Usability BoK (UXBOK) https://www.usabilitybok.org
28.		CC BY 4.0	TB	BET	Business Ethics Textbook (BET) Stephen M. Byars, Kurt Stanberry, et al. https://openstax.org/details/books/business-ethics

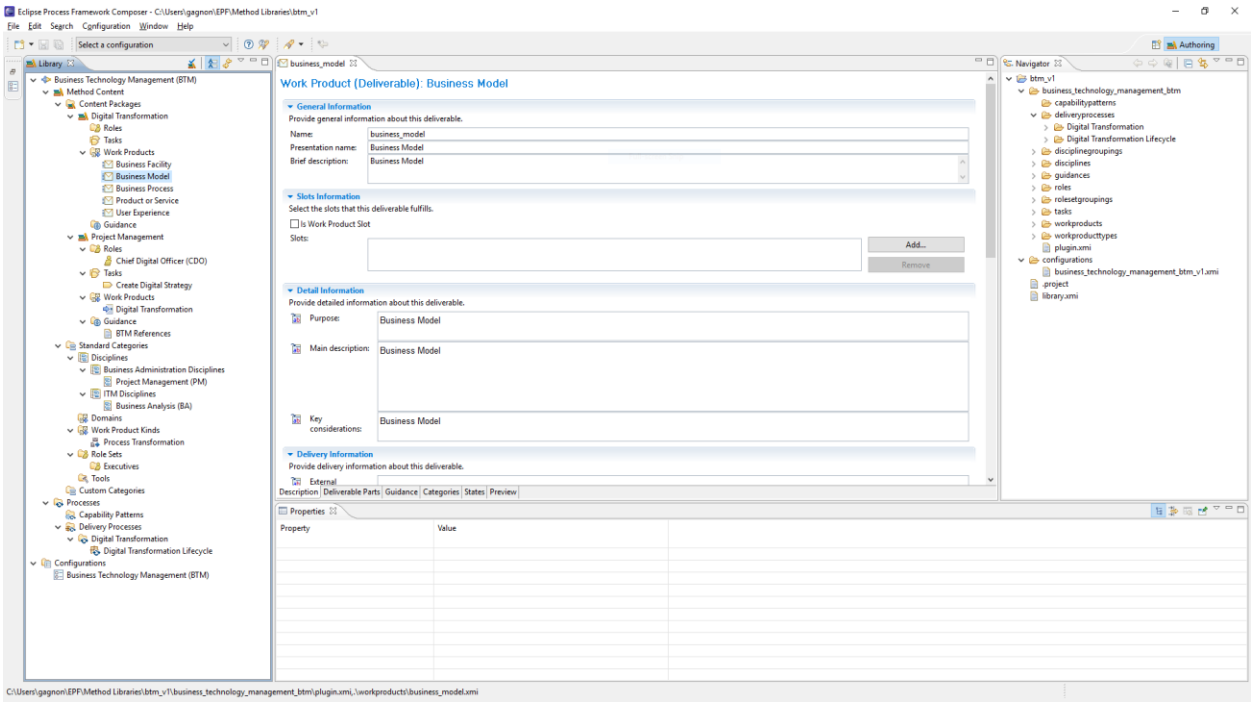
29.		CC BY-SA 4.0	TB	DABP	Digital Accessibility as a Business Practice (DABP) https://pressbooks.library.ryerson.ca/dabp/
30.		CC BY 4.0	TB	IMT	Introducing Marketing Textbook (IMT) by John Burnett https://open.bccampus.ca/browse-our-collection/find-open-textbooks/?uuid=ddbe3343-9796-4801-a0cb-7af7b02e3191
31.		CC BY 4.0	TB	OBT	Organizational Behavior Textbook (OBT) by OpenStax Authors https://openstax.org/details/books/organizational-behavior
32.	Project	EUPL 1.2	GA	OPM2	Open Project Management Methodology (OPM2) by EU-DIGIT https://ec.europa.eu/isa2/solutions/open-pm2_en
33.		CC BY 4.0	TB	PMT	Project Management Textbook (PMT) by Adrienne Watt https://opentextbc.ca/projectmanagement/
34.		CC BY 4.0	TB	TPM	Technical Project Management in Living and Geometric Order (TPM) by Jeffrey Russell, Wayne Pferdehirt, and John Nelson https://wisc.pb.unizin.org/technicalpm/
	Outcome				
35.	Data	CC BY-SA 4.0	VM	DXM	Data Excellence Model (DXM) by Tobias Pentek and Christine Legner https://www.cc-cdq.ch/data-excellence-model
36.		CC BY 3.0	OS	MIKE2.0	Method for an Integrated Knowledge Environment (MIKE) http://www.openmethodology.org
37.	Intelligence	CC BY 4.0 and MIT	VM	TDSP	Team Data Science Process (TDSP) by Microsoft https://aka.ms/tdsp
38.		Apache-2.0	RI	DICE	Developing Data-Intensive Cloud Applications with Iterative Quality Enhancements http://www.dice-h2020.eu/ https://github.com/dice-project/DICE-Knowledge-Repository/wiki/DICE-Knowledge-Repository
39.		CC BY-SA 3.0	RI	DICE	Practical DevOps for Big Data https://en.wikibooks.org/wiki/Practical_DevOps_for_Big_Data
40.		CC BY 4.0 and MIT	RI	EAT	Ethics & Algorithms Toolkit (EAT) http://ethicstoolkit.ai/
41.		CC BY-SA 4.0	VM	IADK	Intelligence Augmentation Design Kit (IADK) by Futurice http://iadesignkit.com
42.	Process	Granted EPL 1.0	PS	OCEB2	OMG Certified Expert in BPM (OCEB2) https://www.omg.org/oceb-2/
43.		CC BY-SA 3.0	OS	BAG	Business Analysis Guidebook (BAG) https://en.wikibooks.org/wiki/Business_Analysis_Guidebook
44.		CC BY 4.0	TB	DDW	Designing Digital Work (DDW) by Stefan Oppl and Christian Stary https://doi.org/10.1007/978-3-030-12259-1
45.		CC BY 4.0	TB	FBPM	Teaching Material by M. Dumas, M. La Rosa, J. Mendling and H. Reijers, for "Fundamentals of Business Process Management", 2nd edition, Springer, 2018 http://fundamentals-of-bpm.org/supplementary-material/

