

**UAE Public Sector Blockchain-Based Digital
Transformation Programs: Value Realization from
Blockchain Technology**

التحول الرقمي في حكومة دولة الإمارات: بلورة القيمة المضافة من تقنية
بلوكشين

by

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of the requirements for the degree of
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ABSTRACT

UAE has proactively joined the world's Blockchain-based DT race and observed signs indicates the country's intention to lead in this field. This intention was evident in H.H. Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum - Crown Prince of Dubai and Chairman of Dubai Executive Council 2017 announcement for 2020 to be the last year for paper-based Government transactions in Dubai with full adoption of Blockchain. Moreover, the launch of UAE Blockchain Strategy 2021 by H.H. Sheikh Mohammed bin Rashid Al Maktoum - Vice President and Prime Minister of the UAE and Ruler of Dubai, April 2018, spiked the UAE local market demands on Blockchain use-cases to help with UAE Government mandate for Blockchain-based DT. This is part of UAE's 2031 Artificial Intelligence Strategy, to become a world leader in adopting technology to improve the quality of life in the UAE and to enhance happiness levels for citizens. The ambitious target is to transform "50 percent of government transactions on the federal level to be conducted using Blockchain technology by 2021," as stated by H.H. Sheikh Mohammed bin Rashid Al Maktoum.

This strategic focus on country level on Digital Transformation, with relatively young and still emerging technology, inspired the very idea of this research. To improve Public Sector success with Blockchain-based Digital Transformation Programs (BDTP) by devising a Framework that is rooted in the best practices in Programs Management and Digital Transformation, while taking into consideration the specific nature of Blockchain characteristics and challenges.

نبذة مختصرة

انضمت دولة الإمارات العربية المتحدة بشكل استباقي إلى سباق التحول الرقمي القائم على تقنية بلوكشين في العالم، ولوحظت علامات تشير إلى نية الدولة على التصدر في هذا المجال. وقد تجلت هذه النية في إعلان سمو الشيخ حمدان بن محمد بن راشد آل مكتوم - ولي عهد دبي ورئيس المجلس التنفيذي لإمارة دبي في عام 2017 أن يكون عام 2020 هو العام الأخير للمعاملات الحكومية الورقية في دبي مع اعتماد كامل لتقنية البلوكشين. علاوة على ذلك، أدى إطلاق استراتيجية الإمارات العربية المتحدة بلوكشين 2021 من قبل صاحب السمو الشيخ محمد بن راشد آل مكتوم - نائب رئيس الدولة ورئيس مجلس الوزراء وحاكم دبي في شهر أبريل من العام 2018 إلى زيادة طلبات السوق المحلية الإماراتية على طرق استخدام البلوكشين لمساعدة حكومة الإمارات العربية المتحدة.

بلوكشين هي إحدى التقنيات الأساسية المرتكزة عليها استراتيجية الذكاء الاصطناعي لدولة الإمارات العربية المتحدة 2031، لتصبح رائدًا عالميًا في تبني التكنولوجيا لتحسين نوعية الحياة في دولة الإمارات العربية المتحدة وتعزيز مستويات السعادة للمواطنين. الهدف الطموح هو تحويل 50 بالمائة من المعاملات الحكومية على المستوى الاتحادي ليتم إجراؤها باستخدام تقنية بلوكشين بحلول عام 2021، كما صرح صاحب السمو الشيخ محمد بن راشد آل مكتوم.

هذا التركيز الاستراتيجي على المستوى الوطني على التحول الرقمي،
بالاعتماد على تكنولوجيا البلوكشين الحديثة والتي لا تزال ناشئة،
ألهم فكرة هذا البحث. لتحسين نجاح القطاع العام مع برامج التحول
الرقمي المستندة إلى البلوكشين من خلال وضع إطار عمل مبني على أفضل
الممارسات في إدارة البرامج والتحول الرقمي، مع مراعاة الطبيعة
المحددة لخصائص وتحديات تقنية البلوكشين.

Dedication

To all those who wished me well with the piece of work.

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INTRODUCTION

Background

UAE has proactively joined the world's Blockchain-based DT race and observed signs indicates the country's intention to lead in this field. This intention was evident in H.H. Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum - Crown Prince of Dubai and Chairman of Dubai Executive Council 2017 announcement for 2020 to be the last year for paper-based Government transactions in Dubai with full adoption of Blockchain (Smart Dubai, 2020). Moreover, the launch of UAE Blockchain Strategy 2021 by H.H. Sheikh Mohammed bin Rashid Al Maktoum - Vice President and Prime Minister of the UAE and Ruler of Dubai, April 2018, spiked the UAE local market demands on Blockchain use-cases to help with UAE Government mandate for Blockchain-based DT (SheikhMohammed.ae, 2018). This is part of UAE's 2031 Artificial Intelligence Strategy, to become a world leader in adopting technology to improve the quality of life in the UAE and to enhance happiness levels for citizens. The ambitious target is to transform "50 percent of government transactions on the federal level to be conducted using Blockchain technology by 2021," as stated by H.H. Sheikh Mohammed bin Rashid Al Maktoum.

This strategic focus on country level on Digital Transformation (DT) with relatively young and still emerging technology, inspired the very idea of this research to improve UAE public sector success with Blockchain-based Digital Transformation Programs (BDTP) by devising a framework that is rooted in the best practices in programs management and DT, while taking into consideration the specific nature of Blockchain characteristics and challenges.

This study starts with discussion of the research background and literature review related to its topic. The aim here is to start by building a comprehensive understanding of the literature relevant to this research and related theoretical background. Firstly reviewing the main DT Frameworks reviewed; after which, Blockchain-based DT considerations are presented; from which themes emerged from this literature review are to be highlighted; and finally arrive to this study's proposed BDTP framework for UAE public sector.

Problem Statement

Blockchain technology is still in the process of roll out stage worldwide, however, due to its potential of sweeping disruption of conventional establishment of trust in value-baring transactions created huge demands in markets. However, research on how to manage BDTP is limited, particularly none found within the context of UAE public sector. This research is an attempt to address this gap in literature.

