

Rebranding IS/IT Management Programs: The Case of Business Technology Management (BTM) in Canada

Stéphane Gagnon
stephane.gagnon@uqo.ca
Department of Administrative Sciences
Université du Québec en Outaouais
Gatineau, Québec, Canada

Abstract

In the past decade, a joint industry-academia initiative was launched in Canada to: revitalize interest in the IS/IT profession, ensure relevance to practice, and overcome the talent gap in management ranks. This led to a set of Learning Outcomes and Accreditation Criteria to help schools align programs with industry requirements. Consequently, several undergraduate IS/IT management programs in Canada have been rebranded to Business Technology Management (BTM). This literature review presents the premises behind this initiative and the merits of a rebranding strategy to grow the profession. Three facets are discussed. First, as the IS/IT profession is increasingly diverse, the rebranding strategy is presented as a valid option to help attract the most talented individuals toward management ranks. Second, since most professional specializations developed a formal Body of Knowledge (BOK), their diversity and lack of integration is analyzed from the viewpoint of Talent Management (TM) processes. Third, given the benefits of unifying all IS/IT roles within a single Digital Leadership profession, some solutions are proposed to develop a new common language to help integrate reference standards and guide professionals in their career progression.

Keywords: Business Technology Management. Accreditation Criteria. IS/IT Profession.

1. INTRODUCTION

Digital projects are creating a new context requiring leaders to look beyond the traditional framework of business-technology alignment, and refocus on digital innovation with a deeper understanding of how organizations lead people to co-develop digital capabilities (Kohli & Melville, 2019). As such, they present new challenges as digital transformation intensifies, where evolving requirements imply new approaches to recruiting and managing professionals and teams, while keeping organizational performance stable, and avoiding “digital failure” (N. Ramesh & Delen, 2021).

To ensure digital projects are staffed with new hybrid leadership skills, IT Talent Management (TM) requires a more integrative and adaptive

competency framework (Jackson & Dunn-Jensen, 2021). TM is one of the most strategic practices in Human Resources Management (HRM) focused on the “Competency Architecture” (i.e., logical structure or ontology of tasks, processes and outcomes, along with required knowledge, skills and experience) as the matching point between operations and people (Lewis & Heckman, 2006), enabling organizations to systematically plan and invest in their best personnel as strategic resources (McDonnell, Collings, Mellahi, & Schuler, 2017). Within the emerging digital organization, TM is becoming a key enabling capability, and possibly a competitive advantage.

To overcome talent management challenges, in 2009 a non-profit organization in Canada, Canadian Coalition for Tomorrow's ICT Skills (CCICT), later merged within the IT Association of

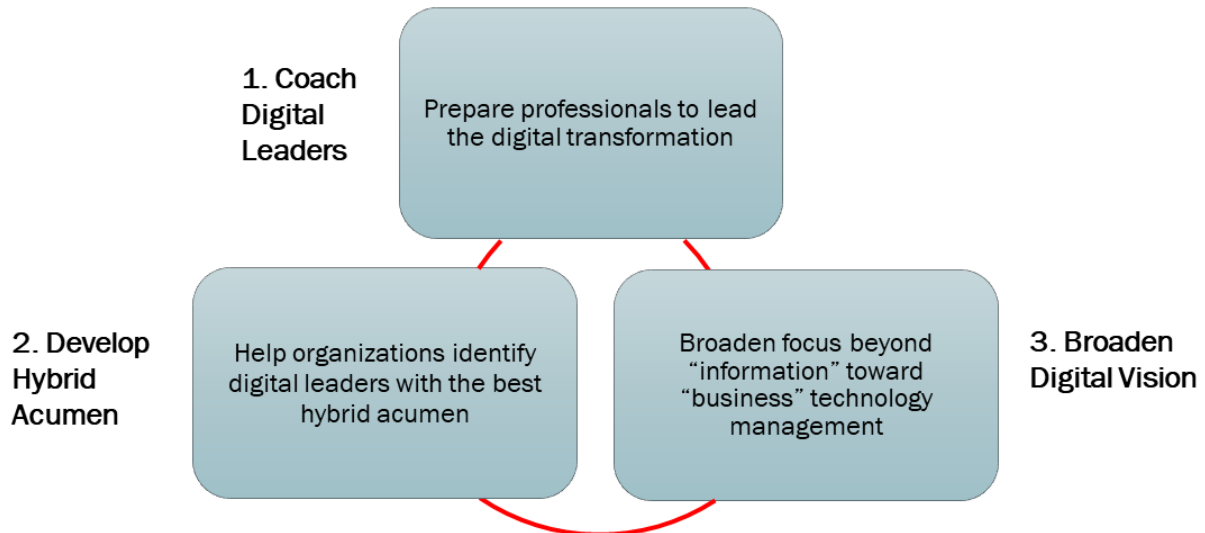


Figure 1 Objectives of the BTM Initiative

Canada (ITAC, 2014), to develop the Business Technology Management (BTM) initiative. Funded by the Government of Canada, it brought together IT executives at leading corporations with faculty at 20+ colleges and universities throughout the country. Its goals were to revitalize interest in the IS/IT profession, to ensure relevance to practice, and to overcome the talent gap in management ranks.

Among other deliverables, the BTM initiative led to Learning Outcomes and Accreditation Criteria to help schools align with industry requirements. The first edition of 32 criteria was published by CCICT in 2009, later expanded into 75 criteria under ITAC in 2016. In 2021, ITAC transferred the BTM trademarks to the Digital Innovation Foundation (DIF), responsible to promote the program globally (<https://digitalinnovation.site>), and to grow the BTM Forum into an open global community (<https://btmforum.org>). With more countries expected to follow Canada, each joining the new BTM Forum Global Council, the initial BTM team joined in 2022 the Canadian Information Processing Society (CIPS), responsible for future BTM accreditations in Canada, with the national Council Chair joining the Global Council as the country's delegate (<https://cips.ca/accreditation-criteria-and-policies>).

BTM Forum aims to develop a unified profession who will lead Digital Innovation, Transformation, and Entrepreneurship (DITE) projects (Figure 1). As was done in Canada, in each country a well-established professional organization will lead a campaign to promote accreditation and build a digital professional coaching ecosystem.

Accreditation criteria will soon be revised following the development of another deliverable the development of a BTM Body of Knowledge (BOK), aiming to become a transdisciplinary IS/IT program Competency Framework (ITAC, 2017). BTM BOK will integrate 15 core competency areas and will leverage existing open-source assets within the Eclipse Process Framework (EPF) modeling environment. While being an exploratory initiative, the first iteration (version 0.1) may offer opportunities for international research partnerships, helping to grow the BTM profession (Gagnon, 2019).

The present research in progress discusses the premises behind this initiative and the merits of a rebranding strategy to grow the profession. The BTM initiative, taking Canada as a background case, is analyzed through three foundational issues that are still open research questions. A prior paper is recommended for those seeking more background information on the BTM initiative, from which the present paper reproduced its figures and table (Gagnon, 2020).