46.		Apache-2.0	VM	jBPM	Documentation for Drools, OptaPlanner and jBPM by IBM RedHat https://github.com/kiegroup/kie-docs
47.	Rule	EPL 1.0	OS	ABRD	EPF Practices, Agile Business Rule Development (ABRD) by Jérôme Boyer and Hafedh Mili https://www.eclipse.org/epf/downloads/configurations/pubconfig_downloads.php
48.	Value	CC BY-SA 4.0	VM	BMC	Business Model Canvas (BMC) by Strategyzer (Alexander Osterwalder, Co-Founder) https://www.strategyzer.com/canvas/business-model-canvas https://www.strategyzer.com/books/business-model-generation
49.		CC BY-SA 4.0	TB	BPDG	Business Plan Development Guide (BPDG) by Lee A. Swanson https://openpress.usask.ca/businessplandevelopmentguide/
50.		CC BY 3.0 Australia	GA	DTT	Digital Transformation Toolkit (DTT) by South Australian Government https://www.dpc.sa.gov.au/responsibilities/ict-digital-cyber-security/toolkits/digital-transformation-toolkit
51.		CC BY-SA 4.0	TB	EIT	Entrepreneurship and Innovation Toolkit (EIT) by Lee A. Swanson https://openpress.usask.ca/entrepreneurshipandinnovationtoolkit/
52.		CC BY-SA 4.0	VM	LCS	Lean Service Creation (LCS) by Futurice https://www.leanservicecreation.com/
53.		CC BY-4.0	VM	LCS -IoTT	Internet of Things Toolkit (IoTT) by Futurice http://iotservicekit.com/
54.		CC BY-SA 4.0	VM	PDT	Platform Design Toolkit (PDT) by Boundaryless https://platformdesigntoolkit.com
55.		CC BY-SA 4.0	VM	PDT-POEG	Platform Opportunity Exploration Guide (POEG) by Boundaryless https://platformdesigntoolkit.com/opportunity-exploration/
56.		CC BY-SA 4.0	VM	PIK	Platform Innovation Kit (PIK) http://platforminnovationkit.com/
57.		CC BY 4.0	TB	SSB	Scaling a Software Business (SSB) by Brian Fitzgerald et al. https://doi.org/10.1007/978-3-319-53116-8

1.3.3 Editing

BTM BOK relies on EPF Composer, an Eclipse development environment, where our selected FLOS assets will be aligned with our digital transformation lifecycle and maturity model (Figure 16). The BTM BOK core language will help integrate assets around the core elements of the EPF framework, as defined by the Object Management Group (OMG) Software Process Engineering Metamodel (SPEM 2.0), initially developed by IBM for the Rational Unified Process (RUP).

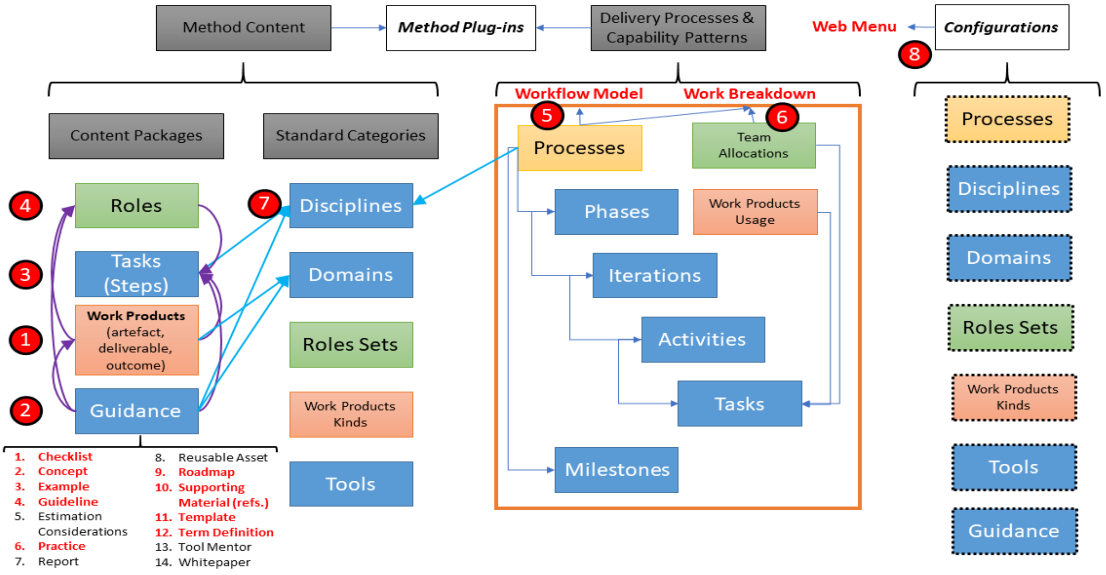
Figure 16: BTM BOK Development Interface within EPF Composer



EPF Composer presents several challenges for beginners, but once standard packages have been analyzed, most users are able to understand the logic and relationships between components. These serve to establish editorial priorities and help guide the team in large collaborative development efforts. BTM BOK leverages the generic SPEM 2.0 schema, with EPF Composer integrating them within a set of Method Library assets that simplify method contents reuse and customization (Figure 17):

- **Process:** Overall digital transformation lifecycle and maturity model to align all sub-processes.
- **Disciplines:** 15+ BTM specializations and their main external BOK references.
- **Workflows:** Broad integrated activities guiding BTM leaders to master the digital lifecycle.
- **Workflow details:** Sub-processes connecting the competencies of the 20+ BTM specializations.
- **Role:** BTM certification levels regrouping the 15+ BTM specializations and their roles.
- **Activity or Task:** Competencies required by the 57+ external BOKs and defining the job roles.
- **Artifact or Work Products:** Expected input and output of the typical digital lifecycle tasks.
- **Tools and Tool Mentor:** Tools recommended to BTM professionals to perform the various tasks.
- **Guidance, Checkpoints, Templates, and Reports:** External references to best practices.

Figure 17: BTM BOK Design Using SPEM 2.0 within EPF Composer



1.3.4 Contribution

There are 11 main applications that are involved in the BTM BOK development and integration (Figure 18). Documentation is provided on the various tools and software used in developing BTM BOK, along with short video demos for team participants (https://www.btm-forum.org/standards/bok/tools). Each app offers complementary functionality integrated within a complete development lifecycle (Table 16).