Purpose and Aim

The goal of this study is to zoom into the enabling factors in a possible BDTP lifecycle, for the purpose of shedding some light on the way such factors can contribute to realizing sought after benefits from such DT programs. The study, therefore, highlights the phases of BDTP and the enabling activities recommended to take place in each phase in a systematic way to add knowledge to interested other (Creswell & Creswell, 2018) in this field.

Study Objectives

Firstly, approach literature review qualitatively to identify:

1. The main phases of BDTP

2. The enabling factors in each phase to help realise the targeted benefits

Secondly, conduct empirical test of identified phases and enabling factors from reviewed literature through a questionnaire, to be administered with a sample selected from Strategy and ICT professionals employed by the UAE public sector. This is to verify:

1. Representativeness of the sample: demographic statistics and attributes
2. Instrument's internal consistency and reliability
3. Statistical relationship and significance of research hypothesis

Finally, the study also targets to conclude with recommendation of BDTP Lifecycle packed with enablers to contribute to their benefits realization.

Scope

The research approach used in this investigation is mixed sequential, starting with exploratory efforts in attempt to identify relevant patterns in literature to the investigated phenomena's constructs: DT programs lifecycle, and enabling factors (Creswell & Creswell, 2018). Followed by confirmatory effort to validate relationships among identified constructs and determine the statistical significance of those relationships quantitatively using SPSS tools (Field, 2013).

The scope of this research covers DT in the UAE, particularly based on Blockchain technology. The study doesn't have any bias towards particular UAE gov organization, and therefore it uses the experience and knowledge of strategy and ICT professionals employed by various UAE gov organizations. Literature reveals some experiences related to DT programs management practices (add references), however, not enough emphasis on the structure recommended for how those programs lifecycle can look like. Moreover, myriad of enabling factors are covered by this

research to examine their correlation with the realization of the sought after benefits from DT programs in the UAE public sector.

The qualitative phase of this study focused on utility of produced literature to understand elements of DT programs phases and enabling factors for BDTP as suggested by interested scholars. On the other hand, the quantitative phase focused on designing and administering a survey instrument of identified elements from the limited available literature found in this area. Descriptive Statistics, Conbach's Alpha, Correlation, and Linear Regression statistical tests were all decided to be part of this study scope to better understand dynamics among BDTP elements (Field, 2013).

Research Questions

This study is an attempt to answer the following questions:

RQ1: what are the phases necessary to successfully manage BDTP at UAE Gov organizations?

RQ2: what are the enablers recommended for each phase of BDTP at UAE Gov organizations?

RQ3: what are the associations among enablers and the benefits from every phase in the UAE Gov organizations BDTP?

LITERATURE REVIEW

REVIEW OF DIGITAL TRANSFORMATION FRAMEWORKS

BUILD Framework

In the book, *Digital Transformation: build your organization's future for the innovation age*, (Herbert, 2017) proposes five steps framework for organizations to go digital and argues are the base for all successful Digital Transformation programs. Herbert starts her theses by addressing the biggest Digital Transformation misconceptions and stresses that such programs do not necessary need big budget to start, and that tackling critical areas of the operations with small well targeted projects reveals more benefits. Another misconception addressed by Herbert is around the assumption that there is consensus around Digital Transformation definition, which proves to be false. Finally, the fallacy of temporary transformational phase is negated by the BUILD framework that proposes provisioning of new culture and processes to constantly adopt to change.

Herbert's BUILD framework establishes the base for one-off Digital Transformation that fundamentally changes the static setting of an organization to a dynamic fabric of agile and responsive operations that organically evolves in reaction to market forces. Such transformation need to happen only once to change the organization forever, according to Herbert, when managed well by tackling: business model; customer experience; and, internal processes. Consequently, Herbert presents outcomes of such Digital Transformation programs to include increases in: revenue; operational efficiency; access to market; and, users' offerings quality. On the other hand, Herbert also stresses the risk of the common misinterpretation of Digital

Transformation, which is leading to mislead investments resulting in expensive, embarrassing and often irreversible mistakes.

Herbert addresses where resistance to Digital Transformation stems from, attributing this typical resistance to risk, uncertainty, and effort that change brings along, which challenges the convenience of status quo that humans naturally prefers. Starting with fear from staff to be replaced by digital native counterparts or machines; Middle-management fear to lose their autonomy; the fear of productivity and revenue declines from traditional customer segments when resources are mobilized to explore digital alternatives; and finally the inconsistencies in customer and staff experiences when some areas transform faster than others in ad-hock manner. All those are root causes discussed by Herbert for Digital Transformation resistance.

Herbert proposes five steps framework to Digital Transformation that addresses the root causes of Digital Transformation challenges and increase chances of success, starting with the Bridge Stage that refocuses the organization on why it exists, rather than merely support how it provides its products or services. This is achievable through identifying and addressing the internal and external gaps, by investigating: how more profitable business models where possible for peers and competitors via leverage of technology; and customers' insights into new offerings and experiences. Such strategic focus on the organization's purpose helps in determining the required magnitude and speed of Digital Transformation program, and therefore need to be captured in Digital Transformation guided by a Shared Vision. Herbert describes such vision as succinct in stating the required DT in a way that successfully lead to gaining key stakeholders' support, particularly the program sponsor(s).

Uncover is the second Stage proposed by Herbert's BUILD Digital Transformation Framework, which focuses on developing best organizational routes to transformation, guided by the Shared Vision developed in the Bridge Stage of the same Framework. Developing the best routes to Digital Transformation are proposed by Herbert to be based on status quo analysis of internal and external barriers that generally hinders the business adaptability to change, and to DT in specific. The Uncover Stage reveals barriers, related to: people, processes, platforms, and partnerships; through challenging their underlying logic leading to discoveries and prioritization of required fixes.

Herbert argues that people become barriers to change when they lose the innovation mindset, or operate with outdated logic and/or poor accountability. On the other hand, processes become barriers to change when they involve frequent consultation, left fully manual, providing false sense of security by creating platforms for internal competition rather than collaboration.