First, as the IS/IT profession is increasingly diverse, the rebranding strategy is presented as a valid option to help attract the most talented individuals toward management ranks. TM implies that talented people identify strongly with their profession and its "rites of passage" (Tansley & Tietze, 2013). But this has not been the case of IS/IT professionals, who typically identify more directly with their respective discipline, with some overlap through broader certification titles (Parker, 2019; Riemenschneider & Armstrong, 2021). Digital

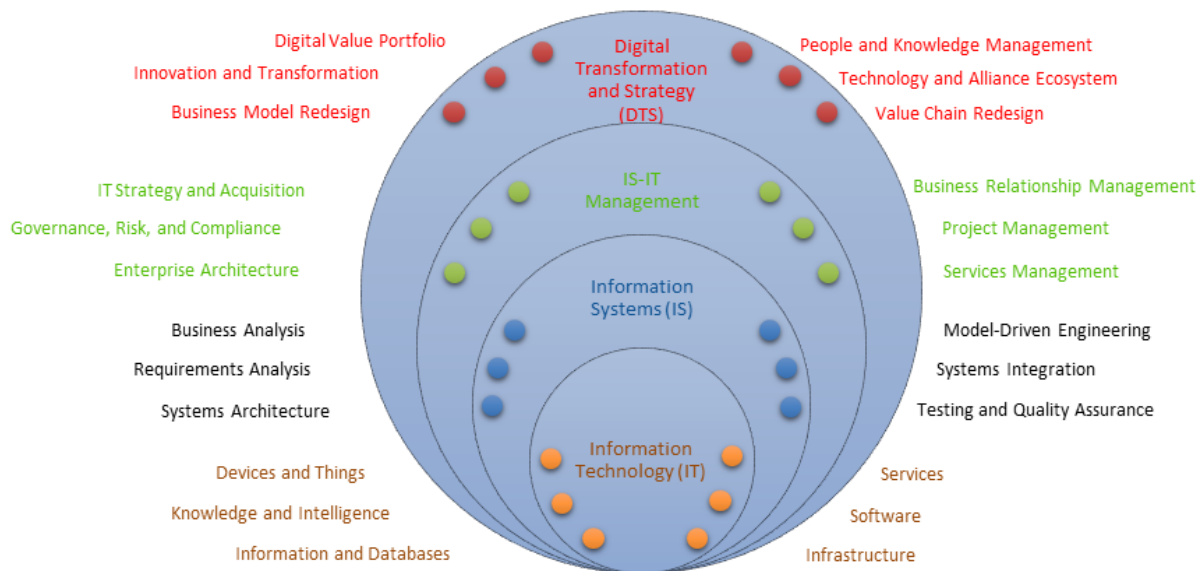


Figure 2 BTM Scope and Integration of DTS, IS/IT Management, IS, and IT

transformation and innovation, by their very nature, differ significantly from traditional certification focus, as they are not so much focused on managing information but more broadly business technologies. Digital projects are also involving a more hybrid skillsets and growing their ranks implies promoting more people capable to diversify in all facets of digital challenges. Refocusing the brand name of this new profession around the broader concept of BTM may help reduce the disparity among aspiring candidates by reducing their original disciplinary attachment, and value their strategic contribution in creating digital organizations.

Second, since most professional specializations developed a formal Body of Knowledge (BOK), their diversity and lack of integration is analyzed from the viewpoint of Talent Management (TM) processes. Most BOKs are developed by professional committees with a focus on identifying best practices in IT management, but rarely with an aim to develop a full-fledged digital organization. They are also very diverse and present several inconsistencies, while prescribing relatively rigid business processes and job roles. Finally, few of the copyright-owning associations collaborate among one another, leaving professionals with a burden to earn credentials in more than one digital-related field.

Third, there are benefits in unifying all IS/IT roles within a single Digital Leadership profession, exemplified by some emerging new professional roles, such as data science (Dorschel, 2021).

Some solutions are proposed to develop a new common language to help integrate reference standards and guide professionals in their career progression. It is still unclear how to best staff digital projects and lead them successfully, and several sources of expertise can contribute. Within a post-alignment era, a hybrid skillset implies the development of a new unified ontology for digital projects, improving TM accuracy, breadth, and flexibility.

2. FROM INFORMATION TO BUSINESS TECHNOLOGY MANAGEMENT

Rebranding IS/IT Management

Digital transformation is not new but its acceleration may lead to new value-driven behaviors (Vial, 2019). In private, public, or non-profit sectors, organizations everywhere are investing in innovative technology and are required to rethink, more than ever, their business models and core competencies (Sousa & Rocha, 2019). This trend is increasing the demand for a new generation of leaders with hybrid skillsets, requiring Information Systems (IS) and Information Technology (IT) professions, spanning business, computing, or engineering schools, to grow beyond their fragmented and competing specializations (Somers, 2010).

As it seeks to unify the profession, BTM can be viewed as the integration of traditional IS/IT/ITM disciplines (Figure 2), where all other paths can lead to a leadership position in Digital Transformation and Strategy (DTS). Instead of