Figure 18: BTM BOK Development Team Platform

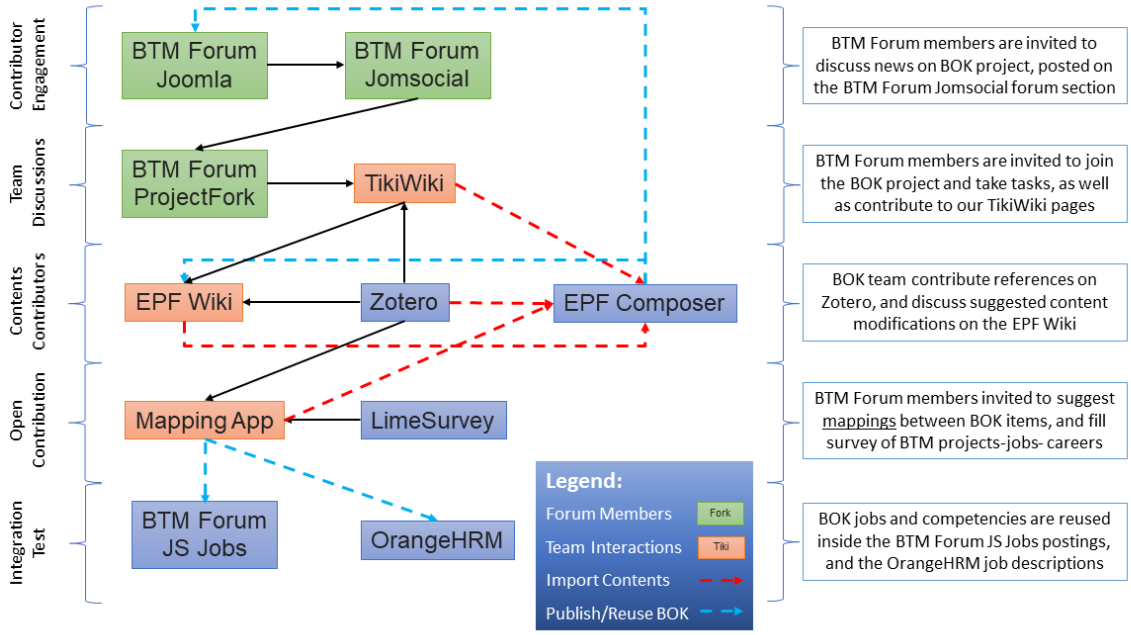


Table 16: BTM BOK Development Apps and Functionality

BTM BOK Apps	Functionality
BTM Forum	ITAC created in 2009 the Business Technology Management (BTM) initiative, promoting a renewed sense of community, mapping many career paths crossing business and technology. In 2016, it launched the BTM Forum (Joomla) website, developing a new Body of Knowledge (BOK) and professional certifications, program accreditation standards, and learning guides to help prepare the next generation of digital transformation leaders.
BTM Forum Apps	BTM Forum website integrates several sub-applications or Joomla Extensions: (1) social networking (JomSocial), (2) discussion forums (JomSocial), (3) sophisticated projects plan and development (ProjectFork and JomSocial), and (4) jobs board (JS Jobs). These are accessible by registered users and user groups permissions. They are used for creating development projects, social sharing, discussions as well as for the integration of jobs and CVs reuse.
BTM BOK Zotero Group and Citation	Zotero is a free references management software used to manage, collect, organize, cite, and share research. A Zotero referencing app is developed and integrated in BTM BOK apps. To add your references and use them to cite the content inside our apps, you need to: • Download and install Zotero desktop • Join the BTM BOK Zotero references group on the web • Import references from any journal into your local Zotero desktop app • Add your references into the BTM group using your local Zotero desktop app • Sync from local to web group • Reference and cite the content on the apps as shown on the demos.
Core BTM BOK	BTM BOK serves as a reference web site to guide practitioners at all levels of Competency: Associate, Professional, Manager, and Executive. It provides a generic core model "centered" on business value and technology, instructing what knowledge and certifications are required to enter new BTM positions and guiding upcoming digital leaders toward the common core competencies of their profession. The Eclipse Process Framework (EPF) Composer is used to develop and design the BTM BOK library integrating various external plugins and assets in a single BOK. The EPF Wiki (a Ruby app) is used to publish, maintain and add contents to the BOK developed in EPF. A Zotero references app is developed and integrated in EPF Wiki to allow for easy insertion of academic and professional literature citations.
Mapping App	BTM BOK mapping application allows members to create mappings or associations between various industry standards and BTM positions to identify and create competencies. Currently 1729 standards and 33 positions information are added and ordered hierarchically. The mapping app also includes adding references and citations through an integrated Zotero references manager app. Each member's created mappings and content can be shared with other members or kept private according to the member intent.
Community App	BTM BOK Community (TikiWiki) app aims to creating a knowledge hub for everyone who is interested in the subject to participate and collaborate. It provides members with a wiki-like environment where they can comment, create, add content to discuss

	various BTM BOK topics and literature. This allows enhancing BTM BOK community knowledge base and encourages sharing and collaboration.
Survey App	BTM BOK Survey application (LimeSurvey) enables easily creating surveys to be used to build case studies and career paths.
HRM App	BTM BOK Human Resources Management (OrangeHRM) application is used for integrating with other apps to matchmaking between jobs description and candidates.
Portal App	BTM Forum uses an e-learning app (Moodle) as its assessment portal. While not depicted on our diagram, this app will soon allow us to reuse BTM BOK positions and competencies. These items will be inserted directly within the certification process. Equipped with BTM BOK assessment criteria, assessors will be able to rapidly process applications while ensuring standards compliance. The app also enables applicants to finish their applications with minimal staff interventions, track status, receive updates, and get their certification and digital badges for inclusion in web profiles.

One of the key apps for integrating community contributions is the BTM BOK Standards Mapping System (Figure 19). It allows to consult the whole range of recommended practice standards, using a tree-based navigation interface, where contributors can login and recommend specific mappings among items. Each item can also be linked to citations to external references, especially FLOS but also proprietary standards. These standards items are reused and combined to give shape to various competencies, which are in turn reused in jobs or positions, integrated within career progressions (Table 17).