Organization's current ICT platforms can also represent barriers with their embedded constraints that lead to issues in usability and integration, development cycle and performance, complexity and utilization, scope and scale. Finally, the Uncover Stage of BUILD Framework carefully examines status of organizational partnerships for their vital role in leveraging the right Digital Transformation opportunities. Having no strategic oversight over number, types, management approach across partners, while emphasizing deliverables quality rather than long term benefits, are all barriers to embarking on the right Digital Transformation with the right partners in the right way. In Herbert's Uncover Stage, identified barriers become the way to realize Digital Transformation vision.

Iterate is the third Stage of Herbert's BUILD Digital Transformation Framework, where she argues to be the right way to manage Digital Transformation projects that doesn't demand too much upfront clarity to satisfy traditional management techniques, while provides reasonable methodology that avoids embarking on projects that are not clearly aligned to organizational strategy. Iterate is a project management methodology that Herbert proposes to facilitate producing measurable results that enables improved decision making quality, through short cycles to develop minimum viable products (MVP), by cross-functional teams, which are tested with real users to only scale the right innovations. This is recommended to happen by Herbert under different brand when showing unfinished products to real customers can negatively impact the organization's brand. Moreover, taking cross-functional teams away from their usual environment can boost their innovation and collaboration levels. Innovation labs, hubs, accelerators, internal start-ups and external joint ventures are all possible environments for Iterate to flourish, in case managed well not to become its own silo. Herbert also stressed how vital for Digital Transformation program success is for its leaders and cross-functional teams to keep open mind towards updating the shared Digital Transformation vision and the routes to transformation based on the learning outcomes of Iterate Stage. Having said that, every route to transformation need to have clearly set goals by the Digital Transformation leaders and input from cross-functional team that will actually try to achieve them.

Herbert proposes initiating as many Digital Transformation projects as possible and manage them through the short cycles of Iterate Stage; at the end of each cycle intermediate results are to be evaluated to filter out unsuccessful projects in meeting the project goals minimum success criteria, by proving to be: valuable for real customers, adding competitive advantage, sustainable,

feasible, and scalable. The common three IT project stages are emphasized by Herbert as triggers to evaluate Digital Transformation projects and allow them to grow, those are: prototypes and/or proof of concept; Alpha test; and Beta test. Failing to test with real customers, testing with biased participants, testing in false environments, or testing with too many people; are all presented by Herbert as mistakes in leading Digital Transformation projects. Moreover, Herbert suggested a checklist for management of Digital Transformation projects, starting with ensured: mapping of goals to shared vision and linked to business success drivers; measurement of goals against the five evaluation criteria; application of goals at all three project stages; goals are empirically testable; and flexibility of implementation specification to the cross-functional team.

Additionally, having senior sponsor; team agreement with the goals and minimum success criteria; clearly defined reviews schedule; proper team equipment and space; and having access to needed stakeholders and experts are all necessities for success. However, when failure occur, the culture need to be prepared to welcome it and investigate its root-cause, suggested to follow lean manufacturing style in issues management.

Leverage is the fourth Stage proposed by Herbert's BUILD Digital Transformation Framework that targets capitalization on DT projects successes to gain support to scale. On the other hand, Herbert also suggests that addressing new threats to the Digital Transformation program that were not there when the program got initiated is another focus of this Stage. Leveraging Iterate Stage successes according to Herbert need to happen on two levels, internal to gain empowerment to scale up the solution to its full potential, and also external to recruit required talents and embark on strategic partners. Such leverage is described to be based on iterative projects tangible results that can sell DT benefits to other business areas to join in, as well as, the

intangible results evident in achievements and acquired skills by the projects teams. On the other hand, Herbert also stressed the need to account for threats from internal politics and major changes that will naturally pose huge challenges and serious risks to the success of the Digital Transformation program.

Internal leverage according to Herbert need to have clear measurable goals that largely depend on the nature of targeted audience and how best they are to be engaged. Additionally, Leverage team need to have clear ownership of planned engagement activities and follow the same iterative approach used to manage the development of Digital Transformation projects to also manage the engagement methods. By applying BUILD Stage 2 Iterate techniques, Leverage team will be able to learn which engagement methods are more effective in certain contexts and reasons for some methods failure. Accordingly, Leverage plan is revisited in favour of effectiveness.

Leveraging externally, according to Herbert, is very similar to internal leverage activities, with even clearer goals and audience that do not require careful political manoeuvring to unleash. However, the downside of external leverage clarity is the likely internal backlash when not balanced with proper internal leverage. When internal key stakeholders are not well informed, they can misinterpret externally communicated messages and overreact as a result. Moreover, another challenge with external leverage to account for is the reactions of competitors and customers scrutiny.

Disseminate is the fifth Stage in Herbert's BUILD DT Framework, which provides guidelines to spread innovations in a way that Herbert describes as "sustainable adaptability" to ongoing

changes. The focus of this crucial stage is to go beyond sharing the results of Digital Transformation projects, to shifting the organization management approach from top-down to bottom-up. This is to empower staff to keep operations relevant to organization goals with proper responses to transparent customer insights. On the other hand, leaders keep scanning the business environment for major changes and enable the organization to properly react by establishing support infrastructure, partnerships, and relevant talent. Such transition in organizational model is proposed to follow the same incremental approach presented in Stage 2 of BUILD Digital Transformation framework, that is, Iterate, with first-hand involvement of Digital Transformation leaders and iterative teams' members, to: disseminate the iterative and cross-functional team model, as well as, introducing new people, process, platforms, partnerships.

The bottom-up control of complex adaptive systems theories is reviewed by Herbert and associated through analogies to her proposed Sustainable transformation traits, where the clearly defined common goals motivates cooperation for fast accomplishments, with emphasis on recognition of individual efforts. Moreover, bottom-up adaptive approach employs feedback loops that constantly inform individuals of accuracy of their efforts in meeting the desired goals to adjust immediately. Finally, simple processes that are clear to all, which empowers individuals to react confidently and accurately to changes, are the base for the bottom-up approach operating model.