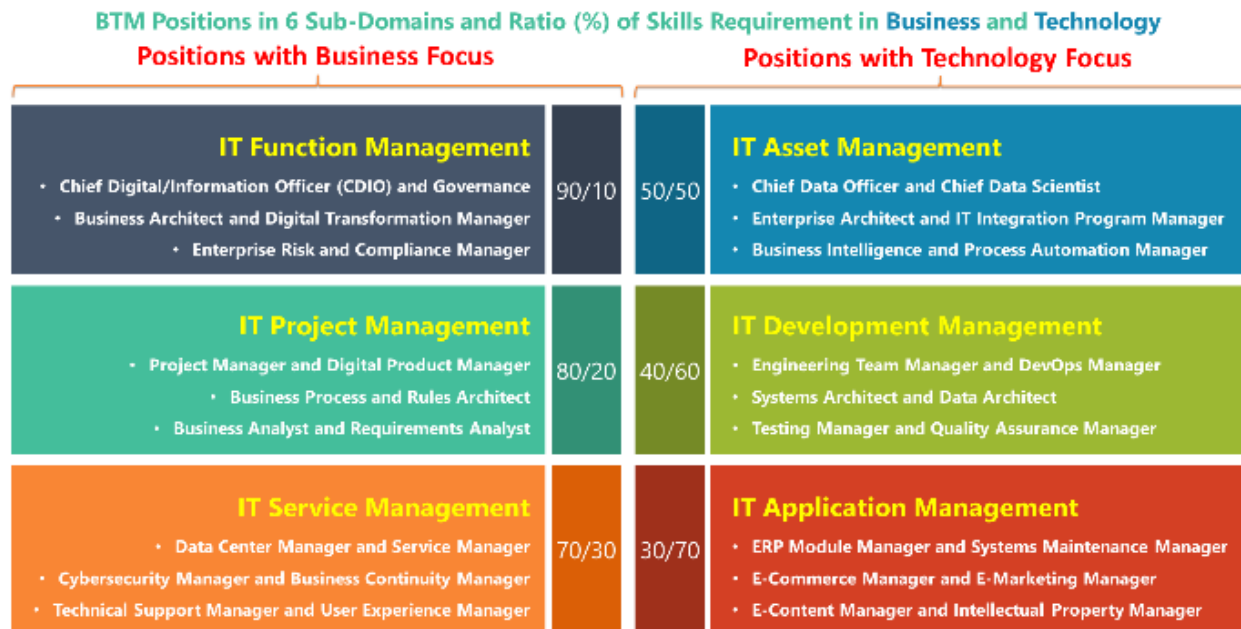


Figure 3 IS/IT Positions Blending Business and Technology

viewing these issues as primarily an IS discipline concern, DTS can become a more integrative framework of all decisions to develop a digital enterprise 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.

Adding the “branding” of BTM does not replace but instead enriches all “streams”. It brings business, computing, and engineering schools as joint partners in a campus-wide strategy for a new digital leadership profession. It does so by refocusing the “concept” behind IS/IT, shifting from an “information” to a broader “business” focus, uniting all disciplines concerned with digital organizations (Demirkan & Spohrer, 2018).

Toward Hybrid Skillsets

The Canadian initiative also promoted greater alignment of academic programs with industry requirements. As such, graduates are expected to meet the hiring needs of a greater variety of hybrid skillsets in digital projects. As such, BTM is not defined by the founding disciplines, but rather as a “profession” that creates seamless bridges between numerous certifications and specializations, identifying expected competencies, and offering learning guidelines to develop new BTM expertise.

In particular, the BTM BOK 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.

As IS/IT job profiles are increasingly intertwined, they can be classified as per their relative mix or ratio of skills requirements in business and technology, helping to define the unified BTM profession.

Talent management for digital organizations will require a more systematic approach to professional coaching. It has been some time since IS and IT disciplines have started to converge (Laumer, Maier, Eckhardt, & Weitzel, 2012; Madnick, 1995). But the efforts to do so at disciplinary levels have not yet been frequent, requiring professional associations to take a more proactive approach to integrate the profession around a coherent set of objectives for the BTM profession. The BTM initiative, with the creation of a BTM Forum, has created an opportunity to develop distinctive approaches to help strengthen the hybrid business-technology-management acumen (Figure 3). It opens the door to diversifying career paths and cross-pollinating existing practices and helping define new common core knowledge base. They also involve redefining digital strategies, broadening the vision from an information to a business focus in

IS/IT. While BTM is inheriting from IS and IT foundations, its scope and objectives are becoming more unified and distinct, transcending its original disciplines (Joia & Mangia, 2017).

3. RETHINKING IT TALENT MANAGEMENT

Talent Management

BTM aims to become a new approach to digital skills and IT HRM. A priority is to see beyond traditional processes designed as reactive support units. Digital projects require new TM capabilities to provide a systematic effort to optimize the match between the organization's strategic roles and people's ability, motivation, and career opportunity (Collings & Mellahi, 2009). It must leverage rapid globalization to enable more flexible matching between talented employees and jobs (Tarique & Schuler, 2010), making corporate HR becoming a strategic advantage in highly competitive markets (Farndale, Scullion, & Sparrow, 2010). TM is particularly focused on the deployment of strategic HR functions throughout the organization and its global locations for TM-driven unit-level management systems (Morris, Snell, & Björkman, 2016).

Making TM better fit for digital projects is impeded by several business challenges. These include: transforming HR as a strategic function (Ulrich & Dulebohn, 2015), maintaining career coherence using logical competency anchors for talent and job pools (Schein & Van Maanen, 2016), ensuring employee trust with adequate compensation and fair processes (Seopa, 2015), deploying TM processes uniformly across all organizational units (Thunnissen, 2016), and building a TM capability in early stages of an organization's growth (Krishnan & Scullion, 2016).

Bodies of Knowledge

Intelligent TM tools for digital projects must be able to deal with more complex environment than traditional IT management has confronted. BTM BOK aims to integrate numerous open source BOKs, avoiding to "reinvent the wheel", and instead provide a generic core language to help integrate existing professional and curriculum standards. On surface, its purpose and structure may resemble those of other disciplines, e.g., the Project Management BOK (Project Management Institute, 2013), the Business Analysis BOK (International Institute of Business Analysis, 2015), and Software Engineering BOK (Fairley, Bourque, & Keppler, 2014). However, BTM BOK aims to develop a more agile approach to digital leadership, based on OMG's Essence (Jacobson, Ng, McMahon, Spence, & Lidman, 2012).

A Capability Maturity Model (CMM) is often combined to the BTM BOK to measure the varying levels at which organizations can perform, with the CMM Integrated (CMMI) as one of the first models developed in the 1980's. This standard has been customized to various core functions, including services (CMMI Institute, 2010), development processes (von Wangenheim, Hauck, & von Wangenheim, 2009), and human resources management (Y. C. Chen & Wang, 2018). BOK and CMM concepts have been extended as well to IT strategic management (Y.-C. Chen & Wu, 2011; Luftman, 2000, 2015; Peppard & Ward, 2004), with limited integration span.

These standards have been criticized for their restrictive assumptions as organizational evolution is often less structured and more emerging. But they remain extensively adopted for their value as a common language for all stakeholders around process change and quality (Duffy, 2016). They are also recognized as decision-making support by ensuring a value-based perspective prevails throughout Business Process Management (BPM) tasks (Forstner, Kamprath, & Röglinger, 2014).

Diversity of Credentials

Digital leadership roles require a solid grounding in both business and technology expertise. BTM seeks to redefine traditional IS/IT credentials that are mostly based on disciplinary programs. Professionals are then encouraged to pursue specific BOK-based certifications as per needed. The diversity of both disciplines and BOKs can have substantial impact on the effectiveness of TM methods and processes, and BTM BOK helps to manage complexity with a common language.

There have been limited efforts to map BOKs around a core language. TM decision-making is therefore based mostly on disparate reference models and job roles. Their mappings to relevant digital leadership tasks and functions are yet to emerge. A key issue is that they lack logical integration, with duplication but also confusion as to common grounds between task component mappings and their required competencies. This causes difficulties in managing IS/IT career paths, as many professionals and their hiring managers face ambiguity as to what standards are the right one for what job roles.