Figure 19: BTM BOK Standards Mapping System

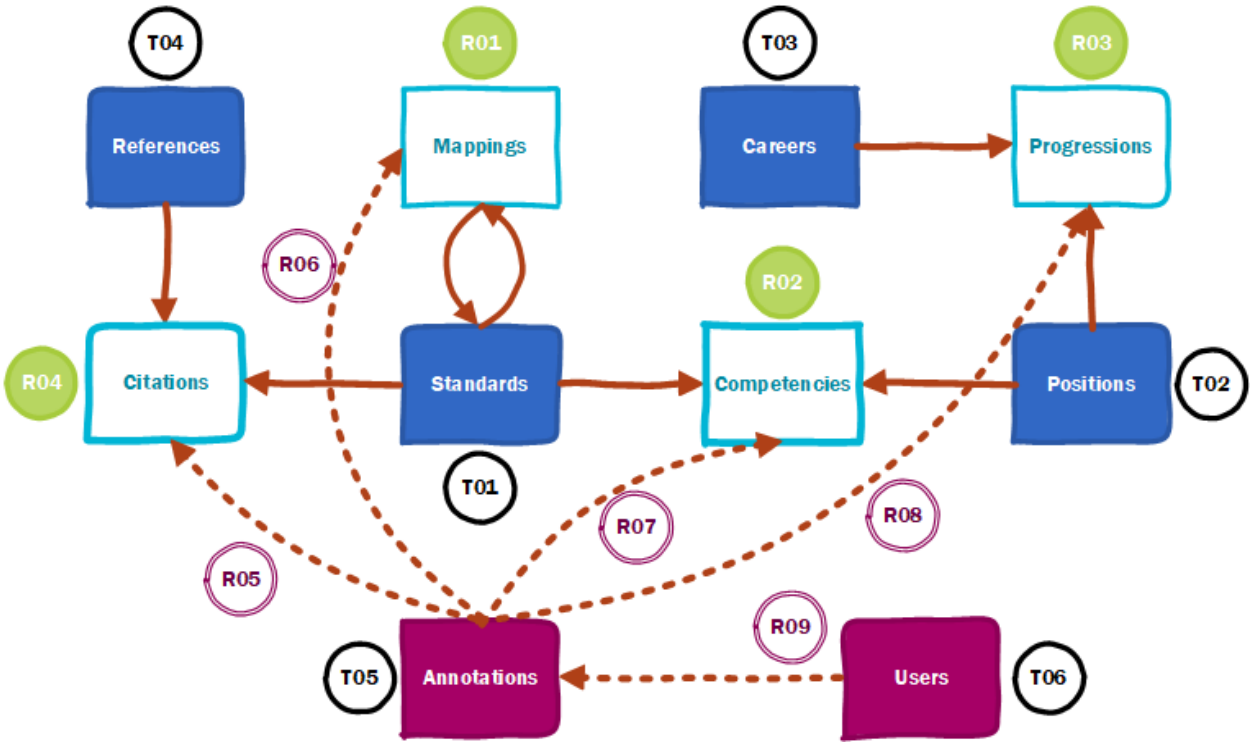


Table 17: BTM BOK Mapping App Database Tables

Line	Table	Code	Contents	Privileges
1.	Core Tables			
1.1.	Standards	T01	All BOK standards (18 items)	Admin only
1.2.	Positions	T02	All BOK NOS Positions (27 items)	Admin only
1.3.	Careers	T03	All BOK career paths from survey	Users add
1.4.	References	T04	All BOK references on Zotero	Zotero only
2.	Core Relationships			
2.1.	Mappings	R01	Map standards to each other	Users add
2.2.	Competencies	R02	Map standards to positions	Users add
2.3.	Progressions	R03	Map positions to careers	Users add
2.4.	Citations	R04	Map references to standards	Users add
3.	Support Tables			
3.1.	Annotations	T05	All annotations	Users add
3.2.	Users	T06	All users	Admin only
4.	Support Relationships			
4.1.	Citations Annotation	R05	Annotations to citations	Users add
4.2.	Mappings Annotation	R06	Annotations to mappings	Users add
4.3.	Competencies Annotation	R07	Annotations to competencies	Users add
4.4.	Progressions Annotation	R08	Annotations to progressions	Users add
4.5.	Annotation User	R09	User who made annotation	Users add

1.3.5 Authors

BTM BOK depends on the integrated activities of 3 development team roles (in FLOS formats.

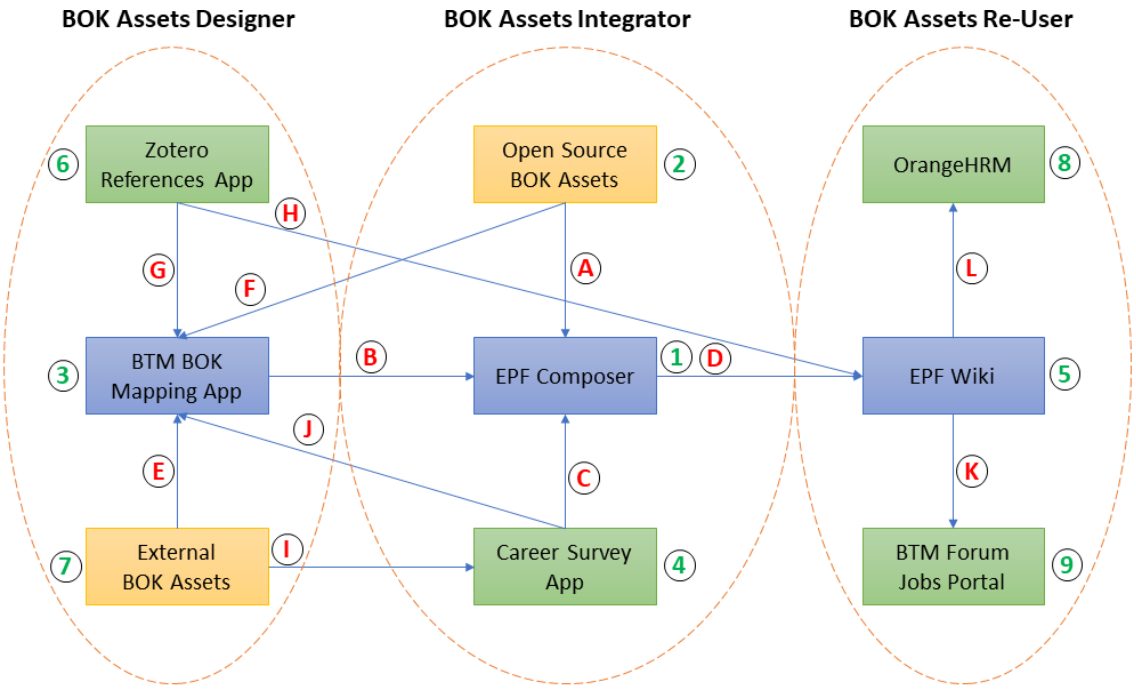
Figure 20):