Herbert proposes two steps for innovation scaling: first to instil the iterative approach principles, then to scale the cross functional team model. For the iterative approach to get entrenched in the organization, universal goals that defines what success looks like are required for clarity; those goals are: mission led, customer focused, and contextually appropriate. It is also vital to provide

authorization for cross departmental collaboration and simple process for external partners' collaboration. Additionally, access to innovation tools, assets, and resources need to be granted to all staff contributing to Digital Transformation. Herbert finally emphasizes the importance of tracking individual contributions and rewarding hard work to further instil the iterative approach.

The second step proposed by Herbert in the Disseminate Stage, is to scale the cross-functional team model iteratively to ultimately enable the agility of the organization by knocking down silos that prohibits superb performance. The rational presented evolves around the unreasonable expectation from people grouped merely based on their similar skills to perform at their best. Alternative assignment-based amalgamated skills is evident to boost motivations and reliance of team members on each other's expertise to innovate in solving problems, while elevating each member's sense of ownership and pride for the constant recognition of individual contributions.

Scaling the cross-functional team model starts by the original Digital Transformation leadership and team establishing flexible systems for scale as guiding framework for the next iterative teams, that leaves room to accommodate specifics of different customer types and business areas. Such consideration is vital in developing flexible systems for cross-functional teams to act autonomously on change, otherwise risking areas of the business losing interest in utilizing innovative solutions. Flexible systems are proposed to be based on four digital disciplines, those are: Customer Experience, Design, DevOps, and Insights; each of which need to include common technology, adaptable processes, reusable assets, and open communities to facilitate and support the cross-functional teams efforts. Herbert also emphasizes the importance of well-defined and effectively communicated core principles for flexible systems to clearly guide cross-functional teams on: legal, cultural, and brand aspects to adhere to in their day-to-day work.

Finally, for Disseminate Stage to achieve its goals, Herbert closes the loop of the iterative approach to manage Digital Transformation by proposing going back to BUILD Stage 1, Bridge, by identifying gaps in current: platforms, partnerships, people, and processes; which requires new investments to sustain adaptability to change.

The Cloud Adoption Playbook

In the cloud adoption playbook, (Abdula, et al., 2018) presents a framework for Digital Transformation with cloud-based Digital Transformation backdrop. Many of the presented elements of the proposed framework are observed in literature within other technology-based Digital Transformation contexts. The authors start by highlighting the business drivers that motivates organizations to transform digitally with the cloud, which cannot be done without well strategized Digital Transformation program. This discussion commences with description of current minimum interaction expectation that is conditioned by the best interaction experienced anywhere, whither on personal or professional level. Those drivers set the context for the proposed framework dimensions to methodically guide the organizations assessment of its future position and to plan its roadmap towards it. Exceptional user experience, accelerated time to market, higher service quality, cost flexibility, repeatability and flexibility, safety, security, and compliance; presented as examples of such drivers. Maintaining alignment among business drivers and strategic intent for the entire Digital Transformation is emphasized by Abdula et al. for success. Moreover, a holistic approach to Digital Transformation that takes into accounts enterprise factors, like: time, structure, assumptions, talent, culture, among other factors is recommended to guide Digital Transformation efforts. The need to innovate beyond technology to address changes in the nature of vendor contracts is also discussed, to leverage the evolving

relationship with service providers as a result of obsolete services in the age of Digital Transformation with cloud.

(Abdula, et al., 2018) Proposes a cloud-based Digital Transformation framework that is argued to accelerate and sustain transformation successes in a roadmap that facilitates scale. Key attributes of the proposed Digital Transformation framework, are: composability to focus more on elements of high priority, flexibility to go in depth as required, and agility to correct course based on experimentation outcomes. The proposed framework is based on three fundamental themes that enables the thinking and envisioning of the transformation by establishing the underlying strategic intent, balances the transformation giving the organizational context, to finally thrive on new foundations and realize strategic outcomes. Abdula et al. describes Digital Transformation as hard requiring more than technology deployment, including: people, processes, information, and cultural elements to be considered and addressed as part of the Digital Transformation program. The authors emphasized some fundamental strategies to address such challenging elements starting with the practice of agile engagements and organizational alignment, rethinking and negotiating partnerships, and re-establish the foundational methods and skills to boost Digital Transformation. (Abdula, et al., 2018) Defined well the overarching goals of any IT function, entailing improving operational efficiency, complying with regulations, ensuring security for business transactions, and aligning technology to business strategy. Those IT functions goals were considered while developing Abdula et al. Digital Transformation framework that brings together stakeholders that must collaborate to innovate meaningful journeys to realize targeted benefits. The proposed framework include seven dimensions: culture

and organization, architecture and technology, security and compliance, emerging innovation spaces, methodology, services management and operations, and governance.

Figure 1 Dimensions of adoption

Abdula et al. suggests creating Digital Transformation journey maps relevant to the organizational context and advance in the adoption journey stepwise, starting with proper definition of the business strategic intent, technology evaluation, and organizational change effects. The second step proposed in this adoption journey the identification of strategic opportunities to expedite Digital Transformation, followed by ideation and prioritization step to focus on most feasible innovations. The fourth step in the proposed adoption journey is focused on piloting prioritized innovations and proving capabilities to guide the fifth step in the journey and scale validated innovations by end users. Finally, the Digital Transformation journey is proposed to conclude with defining strategic outcomes, capitalizing on proven successes and enhanced with feedback to achieve benefits as business processes are getting transformed.

“Digital transformation requires designing a strategic road map for sustained success. The framework helps you adapt to your organization’s changing needs along the way while maintaining a clear focus on strategic intent”. This alignment is proposed to be governed by ten key actions. Starting with involvement of the right people, align technology to business, address the dimensions holistically while considering their key attributes, maintain client-centred approach through Design Thinking, highlight quick wins, collaborate actively with process owners, balance internal and external forces with sustained and disruptive innovations, establish

clear deliverables with success criteria for each dimension, and finally provision for hybrid models.

(Abdula, et al., 2018) Presents key attributes to cloud-based Digital Transformation strategy that defines the strategic business intent in actionable manner that guides execution towards expected outcomes and value realization. The strategy development approach evolves around the proposed Digital Transformation framework dimensions and entails six steps: business objectives, portfolio analysis, state definition, readiness assessment, execution roadmap, and approach selection. As a result, a comprehensive Digital Transformation strategy scope will include the proposed Digital Transformation framework focuses.