A key objective of BTM BOK is therefore to help reduce the complexity where it is unnecessary and help both professionals and hiring managers navigate more complex digital project leadership

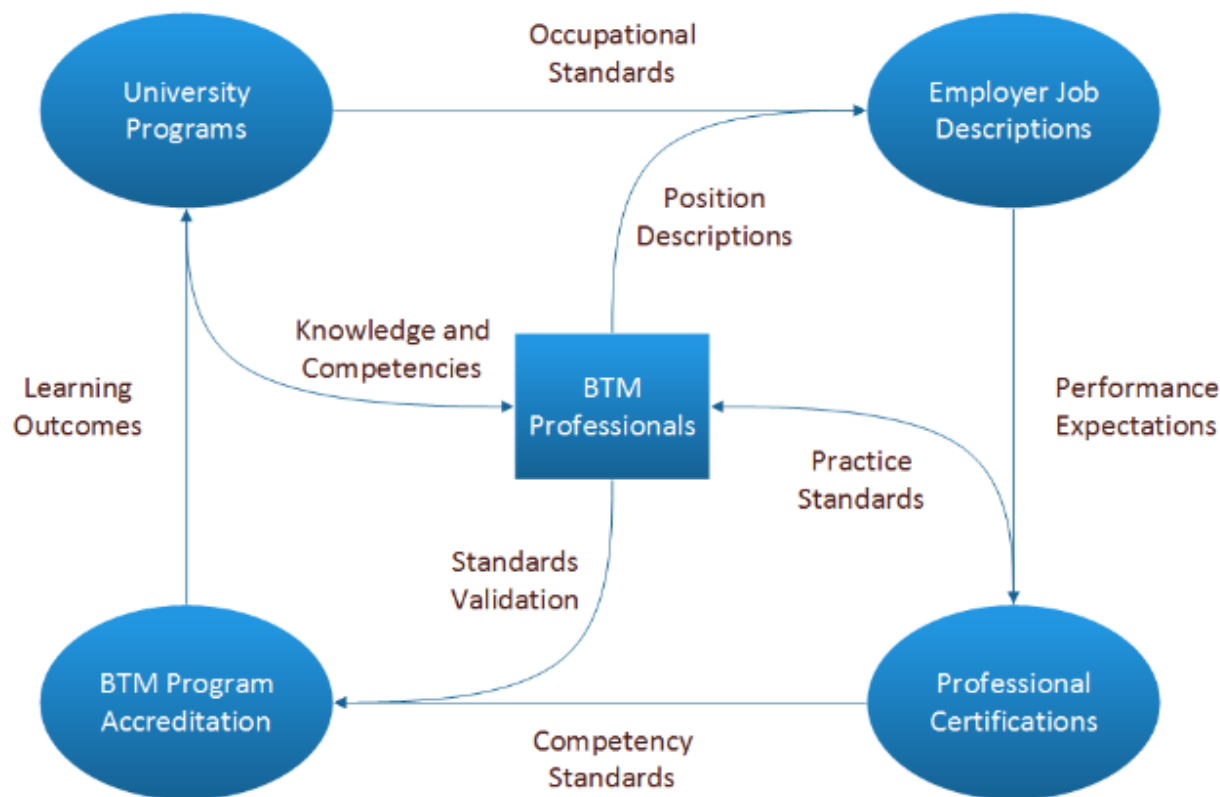


Figure 4 BTM Professionals at Core of Credentials Renewal Cycle

roles. Mappings among jobs, tasks, and competencies, should be fine-grained enough to enable seamless customization to various career paths and preferences, making it a valid tool for self-service career planning and learning gap analysis. While agile methods have tremendously changed the way professionals interact in digital projects, there is still a need for specialization and focused expertise to be reused across the digital project portfolio.

By creating a more dynamic profession, BTM can lead professionals to help harmonize practice, standards development, and academic programs (Figure 4). The past decade has shown a rapid modernization of IS programs beyond their basic information and toward broader business concerns. This trend has been supported by new curriculum guidelines, seeking to transform IS education at both undergraduate (Martz, Braun, & Hughes, 2011) and graduate (V. Ramesh & Gerth, 2015) levels. Helping to overcome obstacles in adopting reference frameworks, universities are increasingly adopting guidelines to between prepare their graduates for emerging digital roles (Leidig & Anderson, 2020; Heikki Topi et al., 2010).

These changes in the IS curriculum are similar in scope, but distinct in focus, to those in Information Technology (IT), a distinct field by its emphasis on technology development and implementation (H. Topi & Wright, 2013). This is reflected in the definition of IT degrees as composed of a certain overlap with IS, with greater focus on practical aspects of Computer Science (CS) and Software Engineering (SE) degrees, confirming that IT has its own professional paradigm (Denning & Freeman, 2009). The emergence of IT degrees are also a response by academia to the changing needs of the market or industry (Alkazemi et al., 2014), leading to more focus on business technology innovation, both at the undergraduate (Samarthyam, Suryanarayana, Gupta, & Nambiar, 2012) and graduate levels (Pyster, Lasfer, Turner, Bernstein, & Henry, 2009).

Overall, BTM can set new trends with a profound impact on digital talent and credentials, and how executives will staff digital projects, as prior research has shown how TM decision-making is affected by talent supply. For example, the IS curricula have changed at several occasions in its 50-years history (Longenecker, Feinstein, & Clark, 2013). One of the most important

occurrences has been the integration of e-business across all business disciplines at the turn of the millennium. A recent change as well is the similar impact of big data analytics and artificial intelligence across the business curricula, including in IS (Lyytinen & Topi, 2021). They offer renewed opportunity to create more creative data-driven professionals that transcend several digital specializations (Jacobi, Jahn, Krawatzek, Dinter, & Lorenz, 2014). Other challenges that remain a concern include, among others, co-evolving capstone and core courses to ensure more real-world focus (Reinicke, Janicki, & Gebauer, 2012), better preparing students for international business (Pawlowski & Holtkamp, 2012), and reflecting the necessary practical skills for various standards that have become common knowledge across the profession (Jarman, 2011).

4. UNIFIED DIGITAL PROFESSION

Career Dynamics

In time, with more programs adopting the BTM brand through accreditation, more graduates will join the cohort of digital project professionals. This global community will federate several disciplinary streams with IS/IT expertise and reduce the increasingly complex career choices they are facing, especially certifications.

BTM will help them deal with transdisciplinary challenges that their programs have rarely prepared them to deal with. This has major impact on their career progression which is also driven by technology evolution, learning pace, and industry dynamics (Joia & Mangia, 2017). Undergraduate curricula must therefore co-evolve with emergence of digital organizations. To help ensure employability of students in new roles (McKenzie, Coldwell-Neilson, & Palmer, 2018), a unified language must be developed and adopted, along with a continuous learning and systematic career literacy programs (Lin-Stephens, Smith, Peso, & Pang, 2016).

With more diverse specializations and certifications required for salary progression, professionals are greatly constrained by competition. Yet it is still unclear to what extent multiple certifications help them move along their careers, and what mix is best within an investment model of jobs (Fu & Chen, 2015). There is also a shift away from traditional career progression (e.g., moving through Business Analysis, Project Management, and IT Services Management), which implied loyalty and

promotion through ranks of a typical corporate IT division, toward diverse assignments with IT and business units, vendors and consulting, and start-ups. This is leading to higher turnover rates (Maneesatitya & Fongsuwan, 2014) and alternance of national and international appointments (Aldrette-Malacara & Martínez-Flores, 2012).