- BOK asset **designer** builds the framework, manages contributors, and maps relevant assets;
- BOK asset **integrator** uses EPF composer and wiki to integrate all assets on a fine-grain basis;
- BOK asset **re-user** develops reuse proof-of-concepts for HRM functions through new APIs.

These roles are generically shared by various community contributors. All participants are recruited through BTM Forum portal apps. They all have opportunity to elect their respective choice of role as per ongoing public listings of pending work items. The elected role can be shifted and even combined, none being unique or exclusive.

The choice of roles depends heavily on the ability of a contributor to use the relevant software tools and add their personal experience and their organization's perspective. As such, it is customary to find people with hands-on experience of software development to act as BOK Assets Integrator, since they will be most familiar with Eclipse Integrated Development Environment (IDE) functionality. Meanwhile, BOK Assets Designer role will often be chosen by those with extensive knowledge of a specific professional practice (e.g., Project Management), and focus on creating the relevant contents to be actively integrated by Integrator roles, both often combined by one person or team-cell if already competent. Finally, the more advanced and complex role is BOK Assets Re-User, where the use of EPF Wiki assets, stored in XMI formats, are carefully integrated into other Talent Management and HRM systems, mostly through XML-based APIs to enable near-real-time update of contents as BTM BOK assets are continuously integrated and deployed in FLOS formats.

Figure 20: BTM BOK Development Team Roles



Each role has responsibilities within the development process (capital letters referring Figure 20 arrows):

A. Integrate all open source BOK assets, e.g., Open PM2, Open UP, and others to be released.

B. Import BTM BOK mappings between all elements, especially to connect 20+ BOKs to workflows.

C. Import results of the Career Survey App to find most typical positions and career progressions.

D. Publish BTM BOK assets and maintain EPF Wiki contents to ensure feedback reused in model.

E. Coach community contributions to map 20+ external BOKs using the BTM BOK Mapping App.

F. Coach community contributions to map core open source BOKs in the BTM BOK Mapping App.

G. Coach community to add contents to the Zotero References App and map them to BOK items.

H. Coach community to add contents to the Zotero References App and cite within the EPF Wiki.

I. Configure the Career Survey App using the 20+ external BOKs from BTM BOK Mapping App.

J. Import Career Survey App result as positions and career progressions in BTM BOK Mapping App.

K. Develop EPF Wiki API to integrate BTM BOK assets in key functions of the BTM Forum Job Portal.

L. Develop EPF Wiki API to integrate BTM BOK assets in key functions of the OrangeHRM Web App.

BTM BOK development cycle will initially unfold through 6 milestones that interns meet as a team, with BTM BOK Review Team involved at each point:

1. **M1:** Team recruited; infrastructure installed; plan formalized; IPR agreement starting;
2. **M2:** BTM BOK mock-up with assets; contributor documentation ready; invited 20+ contributors;
3. **M3:** First contributors update; validate BTM BOK mappings; reassign contributor tasks;
4. **M4:** Second contributors update; validate BTM BOK mappings; reassign contributor tasks;
5. **M5:** Public Demo of BTM BOK v3; integration to BTM certifications; integration to HRMS/CVs;
6. **M6:** Transfer BTM BOK assets and infrastructure to ITAC; report to MITACS and UQO.

BTM BOK development teams were created to carry out and supervise the various tasks and responsibilities of these 3 key roles. Here are the 4 teams presently being staffed, with recruitment regularly expanding the capacity to cover more BOK areas requiring integration:

1. **T1 - Contributors Team:** Act as our Free, Libre, Open Specifications (FLOS) team, an international network of open source analysts, researchers, and consultants ready to integrate their best ideas in the BTM BOK. Work regularly on our team servers, and often publish blogs, social network posts, and academic articles, updating the public about progress in some sections of our BOK assets.

2. **T2 - Integration Team:** Act as Continuous Integration (CI) team, responsible for curating all BTM BOK assets, as well as configuring and maintaining all DevOps infrastructures for all teams. Support contributors and ensure coherence in integrating inputs at various stages.

3. **T3 - Review Team:** Act as our Quality Assurance (QA) team, staffed primarily with asset-specific experts, typical either of faculty or integrated BOK authors. Will perform close oversight of BTM BOK contents and development steps, and possibly sit on the doctoral thesis committees of some students who will publish some research re. the BTM BOK.

4. **T4 - Oversight Team:** Act as our Release Candidate (RC) team, a group who makes the call on what assets of the BTM BOK we are to release publicly on GitLab. Staffed with BTM Forum Governing Council members, including a representative from the IT Association of Canada (ITAC) as formal owners of the BTM registered trademarks in Canada and the United States.