Figure 2developing a cloud strategy

The authors emphasize the organizational cultural elements that challenges cloud-based Digital Transformation that can prohibit the realization of sought benefits. Some issues that organizational culture influences were discussed, like the challenge of creating attractive culture to the right talents; and addressing interpersonal conflicts. The need to instil values that lead to targeted Digital Transformation outcomes is discussed, such as: cooperation, empowerment, positivity, and team spirit. (Abdula, et al., 2018) Defined organizational culture, as: “the combination of the shared values, beliefs, and social norms in an organization, resulting in behaviours, practices, and customs that the members of the organization follow”. Organizational culture is been classified to formal and informal rules, where the latter is not written norms of the place that challenges change agents when break them, wither intentional or not. Abdula et al.

explains how organizational culture varies across the same organization's levels and business units, and depends to a large extent on the type of leadership involved, and invites for thoughtful consideration of key cultural elements while deciding on new technology implementation choices. Firstly, willingness to embrace change that is inevitable consequence of Digital Transformation on: skill sets, organizational structures, risk management approach, and funding models of Digital Transformation projects. On one end, some organizations are willing to embrace disruption in favour of rapid response to changing business conditions, however, such organizations introduce so many changes that have big negative impact if not successful. On the other end, most organizations are slow and carefully examine decisions from many angles to minimize risk, however, they often over plan and complicate situations with endless committees and reviews to make decisions. Instead, the authors recommend embracing change incrementally through experimentation to base decisions on data rather than best guesses.

The second cultural element to consider while planning for Digital Transformation is related to decision-making styles, which are presented by Abdula et al in two styles, the centralized top-down decision-making style that result from rigid organization structures with fixed roles and responsibilities that helps in arriving to decisions fast but reduces decisions quality due to the absence of operation or local knowledge. The other decision-making style is consensus based and involve all team members to jointly decide. A well-defined level of autonomy and accountability is proposed by the authors as a balance among the two decision making styles.

The third cultural element to consider while planning for the change that DT brings is organizational attitude towards risk, where most organizations are risk averts, fewer embrace risks willingly to leverage opportunities. Abdulla et al. describes the challenges that comes when

one of the two risk tolerance style becomes so dominant in an organization to the extent of little decisions in the case of low risk tolerance cases, all the way to bid decisions in the case of high risk tolerance ones. Both lead to serious losses in efficiencies in the former as opposed to financial losses in the latter. (Abdula, et al., 2018) Invites to reach a balance among increased risk tolerance with small decisions, while establishing controlled experimentation the more serious the decision gets, through careful engineering of a process that allows for consideration of various technical solutions, regardless of level of skills within the concerned team. This approach limits the damage when unsuccessful through established control measures. This allows close collaboration with end users to introduce small changes gradually with what is popularly known among modern application developers as the MVP that help manage risks while transforming with technology.

Finally, view of failure is been argued by Abdula et al. as the most insidious key cultural element when viewed as personal shortcoming rather than experiences to learn from. Additionally the writers describe the changes that Digital Transformation brings due to changes in the type of challenges for the organization to address and pace of development, leading to the need for different type of talent that more generalist than specialist to handle full-stack development, as well as, redistribution of skills, roles and responsibilities to gain speed and reduce number of handoffs among teams. Such changes need to be planned and managed carefully to reasonably address resistance by people with jobs to be eliminated or power to be reduced.

(Abdula, et al., 2018) Stressed the importance of Agile adoption in Digital Transformation to establish the proposed controlled experimentation approach for the management of Digital Transformation, which introduces squad team model that has a maximum of 10 members

focused on specific function, like: application development or build functions, user experience and interface design functions, and the like. A typical development or build squad includes: lead or anchor developer, three or four pairs of full-stack developers, product owner, application architect, a pair of site reliability engineers (SRE) and optionally a designer. SRE is a new role in digitally transforming organizations structures that focuses on fixing bugs that emerge from operations and automate prevention mechanisms for resolved incidents not to reoccur. Designers might get grouped in one squad and shared among build squads. Work is assigned to squads in epics, each of which represents grouping of closely related user stories that are added to backlog of continuously prioritized stories, on daily basis, with Kanban or any other Agile management method. Squads that work on epics leading to one product are called tribe and it is at this level that project manager is assigned to orchestrate the squads' efforts and perceptions. Each squad is completely autonomous and therefore meet organizations Digital Transformation emerging need for generalist talents for they are self-sufficient and as a result minimize handoffs across squads. The fact that squads are small and autonomous lead to major change in traditional siloed organizations to deal with, in terms of decentralizing specialization downwards to the squad, as well as shifting the program and project management approach to reactive Agile mode. Digital Transformation projects teams can be decentralized, however, each squad members must be co-located to facilitate rapid knowledge transfer and growth through rotation of pairs across user stories.

The authors discussed the disadvantages that advanced societies faced with outsourcing and offshoring in terms of intellectual property rights and inevitable inter/inter-team issues associated with offshoring. A tribe usually start with one squad, which then get split into multiple new

squads that blends senior members with new members in pairs to bring the latter productivity up to required level with intensive ongoing shadowing and hands on training. Abdula et. al also describes another organizational construct called the guild, which is less formal community of practice that brings people with the same specialization together for sharing best practices across the tribes.

Finally, (Abdula, et al., 2018) presents an organizational unit that can alleviate the cultural issues that DT programs bring about, namely Centre of Competency (CoC), which is independent unit owned and provisioned by other units that have stake in the success of DT. CoC has enterprise level focus to deliver Digital Transformation programs through repeatable success, rather than individual projects, therefore: emphasizes best practices and standards, provide expertise to advise on development and deployment issues, build autonomous teams, and continuously scan for emerging disruptive technologies.