These trends are also affected by the progressive aging of the IS/IT workforce (Brooke, 2009), the positive effect of more women choosing IT and digital projects as their primary career (Armstrong, Riemenschneider, & Giddens, 2018; Armstrong, Riemenschneider, & Reid, 2012; Bairoh, 2016; Herman, 2015; Nelson & Veltri, 2011; Papastergiou, 2008; Rosenbloom, Ash, Dupont, & Coder, 2008; Warren, Young, & Williams, 2012), and increasing recognition that personality and values play a major part in choosing what type of digital career fits best a person (Lee & Yen, 2013; Nichols, 2010).

Professional Identity

Mutual learning between several disciplines will increase as professionals share the same BTM brand. Their employer will seek BTM graduates, and possibly identify BTM teams within their organization to lead strategic digital projects.

Hence, the growth of a new professional identity around the BTM brand can help overcome a weakness, recently critiqued as the "crisis of the profession" in both IS (Somers, 2010) and IT (Holmes, 2010). There is a growing distance between theory and practice, with professionals requiring more personal investment after graduation to become employable. As well, the diversity of BOKs and professional certifications creates a further isolation among disciplines, and consequently their respective learning and best practices can hardly be shared as common culture.

With a strong professional identity, BTM professionals also develop their own code of digital ethics. The field of computing and digital technologies, whether focused on technical and/or management skills, is requiring an ever greater sensitivity to end-users, business acumen, and moral rigor (Huff & Barnard, 2009). While most educational programs are attempting to meet these concerns, professional standards must be better integrated to reconceive the whole profession with these issues at its core, as opposed to making them mere support competencies. As a result, continuous learning programs are insufficient at providing all the

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: recognition of skill level by open network
Associations	Specializations: formal integration of several BOKs	Multi-Certified: harmonize certifications, no competition	Membership: recruit new members, wider visibility
Academia	Faculty: implement research across all areas	Schools: clear accreditation and curriculum guidance	Enrollment: attract talent to key jobs (cf., CPA, PEng)
Employers	Managers: formal trans-disciplinary job profiles	Promotion: standards for promoting through ranks	Markets: 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: expertise areas share same principles	Business: higher org. to address ethics cases	Economy: fill talent gap, accelerate digital adoption

Table 1 BTM Benefits

necessary soft skills required for digital project leadership.

This crisis presents itself as a broad and slowly evolving adaptation and emergence challenge. While generally a conscious choice to identify with a particular career group, professional identity is nevertheless one of the more complex and longest to develop cultural trait, especially through personal networking and mentoring (Dobrow & Higgins, 2005). The identity evolves through successive revisions to one’s career narrative (Obodaru, 2017), as well as resolved conflicting choices through professional accomplishments (Reay, Goodrick, Waldorff, & Casebeer, 2017). This experience creates an amalgam of preferred practices, ideally from those shared recognized across the organizations for which a professional lends her or his loyalty (Chreim, Williams, & Hinings, 2007).

The new BTM professional identity can co-evolve at individuals, teams, organizations, and industry levels (Kapoor, 2019). Digital transformation imposes profound redesign of IS/IT job roles and careers, and like all professional change dynamics, executives must anticipate resistance as a natural phase for technology professionals (Y. Chen & Reay, 2020). Digital leadership roles, as they are strategy-related and have major impact for an organization, require an unusual degree of maturity before professionals may be recognized qualified to lead. As other professions

have witnessed, career planning in the face of rapid technological change must consider all facets of the digital appropriation cycle, not only as part of business processes, but also in defining the character of the professionals themselves (Goto, 2021).

Professional Coaching

BTM as a “knowledge ecosystem” goes 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. It is also a “knowledge development initiative” seeking to harmonize all facets of how professionals lead their community learning dynamics.

The BTM initiative and its BOK can be used to provide key benefits to the international IS/IT community (Table 1). The profession 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 its professional body 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

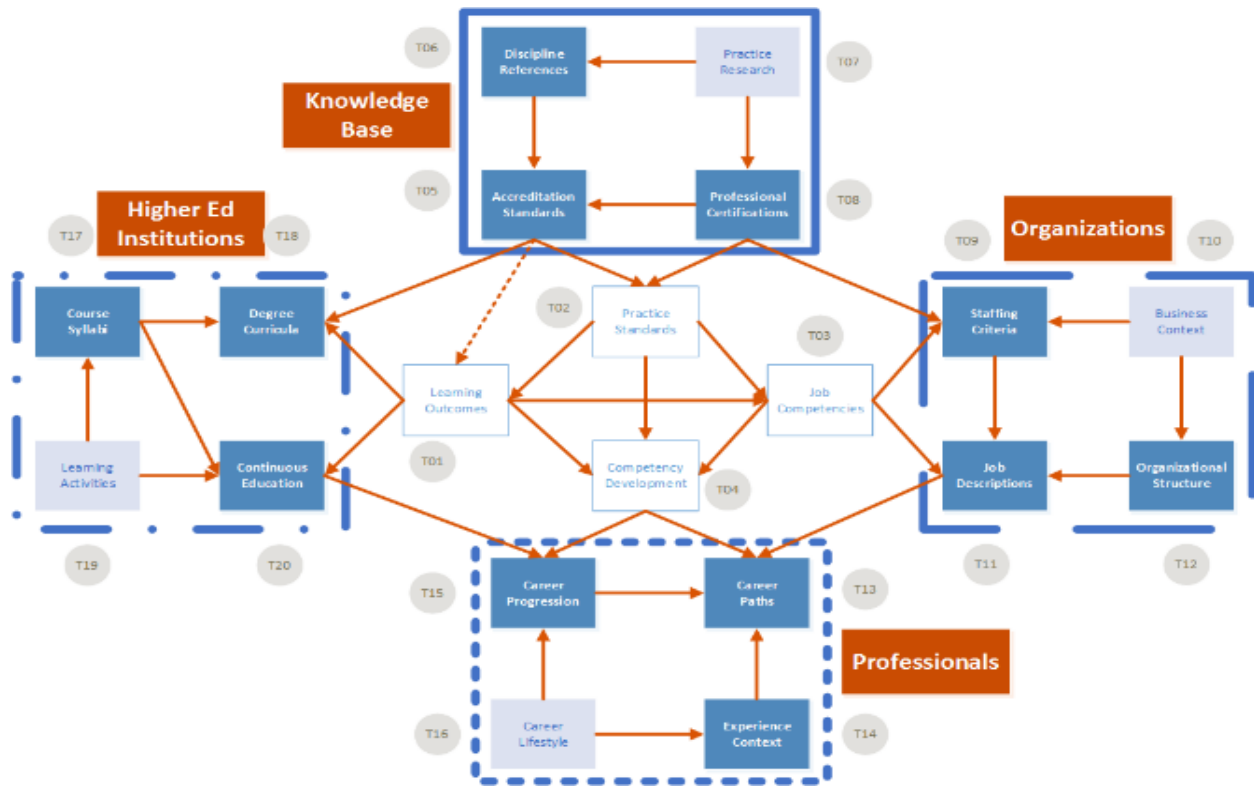


Figure 5. BTM BOK Customization Opportunities

join when job roles are clear, with realistic and progressive competency requirements, and easy to access.