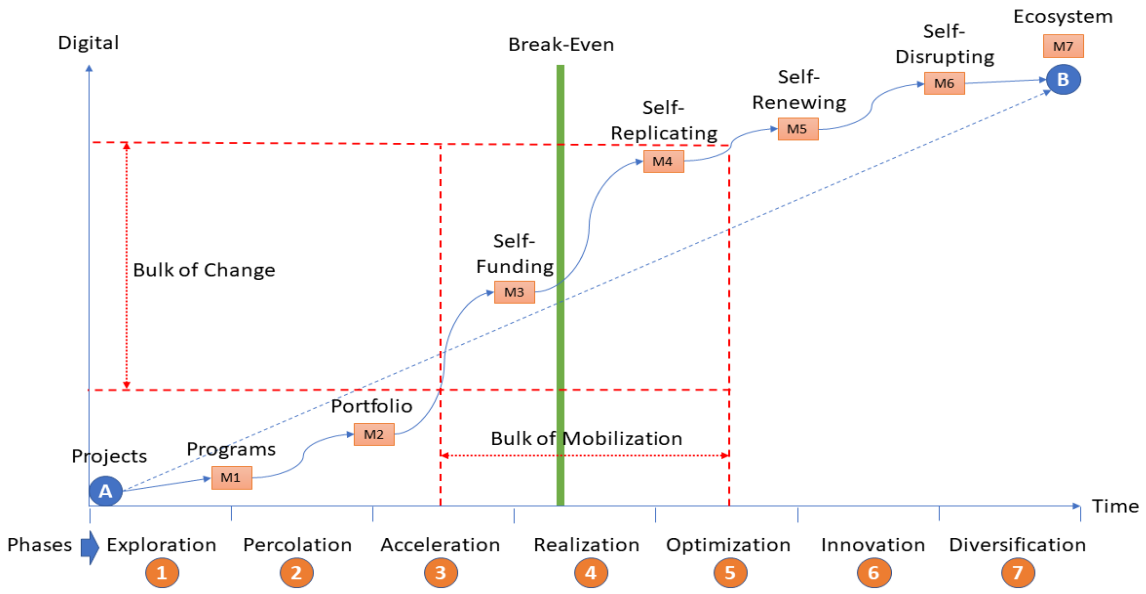
2 Transformation

The digital transformation journey presents at each phase new leadership challenges to BTM professionals.

2.1 Opportunity

While most traditional organizations are familiar with digital projects and programs of small projects, few have entered the "bulk of change" phase where the organization becomes digital (Figure 21). This is where BTM professionals at all ranks become essential, where the organization becomes truly digital, i.e., BTM leaders help making products, process, people, partners, and business portfolios more agile in using IT. Beyond that point, the digital transformation is self-funding through internal savings and renewed competitive positioning.

Figure 21: BTM Maturity Levels and Digital Lifecycle



2.1.1 Scan

Table 18: BTM and Innovation Focus

Dimension	Definition	Criteria
New	Innovation is about new concepts and solutions to various needs	New to the world or a region, new to an industry or an organization
Contextual	Innovation is contextual to the organization and industry within which it is adopted	The same type of solution can take a distinct nature or shape in others, and still be classified as innovative, at least within that realm
Where	Innovation in organizations can occur at strategic and/or operational levels, within a planned and/or emergent activity, with deliberate and/or unintended outcomes	Innovative activities and outcomes will depend on the sector, and occur as per their respective dynamics, e.g., business, government, municipal, para-public, or non-profit
What	Innovation can bring new solutions in one or more deliverables	New business models, new products/services, new technology/infrastructure, new production/business processes, new management methods/practices, new ways of thinking/working, etc.
When	Innovation happens when forces converge or spontaneously organize as a new "equilibrium solution", often viewed as a "dominant design" among competing solutions	Dominant designs are typically rooted in a set of evolving needs, and in response to opportunities and/or constraints that form a "complex system" leading to, causing, or driving innovation
Why	Innovation typically targets performance or a planned outcome	Profits or Return on Investment (ROI), productivity or quality improvement, meeting end-user/stakeholder needs, serving new markets or constituents/mandates, access to new resources or knowledge, employee initiative and ideas, etc.
How	Innovation is best conceived as a project, with a beginning and ending, and unfolding as a process managed by one or more interdisciplinary team(s) throughout a lifecycle	Innovative projects may be composed of one, more, or any of a few stages within which several iterations may occur, with varying degrees of originality and hybridation among innovative needs, options, and solutions, involving: (1) development, (2) implementation, (3) diffusion, (4) adoption and adaptation, (5) abandonment or replacement

2.1.2 Discover

Table 19: BTM and Digital Lifecycle

Features \ Activities	Innovation	Adoption	Transformation	Optimization	Diversification
IT Mandate	Development	Development	Operation	Management	Governance
IT Impact	Products	People	Places	Processes	Partnerships
IT Benefits	New model, new arch., new code, new apps, new users, new value	Simplify, open perspectives, collaboration, speed, effective	Mobile, things, intelligent, real time, analytics-driven	Open source, reuse, acquire, integrate, standardize	Assets, supply, competitive, new products, market access
BTM Expertise	Entrepreneurship	User Experience	Infrastructure	Architecture	Value Strategy
BTM Role	Create concepts and models at core of new solutions	Translate user requirements to ensure best solutions	Integrate new solutions and help users adapt practices	Design new way of working and delivering value with existing IT	Advise on use of IT for new value, link to market vision
BTM Partners	Engineers	End-Users	IT Vendors	Line Managers	Executives

2.1.3 Prioritize

Table 20: BTM Context in Private and Public Sectors

Project Context	Private Sector (advantages)	Public Sector (constraints)
Strategy and Policy Making	• Senior executives make decisions • Competitive intelligence is key • Board will follow CEO guidance	• Long and complex consultations • Election cycles influence decisions • DM must follow Cabinet priorities
Value from IT Investments	• Use IT for efficiency and growth • Innovate as often as possible • Justify IT investments based on value	• Use IT to implement and support programs • Innovation mostly at beginning of program • IT investment dictated by policy priorities
Flexibility in IT Procurement	• Short-term competitive IT contracts • Vendor accountability and switching • Cloud services and integration are key	• Long-term licensing and outsourcing • Vendor autonomy in IT service delivery • Law remains a challenge for cloud services
Project Management	• Strategic projects have mini-CEOs • PM certification and capabilities • PMO with special integrated systems	• Close control of strategic projects • PM profession and capability emerging • PMO uses mostly accounting systems
Budgeting Cycles	• Budgets are adjusted quarterly • IT is protected, linked to profitability • Performance control based on ROI	• Annual budgets, difficulty to increase funds • Policy priorities get most funds, IT second • Control based on budget conformity
Financial Stability	• Projects that deliver value are priority • Funding follows business growth • Innovate with revenue opportunities	• Programs can get cut without notice • Funding follows Cabinet priorities • Innovate if new IT is absolutely necessary
Access to Best Expertise	• Salaries based on knowledge value • Staff changes based on performance • Protect internal strategic IT capabilities	• Union salaries are fixed and uncompetitive • Staffing based on long term temp agencies • Consultants provide strategic IT expertise