Architecture and technology is discussed by (Abdula, et al., 2018) proposing leveraging competitive advantage with new platforms, services, and applications development models, such as microservices, while establishing a balance among architects and developers point of views. The disadvantages of waterfall delivery presented were Digital Transformation projects get stuck until requirements are fully gathered, decisions on development tools and frameworks are finalized, and sceptical executives got proof of performance on software stack. The authors suggested architects to empower developers and SREs to decide on software patterns as per architect-defined strategies of repeatable success and reference architectures. (Abdula, et al., 2018) DT framework emphasizes fundamental change aspects to be managed while employing

technology trends that tangibly influence both the business, as well as, the technology platforms required to support them.

Project Management Institute Program Management Standard

The American Standard for Program Management (PMI, 2017) is a principle-based standard, developed by 15, and reviewed by 179 Subject Matter Experts from both Academia and Industry. The Standard offers widely accepted definitions, concepts, in a framework that guides good practices evident as vital to programs success. (PMI, 2017) Program Management Standard organizes its guiding principles and practices in a Life Cycle and Performance Domains.

(PMI, 2017) Defines a program as: “*related projects, subsidiary programs, and program activities managed in a coordinated manner to obtain benefits not available from managing them individually.*”. Moreover, Programs are classified as part of Portfolios, that are: “*collection of projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives.*”. The aim of this approach to program management is to deliver intended benefits through adaptable plans for Component projects and/or sub-programs to changes in organizational strategy. This aim is approached through practices enforced by the Standard’s Performance Domains: Strategy Alignment, Benefits Management, Stakeholders Engagement, Program Governance, and Life Cycle Management.

Figure 3 Program Life Cycle structure

(PMI, 2017) Program Life Cycle structure, illustrated in Figure 3, increases control and chances for Programs success, by focusing organizational resources on maintaining alignment with dynamic changes of organizational strategy. Governed by Program Governance Performance Domain of the Standard, which aligns and interacts with Organizational Governance, to authorize Components: kick-off, transition, and closure. PMI standard mandates Program Closure phase to begin only upon successful Delivery and Transition of intended Program Benefits, together with Sustainment plan to establish the foundation of successful operations following the Program Closure.

According to (PMI, 2017), Program Management Performance Domains are: *“complementary groupings of related areas of activities or functions that uniquely characterize and differentiate the activities found in one performance domain from the others within the full scope of program management work.”*.

Figure 4 Program Strategy Alignment

Program Strategy Alignment Performance Domain Figure 4, enforces continuous alignment of Program Components with Organizational Strategy, and facilitate the realization of organizational benefits as a result of this alignment (PMI, 2017). Depending on the Organizational Project Management (OPM) maturity of the organization, a more or less formal process will exist as part of Portfolio Management practices for program selection, based on a viable Program Business Case that establishes the validity of the Program expected benefits in meeting strategic goals and objectives. Once the Business Case is approved, the Portfolio Board

or Program Steering Committee will also manage the selection process to consider proposed initiatives for inclusion in the Program Charter, together with strategic objectives, intended benefits, required resources and funding requirements. Once approved, the Program Charter authorizes the utilization of identified resources to execute the program, guided by the approved Roadmap.

(PMI, 2017) Standard defines Program Roadmap as: *“a chronological representation of a program’s intended direction, graphically depicting dependencies between major milestones and decision points, which reflects the linkage between the business strategy and the program work.”*. This important managerial communication tool helps stakeholders’ continuous assessment of program’s progress in effective manner for the purpose of building and maintaining support required for program success.

Program Strategy Alignment Performance Domain includes activities required to continuously identify internal and external influences that impacts the program’s success. Such identification and consequent recommendations to key stakeholders maintains advocacy by ensuring constant alignment with strategic goals and objectives. Moreover, developing Program Risk Management Strategy is a key focus of this performance domain, to ensure undespaired implementation of Program Roadmap.

Figure 5 Program Benefits Management

Program Benefits Management Performance Domain Figure 5, entails activities necessary for the identification, analysis and planning, delivery, transition, and sustainment of Program Benefits. The objective of this performance domain, is to keep Program Stakeholders efforts focused on the production and sustainment of planned benefits throughout the Program lifecycle and beyond. While identifying those benefits, the context of their beneficiary need to be fully considered. This includes parties that may experience negative impacts due to Program Benefits, like staff cuts or consolidation of business units. Provisioning for minimization of negative impact is another vital activity in this performance domain. Benefits transitioning and sustainment activities need to accommodate incremental, as well as, consolidated realization of Program Benefits during the Program Life Cycle and beyond.

Figure 6 Program Stakeholder Engagement

Program Stakeholder Engagement Performance Domain Figure 6, is concerned with activities required to perform Program Stakeholders: identification, analysis, engagement planning, engagement, and communications. (PMI, 2017) Defines Stakeholders, as: *“individual, group, or organization that may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio.”*. Program Managers need to manage internal, as well as, external Stakeholders expectations to benefit from their positive, while minimizing their possible negative impact on the Program success. Balancing Stakeholders interests is vital through careful engagement, beyond sheer communication activities, for example involving them in governance activities.

Figure 7Program Governance

Program Governance Performance Domain Figure 7, is the decision making and oversight function, which includes activities that defines Program Governance: practices, roles, and design and implementation. The aim of this performance domain is to ensure the sponsoring organization of the delivery of intended benefits through authorization and monitoring system for the Program and its Components. Program Governance is performed mainly by the Program Steering Committee and is linked to Portfolio and Organizational Governance bodies.

BLOCKCHAIN CONSIDERATIONS

UAE has proactively joined the world's Blockchain-based Digital Transformation race and observed signs indicates the country's intention to lead in this field. This intention was evident in H.H. Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum - Crown Prince of Dubai and Chairman of Dubai Executive Council 2017 announcement for 2020 to be the last year for paper-based Government transactions in Dubai with full adoption of Blockchain. Moreover, the launch of UAE Blockchain Strategy 2021 by H.H. Sheikh Mohammed bin Rashid Al Maktoum - Vice President and Prime Minister of the UAE and Ruler of Dubai, April 2018, spiked the UAE local market demands on Blockchain use-cases to help with UAE Government mandate for Blockchain-based Digital Transformation. This is part of UAE's 2031 Artificial Intelligence Strategy, to become a world leader in adopting technology to improve the quality of life in the UAE and to enhance happiness levels for citizens. The ambitious target is to transform "50 percent of government transactions on the federal level to be conducted using Blockchain technology by 2021," as stated by H.H. Sheikh Mohammed bin Rashid Al Maktoum.