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.

Beyond its ongoing development, the next phase of BTM BOK development will be the adoption process through the study of professionals and their career paths. We need to determine how BTM can become a “change philosophy” spanning all digital organizations (Schwarz Müller, Brosi, Duman, & Welpe, 2018). In a more mature state, it should build up toward more complex interdependence among community stakeholders, ensuring organic evolution of disciplinary expertise and professional practice (Figure 5).

This process can help enhance BOK reuse and integration 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.

5. CONCLUSIONS

We outlined an ongoing educational and professional standardization initiative in Canada, aiming to unify IS/IT professionals and educational programs within a common profession. Entitled Business Technology Management (BTM) and founded in great part on the development of an open Body of Knowledge (BOK), we explained the objectives and impact of this initiative, and outlined the structure of the proposed reference model. This initiative is by no means all encompassing, the value for the IS discipline, especially for degree-granting programs, should be to find greater engagement with industry, satisfaction of IS/IT professionals with their identity, and ensuring research is translated to practice, and vice-versa.

Since its inception in 2009 by a group of Canadian universities and leading IT companies, the BTM initiative has grown to encompass 20+ business schools with a dozen accredited or recognized formally through accreditation standards. These schools have graduated more than 3000 students within the past 5 years, and membership in the BTM Forum community has registered nearly 1000 members.

As the BTM Forum's core reference, BTM BOK does not replace existing BOKs, but instead reuses existing open-source ones within the EPF modeling environment and serves as a guide to additional knowledge and sources relevant to enter new BTM positions. It is also expected to be fully open, customizable, and reusable, with a version in XMI consumable with APIs to seamlessly integrate its contents in various Talent Management systems. Planned proofs of concept include custom BTM-compliant job descriptions, automated matching of CVs and job competencies, learning path recommendations given experience for recognized BTM careers, among many others. Given their growing role within Digital Transformation projects, professionals can leverage the BTM BOK as a tool for Talent Management, Practice Guidance, and Team Learning and Coaching.

6. REFERENCES

Aldrette-Malacara, A., & Martínez-Flores, J. L. (2012). *Critical success factors to choose an information technology career: A specific*

case in a Mexican higher education institution. Paper presented at the 16th World Multi-Conference on Systemics, Cybernetics and Informatics, WMSCI 2012, Orlando, FL.

Alkazemi, B. Y., Nour, M. K., Sahrawi, A. Q., Basalamah, A. M., Basalamah, S. M., Lahza, H. F., & Grami, G. M. A. (2014). *A framework for designing a market-oriented curriculum for the degree of information system engineering*. Paper presented at the 2014 4th IEEE Global Engineering Education Conference: Engineering Education Towards Openness and Sustainability, IEEE EDUCON 2014, Istanbul.

Armstrong, D. J., Riemenschneider, C. K., & Giddens, L. G. (2018). The advancement and persistence of women in the information technology profession: An extension of Ahuja's gendered theory of IT career stages. *Information Systems Journal*. doi:10.1111/isj.12185

Armstrong, D. J., Riemenschneider, C. K., & Reid, M. F. (2012). *Schema accuracy and career challenges for men in the information technology workplace*. Paper presented at the 50th Annual Computers and People Research Conference, SIGMIS-CPR'12, Milwaukee, WI.

Bairon, S. M. (2016). *Diverging paths - Career aspirations, choices and consequences for men and women working in technology in Finland*. Paper presented at the 44th Annual Conference of the European Society for Engineering Education - Engineering Education on Top of the World: Industry-University Cooperation, SEFI 2016.

Brooke, L. (2009). Prolonging the careers of older information technology workers: Continuity, exit or retirement transitions? *Ageing and Society*, 29(2), 237-256.

Chen, Y.-C., & Wu, J.-H. (2011). IT management capability and its impact on the performance of a CIO. *Information & Management*, 48(4-5), 145-156. doi:10.1016/j.im.2011.04.001

Chen, Y., & Reay, T. (2020). Responding to imposed job redesign: The evolving dynamics of work and identity in restructuring professional identity. *Human Relations*. doi:10.1177/0018726720906437

Chen, Y. C., & Wang, Y. J. (2018). Application and development of the people capability maturity model level of an organisation. *Total Quality Management and Business*