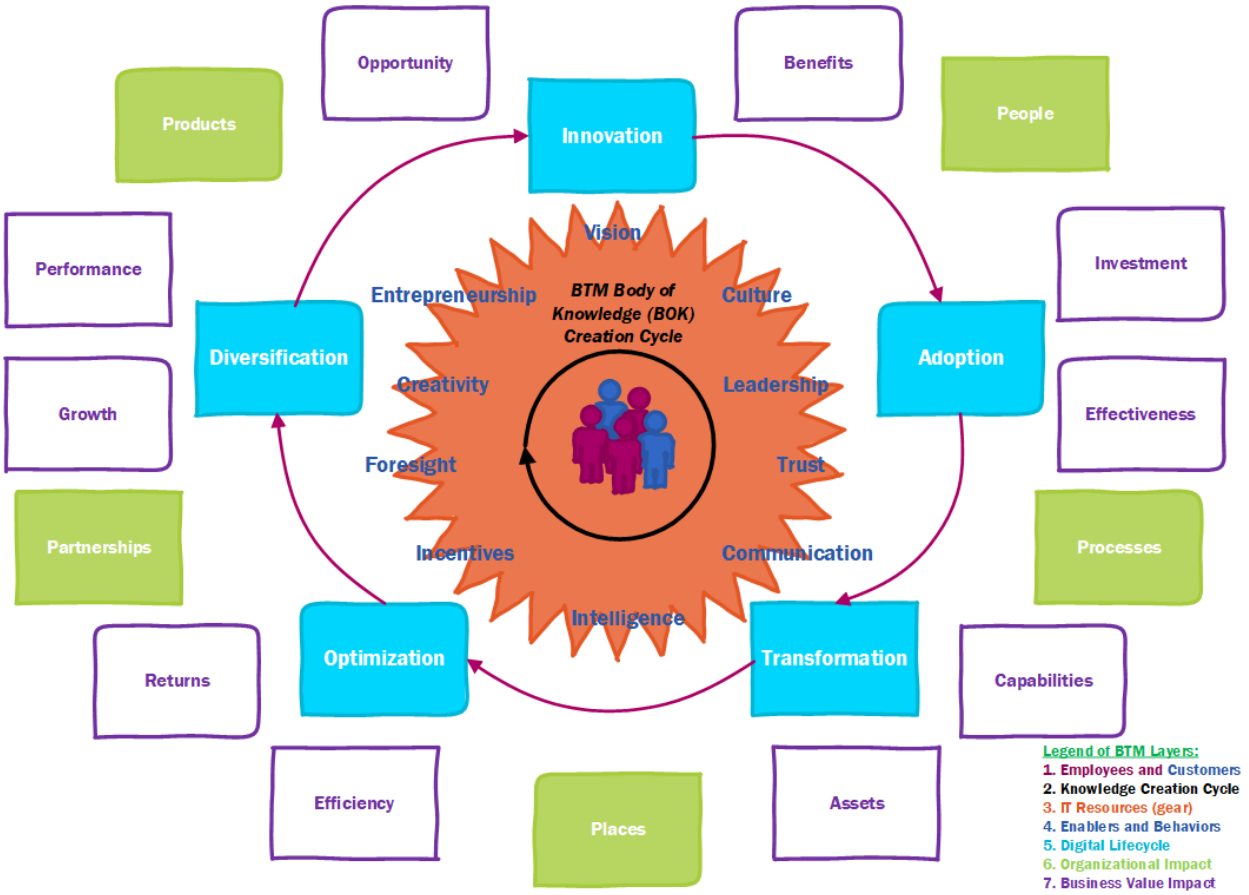
2.1.4 Finance

Table 21: BTM Financing and IT Costs

Units/CIO Branch	Sub-Units (Director)	Direct Costs	% of Budget
Application Development	1. Development Project Office 2. Architecture/Modeling 3. Web Sites/Applications 4. Enterprise Systems 5. Systems Integration 6. Business Req. and Analysis 7. Database Support	Business Analysts/Developers Consultants/Certification Multimedia/Production Integration Appliances Database Analysts	35-45 %
IT Operations	8. Shared Services Liaison Role 9. Internal Data Centers 10. Mainframes 11. Networking/Security 12. Business Continuity 13. IT Security Operations	Outsourcing Services Servers/Facilities Hosting/Maintenance Networks/Telecom. Backups/Recovery	25-30 %
IT Support	14. End-User Equipment 15. End-User Support 16. End-User Software 17. Telephony/Conferencing 18. Identity/Security	Computers/Peripherals Printing and Supplies Software Licenses Devices/AV/Telecom. ID Cards/Access Points	20-25 %
Information Management	19. Content Management 20. Library Services 21. Files and Archives 22. Compliance/Audit	Storage Servers Consultants/Auditors Information Management Analysts	15-20 %
Branch Management	23. Policy and Planning 24. Human Resources 25. Accounting 26. Procurement 27. Legal Counsel 28. Program and Project Management 29. Enterprise Architecture 30. License Management	Strategy Consultants Temp Agencies Accountants/Consultants Vendor Analysis Firms Lawyers/Consultants Project and Program Managers Enterprise Architects All Licenses for Agency	5-10 %