According to (Deloitte's, 2019) Global Blockchain Survey, 53% of participants put Blockchain in the top five strategic priorities for their organizations.

Figure 8Blockchain in the top five strategic priorities

This strategic focus on country level on Digital Transformation with relatively young and still emerging technology, inspired the very idea of this research to improve Public Sector (PS) success with BDTP by devising a Framework that is rooted in the best practices in Programs

Management and Digital Transformation, while taking into consideration the specific nature of Blockchain Adoption.

Blockchain technology is still in the process of roll out stage worldwide, however, due to its sweeping disruption of conventional establishment of trust in value-baring transactions created huge demands in markets. Over 50,000 people are certified already, only on IBM Blockchain solutions. UAE government decided to make strategic investments for the adoption of this very promising technology, by setting ambitious goal to move 50% of government transactions to become fully paperless and Blockchain enabled by 2021.

Blockchain as emerging technology is expected to radically improve banking, supply chain, and other transaction networks and can create new opportunities for innovation. Businesses contain many examples of networks of individuals and organizations that collaborate to create value and wealth. These networks work together in markets that exchange assets in the form of goods and services between the participants. Blockchain technology provides the basis for a dynamic shared ledger that can be applied to save time when recording transactions between parties, remove costs associated with intermediaries, and reduce risks of fraud and tampering.

Technology is constantly emphasized by literature as merely a tool. Business priorities define the targeted outcomes, for which innovation is increasingly perceived as a business driver in itself (Abdula, et al., 2018). Business drivers are mainly focused on improvement of current user experience (UX), time to market, service quality, cost flexibility, repeatability and flexibility, safety, security, and compliance with regulations. Innovative ideas on the other hand disrupt status quo, by introducing totally new ways of doing things.

Blockchain is a business innovation driver with contemporary use-cases that never were possible before due to limitation of legacy technology in establishing required trust for end-to-end integration and automation in multiparty transactions. Blockchain capabilities eliminates the need of multiple ledgers to be maintained by various business networks participants, by introducing single immutable shared ledger, for which results are stored permanently based on consensus among participants.

A Blockchain comprises three things: Business network, which represent ecosystems of exchange, a supply chain, or a series of interconnected business transactions; Assets, which are anything capable of being owned or controlled to produce value. Assets can be digital or physical. A digital thumbprint (i.e. a permanent record) is created to connect the physical asset to the digital asset; and Ledgers, which are where transactions and contracts are digitally coordinated and encrypted. Ledgers are simultaneously and securely available to all participants with an audit trail.

Blockchain empowers enterprises in several ways: It allows them to leverage the power of ecosystems, such as partner and customer ecosystems, to complete transactions faster with greater trust. It also allows to rewrite applications to reduce the cost and complexity of cross-enterprise business processes by eliminating inefficiencies, waste, and duplication. Moreover, Blockchain can support the invention of new styles of digital interactions. It facilitates stringing together multiple interactions that were once isolated into a coherent value chain. It can also help enterprises create cost-efficient business networks in which virtually anything of value can be tracked and traded without requiring a central point of control. Finally, Blockchain can decrease

transactions cycle times by addressing risk and uncertainty while reducing fraud from e-crime and cyberattacks.

According to (Deloitte's, 2019) Global Blockchain Survey, 47% of participating organizations stated IT professionals as the key decision makers in blockchain projects, while 30% stated top management as the key decision makers in blockchain investments. These findings, as well as, the UAE Government focus of this study inspired the rational of focusing the sample on UAE Government employees working in IT and Strategy functions.

TABLE OF FACTORS

The following table summarises identified factors for further investigation in this study. In addition to the three main references described above, further evidence identified from literature that supports the arguments of (Abdula, et al., 2018) (Herbert, 2017) (PMI, 2017) as follows.

Table 1 Table of Factors

Factor/construct	Source
Program definition phase	(PMI, 2017), (Byrne, et al., 2014), (Piney, 2018), (Badman & Sjoberg, 2016)
Program formulation process	(PMI, 2017), (Byrne, et al., 2014), (Piney, 2018), (Badman & Sjoberg, 2016)
Program preparation process	(PMI, 2017), (Byrne, et al., 2014), (Piney, 2018), , (Badman & Sjoberg, 2016)

Program delivery phase	(PMI, 2017), (Piney, 2018), (Badman & Sjoberg, 2016)
Component planning and authorization process	(PMI, 2017), (Piney, 2018), (Badman & Sjoberg, 2016)
Component Oversight and Integration	(PMI, 2017), (Piney, 2018), (Badman & Sjoberg, 2016)
Component Transition and Closure	(PMI, 2017), (Piney, 2018), (Badman & Sjoberg, 2016)
Program closure phase	(PMI, 2017), (Piney, 2018), (Badman & Sjoberg, 2016)
Program Transition	(PMI, 2017), (Piney, 2018), (Badman & Sjoberg, 2016)
Program Closeout	(PMI, 2017), (Piney, 2018), (Badman & Sjoberg, 2016)
Post-program closure	(PMI, 2017), (Piney, 2018), (Badman & Sjoberg, 2016)
Benefits Sustainment process	(PMI, 2017), (Piney, 2018), (Badman & Sjoberg, 2016)
Define business strategic intent	(Abdula, et al., 2018), (PMI, 2017), (Byrne, et al., 2014), (Piney, 2018), (Badman & Sjoberg, 2016)