- Excellence*, 29(3-4), 329-345.
doi:10.1080/14783363.2016.1184568
- Chreim, S., Williams, B. E., & Hinings, C. R. (2007). Interlevel influences on the reconstruction of professional role identity. *Academy of Management Journal*, 50(6), 1515-1539.
doi:10.5465/AMJ.2007.28226248
- CMMI Institute. (2010). *CMMI® for Services (CMMI-SVC), Version 1.3*. Pittsburgh: CMMI Institute.
- Collings, D. G., & Mellahi, K. (2009). Strategic talent management: A review and research agenda. *Human Resource Management Review*, 19(4), 304-313.
doi:10.1016/j.hrmr.2009.04.001
- Demirkan, H., & Spohrer, J. C. (2018). Cultivating T-shaped professionals in the era of digital transformation. *Service Science*, 10(1), 88-109. doi:10.1287/serv.2017.0204
- Denning, P. J., & Freeman, P. A. (2009). The Profession of IT: Computing's Paradigm. *Communications of the ACM*, 52(12), 28-30.
- Dobrow, S. R., & Higgins, M. C. (2005). Developmental networks and professional identity: A longitudinal study. *Career Development International*, 10(6-7), 567-583. doi:10.1108/13620430510620629
- Dorschel, R. (2021). Discovering needs for digital capitalism: The hybrid profession of data science. *Big Data and Society*, 8(2). doi:10.1177/20539517211040760
- Duffy, G. L. (2016). Achieve higher levels of excellence through the capability maturity model. *Quality Progress*, 49(6), 38-44.
- Fairley, R. E. D., Bourque, P., & Keppler, J. (2014, 23-25 April 2014). *The impact of SWEBOK Version 3 on software engineering education and training*. Paper presented at the Software Engineering Education and Training (CSEE&T), 2014 IEEE 27th Conference on.
- Farndale, E., Scullion, H., & Sparrow, P. (2010). The role of the corporate HR function in global talent management. *Journal of World Business*, 45(2), 161-168.
doi:10.1016/j.jwb.2009.09.012
- Forstner, E., Kamprath, N., & Röglinger, M. (2014). Capability development with process maturity models – Decision framework and economic analysis. *Journal of Decision Systems*, 23(2), 127-150.
doi:10.1080/12460125.2014.865310
- Fu, J. R., & Chen, J. H. F. (2015). Career commitment of information technology professionals: The investment model perspective. *Information and Management*, 52(5), 537-549.
doi:10.1016/j.im.2015.03.005
- Gagnon, S. (2019). Business Technology Management Body of Knowledge (BTM BOK). In. Gatineau, QC, Canada: Digital Innovation Foundation (DIF), <https://github.com/Digital-Innovation-Foundation/btmbok>.
- Gagnon, S. (2020). *Business Technology Management as Transdisciplinary IS-IT Competency Framework*. Paper presented at the International Conference on Information Systems (ICIS).
- Goto, M. (2021). Collective professional role identity in the age of artificial intelligence. *Journal of Professions and Organization*, 8(1), 86-107. doi:10.1093/jpo/joab003
- Herman, C. (2015). Rebooting and Rerouting: Women's Articulations of Frayed Careers in Science, Engineering and Technology Professions. *Gender, Work and Organization*, 22(4), 324-338. doi:10.1111/gwao.12088
- Holmes, N. (2010). The Future of the Computing Profession. *Computer*, 43(7), 88-87.
doi:10.1109/mc.2010.209
- Huff, C., & Barnard, L. (2009). Good computing. *Technology and Society Magazine, IEEE*, 28(3), 47-54.
doi:10.1109/mts.2009.934158
- International Institute of Business Analysis. (2015). *BABOK : A Guide to the Business Analysis Body of Knowledge* (Version 3 ed.). Toronto]: International Institute of Business Analysis.
- ITAC. (2014). CCICT Merges With ITAC to Form ITAC Talent [Press release]. Retrieved from <https://itac.ca/blog/ccict-merges-with-itac-to-form-itac-talent/>
- ITAC. (2017). ITAC Partnership Receives Funding from MITACS for BTM Body of Knowledge [Press release]. Retrieved from <https://itac.ca/blog/itac-partnership-receives-funding-mitacs-btm-body-knowledge/>
- Jackson, N. C., & Dunn-Jensen, L. M. (2021). Leadership succession planning for today's digital transformation economy: Key factors to build for competency and innovation.

- Business Horizons*, 64(2), 273-284. doi:10.1016/j.bushor.2020.11.008
- Jacobi, F., Jahn, S., Krawatzek, R., Dinter, B., & Lorenz, A. (2014). *Towards a design model for interdisciplinary information systems curriculum development, as exemplified by big data analytics education*. Paper presented at the 22nd European Conference on Information Systems, ECIS 2014, Tel Aviv.
- Jacobson, I., Ng, P.-W., McMahon, P. E., Spence, I., & Lidman, S. (2012). The essence of software engineering: The SEMAT kernel. *Communications of the ACM*, 55(12), 42-49. doi:10.1145/2380656.2380670
- Jarman, R. (2011). *Progress in introducing ITIL into an information Systems curriculum*. Paper presented at the 17th Americas Conference on Information Systems 2011, AMCIS 2011, Detroit, MI.
- Joia, L. A., & Mangia, U. (2017). Career transition antecedents in the information technology area. *Information Systems Journal*, 27(1), 31-57. doi:10.1111/isj.12087
- Kapoor, A. (2019, 2019). *A grounded theory of computing professional identity formation*. Paper presented at the 2019 ACM Conference on Innovation and Technology in Computer Science Education, ITiCSE 2019.
- Kohli, R., & Melville, N. P. (2019). Digital innovation: A review and synthesis. *Information Systems Journal*, 29(1), 200-223.
- Krishnan, T. N., & Scullion, H. (2016). Talent management and dynamic view of talent in small and medium enterprises. *Human Resource Management Review*, 27(3), 431-441. doi:10.1016/j.hrmr.2016.10.003
- Laumer, S., Maier, C., Eckhardt, A., & Weitzel, T. (2012). *Are we in the right profession?: Comparing information systems, computer science and other disciplines' professional's perceptions of the job market*.
- Lee, H. W., & Yen, K. W. (2013). A study of the relationship between work values and career orientation of employed in the high technology industry. *Quality and Quantity*, 47(2), 803-810. doi:10.1007/s11135-011-9566-2
- Leidig, P. M., & Anderson, G. (2020). *Updating the Information Systems Curriculum: The ACM / AIS IS2020 Joint Project*. Paper presented at the 2020 Computers and People Research Conference, SIGMIS-CPR 2020.
- Lewis, R. E., & Heckman, R. J. (2006). Talent management: A critical review. *Human Resource Management Review*, 16(2), 139-154. doi:10.1016/j.hrmr.2006.03.001
- Lin-Stephens, S., Smith, S., Peso, M., & Pang, V. (2016). *The career information literacy learning framework: A case study of information systems, information technology and engineering capstone units of an Australian university*. Paper presented at the 20th Pacific Asia Conference on Information Systems, PACIS 2016.
- Longenecker, B., Feinstein, D., & Clark, J. D. (2013). Information Systems Curricula: A Fifty Year Journey. *Information Systems Education Journal*, 11(6), 71.
- Luftman, J. (2000). Assessing Business-IT Alignment Maturity. *Communications of the Association for Information Systems*, 4(1), 14.
- Luftman, J. (2015). Strategic Alignment Maturity. In J. vom Brocke & M. Rosemann (Eds.), *Handbook on Business Process Management 2* (pp. 5-43): Springer Berlin Heidelberg.
- Lyytinen, K., & Topi, H. (2021). Industry Expectations for Transforming IS Education—Discussion on AACSB MaCuDE IS Task Force Finding. *AIS Webinars*.
- Madnick, S. E. (1995). Integration technology: The reinvention of the linkage between information systems and computer science. *Decision Support Systems*, 13(3-4), 373-380. doi:10.1016/0167-9236(93)E0051-E
- Maneesatitya, M., & Fongsuwan, W. (2014). Structural equation model of variables affecting turnover intentions on Bangkok's information technology career professionals. *Research Journal of Business Management*, 8(4), 453-463. doi:10.3923/rjbm.2014.453.463
- Martz, B., Braun, F., & Hughes, J. (2011). Business informatics and the information systems perspective: Implementing the IS 2010 curriculum. *Journal of Business and Finance Librarianship*, 16(3), 229-242. doi:10.1080/08963568.2011.581187
- McDonnell, A., Collings, D. G., Mellahi, K., & Schuler, R. (2017). Talent management: A systematic review and future prospects. *European Journal of International*