2.1.5 Benefit

Figure 22: BTM BOK Cycle and Digital Value Creation



2.2 Decision

Figure 23: BTM Decision-Making Environment

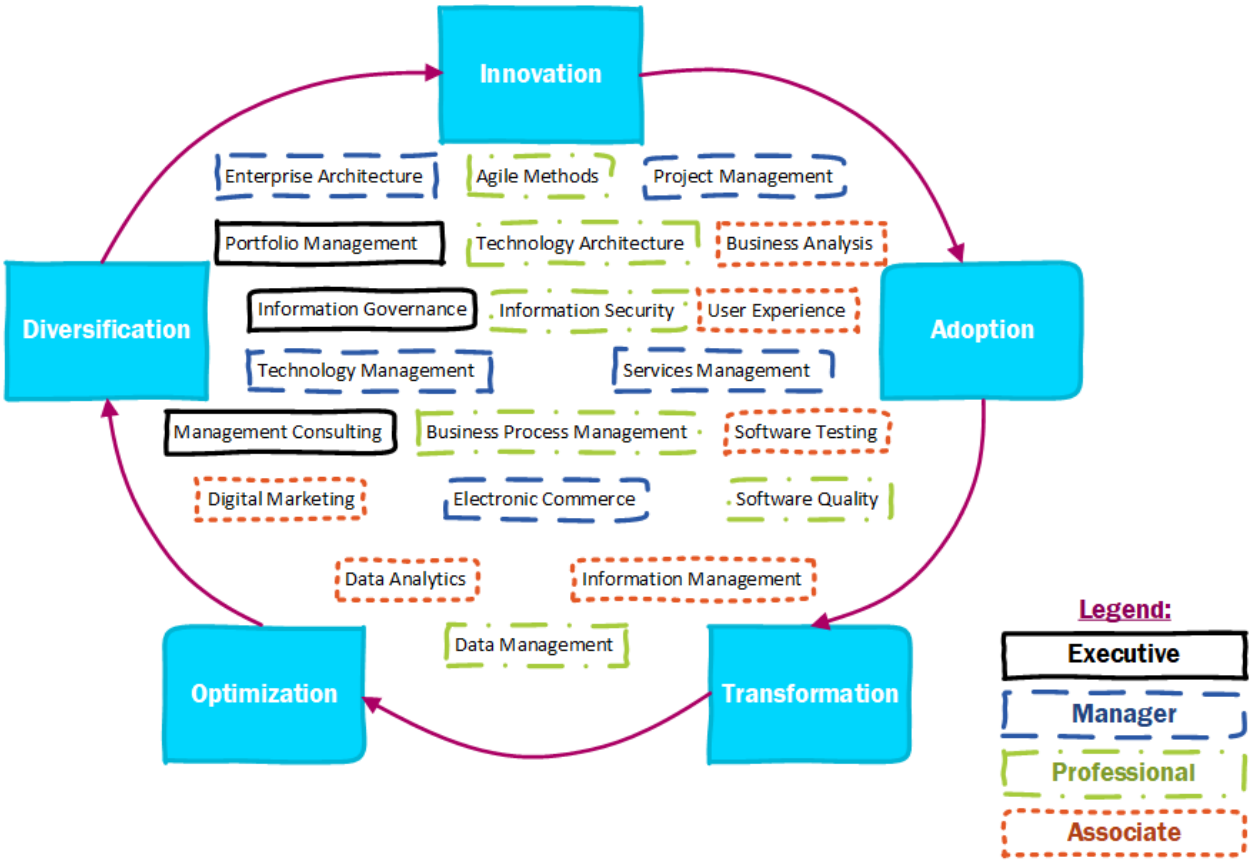


Table 22: BTM Roles and Digital Lifecycle Leadership

Entry Level	Specialization	Innovation	Adoption	Transformation	Optimization	Diversification
Associate	1. Business Analysis	1	1	1	1	1
Associate	2. Data Analytics	1			1	1
Associate	3. Digital Marketing	1			1	1
Associate	4. Information Management		1	1	1	
Associate	5. Software Testing		1	1	1	
Associate	6. User Experience	1	1	1	1	1
Professional	7. Information Security		1	1	1	
Professional	8. Agile Methods	1	1	1	1	1
Professional	9. Software Quality	1		1	1	
Professional	10. Data Management		1	1	1	
Professional	11. Technology Architecture	1			1	
Professional	12. Business Process Management	1	1	1	1	1
Manager	13. Electronic Commerce			1	1	1
Manager	14. Technology Management		1		1	
Manager	15. Services Management		1		1	
Manager	16. Project Management	1	1	1	1	1
Manager	17. Enterprise Architecture	1	1	1	1	1
Executive	18. Management Consulting	1	1	1	1	1
Executive	19. Information Governance		1		1	
Executive	20. Portfolio Management			1	1	1

2.2.1 Who

2.2.2 What

2.2.3 Why

2.2.4 Where

2.2.5 How

2.3 Accountability

Figure 24: BTM Executives and Digital Strategy Accountability

2.3.1 *Steer*

2.3.2 *Explore*

2.3.3 *Align*

2.3.4 *Implement*

2.3.5 *Optimize*

3 Practice

3.1 Fabric

3.1.1 Governance

3.1.2 Compliance

3.1.3 Architecture

3.1.4 Security

3.1.5 Platform

3.2 Team

3.2.1 People

3.2.2 Project

3.2.3 Agility

3.2.4 Engineering

3.2.5 Integration

3.3 Outcome

3.3.1 Value

3.3.2 Process

3.3.3 Rule

3.3.4 Data

3.3.5 Intelligence

4 Discipline

4.1 Business

4.1.1 Strategy

4.1.2 Marketing

4.1.3 Operation

4.1.4 Innovation

4.1.5 Performance

4.2 Management

4.2.1 Talent

4.2.2 Learning

4.2.3 Change

4.2.4 Leadership

4.2.5 Entrepreneurship

4.3 Technology

4.3.1 System

4.3.2 Software

4.3.3 Cloud

4.3.4 IoT

4.3.5 AI

5 Lifecycle

5.1 Scope

5.1.1 Administration

5.1.2 Solution

5.1.3 Support

5.1.4 Facility

5.1.5 Enterprise

5.2 Focus

5.2.1 Behavior

5.2.2 Functionality

5.2.3 Reengineering

5.2.4 Optimization

5.2.5 Diversification

5.3 Sector

5.3.1 Resource

5.3.2 Infrastructure

5.3.3 Product

5.3.4 Service

5.3.5 Public

6 Career

6.1 Goal

6.1.1 Specialist

6.1.2 Complement

6.1.3 Generalist

6.1.4 Senior

6.1.5 Occasional

6.2 Path

6.2.1 Corporate

6.2.2 Embedded

6.2.3 Small

6.2.4 Startup

6.2.5 Consulting

6.3 Progression

6.3.1 Beginning

6.3.2 Diversity

6.3.3 Education

6.3.4 Experience

6.3.5 Promotion

7 Standard

7.1 Accreditation

7.1.1 Diploma

7.1.2 Certificate

7.1.3 Bachelor

7.1.4 Master

7.1.5 Doctorate

7.2 Benchmark

7.2.1 Forerunner

7.2.2 Challenger

7.2.3 Innovator

7.2.4 Optimizer

7.2.5 Disruptor

7.3 Certification

7.3.1 Associate

7.3.2 Professional

7.3.3 Manager

7.3.4 Entrepreneur

7.3.5 Executive