- Management*, 11(1), 86-128.
doi:10.1504/EJIM.2017.081253
- McKenzie, S., Coldwell-Neilson, J., & Palmer, S. (2018). Understanding the career development and employability of information technology students. *Journal of Applied Research in Higher Education*. doi:10.1108/JARHE-03-2018-0033
- Morris, S., Snell, S., & Björkman, I. (2016). An architectural framework for global talent management. *Journal of International Business Studies*, 47(6), 723-747. doi:10.1057/jibs.2015.25
- Nelson, K., & Veltri, N. (2011). *Women in information technology careers: A person-process-context-time framework*. Paper presented at the 19th European Conference on Information Systems - ICT and Sustainable Service Development, ECIS 2011, Helsinki.
- Nichols, R. W. (2010). Ethical currents in a career in science and technology: A case study. *Technology in Society*, 32(1), 18-24. doi:10.1016/j.techsoc.2009.12.004
- Obodaru, O. (2017). Forgone, but not forgotten: Toward a theory of forgone professional identities. *Academy of Management Journal*, 60(2), 523-553. doi:10.5465/amj.2013.0432
- Papastergiou, M. (2008). Are Computer Science and Information Technology still masculine fields? High school students' perceptions and career choices. *Computers and Education*, 51(2), 594-608. doi:10.1016/j.compedu.2007.06.009
- Parker, R. (2019). *Who i Am Becoming, Now: Toward a Computer Science Professional Identity Instrument*.
- Pawlowski, J. M., & Holtkamp, P. (2012). *Towards an internationalization of the information systems curriculum*. Paper presented at the Multikonferenz Wirtschaftsinformatik 2012, MKWI 2012 - Multiconference Business Information Systems 2012, MKWI 2012, Braunschweig.
- Peppard, J., & Ward, J. (2004). Beyond strategic information systems: towards an IS capability. *The Journal of Strategic Information Systems*, 13(2), 167-194. doi:10.1016/j.jsis.2004.02.002
- Project Management Institute. (2013). *A guide to the project management body of knowledge : (PMBOK guide)* (5th ed. ed.). Newtown Square, Penns.: Project Management Institute (PMI).
- Pyster, A., Lasfer, K., Turner, R., Bernstein, L., & Henry, D. (2009). Master's Degrees in Software Engineering: An Analysis of 28 University Programs. *Software, IEEE*, 26(5), 94-101. doi:10.1109/MS.2009.133
- Ramesh, N., & Delen, D. (2021). Digital Transformation: How to beat the 90% failure rate? *IEEE Engineering Management Review, Early Access*. doi:10.1109/EMR.2021.3070139
- Ramesh, V., & Gerth, A. B. (2015). Design of an integrated information systems master's core curriculum: A case study. *Communications of the Association for Information Systems*, 36, 301-316.
- Reay, T., Goodrick, E., Waldorff, S. B., & Casebeer, A. (2017). Getting leopards to change their spots: Co-creating a new professional role identity. *Academy of Management Journal*, 60(3), 1043-1070. doi:10.5465/amj.2014.0802
- Reinicke, B., Janicki, T., & Gebauer, J. (2012). *Implementing an integrated curriculum with an iterative process to support a capstone course in information systems*. Paper presented at the 29th Information Systems Education Conference, ISECON 2012, New Orleans, LA.
- Riemenschneider, C. K., & Armstrong, D. J. (2021). The development of the perceived distinctiveness antecedent of information systems professional identity. *MIS Quarterly: Management Information Systems*, 45(3), 1149-1186. doi:10.25300/MISQ/2021/14626
- Rosenbloom, J. L., Ash, R. A., Dupont, B., & Coder, L. (2008). Why are there so few women in information technology? Assessing the role of personality in career choices. *Journal of Economic Psychology*, 29(4), 543-554. doi:10.1016/j.joep.2007.09.005
- Samarthyam, G., Suryanarayana, G., Gupta, A. K., & Nambiar, R. (2012, 2-9 June 2012). *FOCUS: An adaptation of a SWEBOK-based curriculum for industry requirements*. Paper presented at the Software Engineering (ICSE), 2012 34th International Conference on.
- Schein, E. H., & Van Maanen, J. (2016). Career anchors and job/role planning: Tools for career and talent management.

- Organizational Dynamics*, 45(3), 165-173.
doi:10.1016/j.orgdyn.2016.07.002
- Schwarz Müller, T., Brosi, P., Duman, D., & Welp, I. M. (2018). How does the digital transformation affect organizations? Key themes of change in work design and leadership. *Management Review*, 29(2), 114-138. doi:10.5771/0935-9915-2018-2-114
- Seopa, N. (2015). The impact on the psychological contract of differentiating employees into talent pools. *Career Development International*, 20(7), 717-732.
- Somers, M. J. (2010). Using the theory of the professions to understand the IS identity crisis. *European Journal of Information Systems*, 19(4), 382-388. doi:10.1057/ejis.2010.26
- Sousa, M. J., & Rocha, Á. (2019). Digital learning: Developing skills for digital transformation of organizations. *Future Generation Computer Systems*, 91, 327-334. doi:10.1016/j.future.2018.08.048
- Tansley, C., & Tietze, S. (2013). Rites of passage through talent management progression stages: An identity work perspective. *International Journal of Human Resource Management*, 24(9), 1799-1815. doi:10.1080/09585192.2013.777542
- Tarique, I., & Schuler, R. S. (2010). Global talent management: Literature review, integrative framework, and suggestions for further research. *Journal of World Business*, 45(2), 122-133. doi:10.1016/j.jwb.2009.09.019
- Thunnissen, M. (2016). Talent management: For what, how and how well? An empirical exploration of talent management in practice. *Employee Relations*, 38(1), 57-72. doi:10.1108/ER-08-2015-0159
- Topi, H., Valacich, J. S., Wright, R. T., Kaiser, K., Nunamaker Jr, J. F., Sipior, J. C., & de Vreede, G.-J. (2010). IS 2010: Curriculum guidelines for undergraduate degree programs in information systems. *Communications of the Association for Information Systems*, 26(1), 18.
- Topi, H., & Wright, R. T. (2013). *Differentiating information systems and information technology as fields of study: An evaluation of model curricula*. Paper presented at the AIS Special Interest Group for Education: International Academy for Information Management - AIS SIG-ED IAIM 2013 International Conference on Informatics Education and Research Conference, Milan, Italy.
- Ulrich, D., & Dulebohn, J. H. (2015). Are we there yet? What's next for HR? *Human Resource Management Review*, 25(2), 188-204. doi:10.1016/j.hrmr.2015.01.004
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(3), 118-144. doi:10.1016/j.jsis.2019.01.003
- von Wangenheim, C. G., Hauck, J. C. R., & von Wangenheim, A. (2009). Enhancing open source software in alignment with CMMI-DEV. *IEEE Software*, 26(2), 59-67. doi:10.1109/ms.2009.34
- Warren, J., Young, D., & Williams, K. (2012). *Personality, gender and careers in information technology*. Paper presented at the 18th Americas Conference on Information Systems 2012, AMCIS 2012, Seattle, WA.