Technical Evaluation	(Abdula, et al., 2018), (Arkhipova, et al., 2016)
Organization's change effects	(Abdula, et al., 2018), (Arkhipova, et al., 2016), (Vukosav, 2020)
Identification of strategic opportunities	(Abdula, et al., 2018), (PMI, 2017), (Herbert, 2017), (Ljijana & Dorde, 2018), (Vukosav, 2020), (Agile Practice Guide, 2017)
Ideation and prioritization	(Abdula, et al., 2018), (PMI, 2017), (Herbert, 2017), (Ljijana & Dorde, 2018), (Vukosav, 2020), (Agile Practice Guide, 2017)
Piloting	(Abdula, et al., 2018), (Herbert, 2017), (Ljijana & Dorde, 2018), (Vukosav, 2020), (Agile Practice Guide, 2017)
Scale validated innovations	(Abdula, et al., 2018), (Herbert, 2017), (Ljijana & Dorde, 2018), (Vukosav, 2020), (Agile Practice Guide, 2017)
Defining (measure) strategic outcomes	(Abdula, et al., 2018), (PMI, 2017), (Arkhipova, et al., 2016)
Capitalize on proven successes	(Abdula, et al., 2018), (Herbert, 2017), (Ljijana & Dorde, 2018), (Vukosav, 2020), (Agile Practice Guide, 2017)

Enhance with feedback	(Abdula, et al., 2018), (Herbert, 2017), (Ljijana & Dorde, 2018), (Vukosav, 2020), (Agile Practice Guide, 2017)
Bridge phase	(Herbert, 2017)
Customers engagement gap Analysis	(Herbert, 2017), (Arkhipova, et al., 2016), (Kenneth Dl, et al., 2018), (Vukosav, 2020)
Customers insights gap Analysis	(Herbert, 2017), (Arkhipova, et al., 2016), (Kenneth Dl, et al., 2018), (Vukosav, 2020)
Technology gap analysis	(Herbert, 2017), (Arkhipova, et al., 2016), (Kenneth Dl, et al., 2018), (Vukosav, 2020)
Competition gap analysis	(Herbert, 2017), (Arkhipova, et al., 2016), (Kenneth Dl, et al., 2018), (Vukosav, 2020)
Leadership gap analysis	(Herbert, 2017), (Kenneth Dl, et al., 2018), (Vukosav, 2020)
Shared transformation vision development	(Herbert, 2017), (Ljijana & Dorde, 2018)
Instill customer experience as the basis to DT	(Herbert, 2017), (Vukosav, 2020)
Prioritized transformational objectives	(Herbert, 2017), (Ljijana & Dorde, 2018)

Develop initial DT roadmap	(Herbert, 2017), (PMI, 2017), (Vukosav, 2020)
Uncover phase	(Herbert, 2017)
Identify and priorities barriers in people	(Herbert, 2017), (Kenneth Dl, et al., 2018), (Vukosav, 2020)
Identify and priorities barriers in processes	(Herbert, 2017), (Kenneth Dl, et al., 2018), (Vukosav, 2020)
Identify and priorities barriers in platforms	(Herbert, 2017), (Kenneth Dl, et al., 2018), (Vukosav, 2020)
Identify and priorities barriers in partnerships	(Herbert, 2017), (Kenneth Dl, et al., 2018), (Vukosav, 2020)
Establish enhancement of customer experience as the primary route to transformation	(Herbert, 2017), (Vukosav, 2020)
Formation of cross-functional team	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)
Iterate phase	(Herbert, 2017)
Using relevant cross-functional teams	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)

Secure executive sponsorship	(Herbert, 2017), (PMI, 2017), (Arkhipova, et al., 2016) (Byrne, et al., 2014), (Ljijana & Dorde, 2018)
Agree format and timescales for project reviews and decision making	(Herbert, 2017), (PMI, 2017), (Arkhipova, et al., 2016) (Byrne, et al., 2014), (Agile Practice Guide, 2017)
Iterate in short cycles to produce MVPs	(Herbert, 2017), (Arkhipova, et al., 2016)
Test with real users and improve based on their feedback	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)
Providing teams with an environment away from their usual space	(Herbert, 2017), (Pancholi, et al., 2019)
Early testing under different brand names	(Herbert, 2017), (Pancholi, et al., 2019)
Employ innovation labs, hubs, accelerators, internal start-ups and/or external joint ventures	(Herbert, 2017), (Pancholi, et al., 2019)

Start internal start-ups with seed fund and enable them with freedom to innovate	(Herbert, 2017), (Pancholi, et al., 2019)
Partner with other businesses to quickly respond to major opportunity or massive threat	(Herbert, 2017), (Pancholi, et al., 2019)
Maximizing number of projects to only scale those that demonstrate real business results	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)
Define what success look like and stick to it	(Herbert, 2017), (Arkhipova, et al., 2016), (Ljijana & Dorde, 2018)
Assign executive sponsor for each iterative project in the program	(Herbert, 2017), (Arkhipova, et al., 2016)
Project team understand and agree with the goals and minimum success criteria	(Herbert, 2017), (Arkhipova, et al., 2016), (Ljijana & Dorde, 2018)
Ensure project team are properly equipped to fulfil their roles	(Herbert, 2017), (Ljijana & Dorde, 2018)
Employ Agile and Design Thinking methodologies	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)

Leverage phase	(Herbert, 2017)
Capitalizing on DT projects successes to gain support to scale	(Herbert, 2017), (Ljijana & Dorde, 2018), (Agile Practice Guide, 2017), (Vukosav, 2020)
Present projects results in a way that builds all employees pride in the organization, not only the DT team	(Herbert, 2017)
Build higher job satisfaction by emphasizing achieved efficiencies of the DT team at dealing with change itself	(Herbert, 2017), (Kenneth D1, et al., 2018)
Use project and team achievements to remove DT blockers represented by people with interests in preserving old ways	(Herbert, 2017), (Arkhipova, et al., 2016)
Use project and team achievements to remove DT blockers represented by Unmitigable barriers with digital solution	(Herbert, 2017)

Use project and team achievements to remove DT blockers represented by risks from major change	(Herbert, 2017), (Arkhipova, et al., 2016)
Set goals, audience, responses measurement criteria	(Herbert, 2017)
Assign ownership and resources	(Herbert, 2017)
Use an iterative approach to test different methods and enhance with feedback	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)
Grow projects that work and learn why others failed	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)
Methods for leverage: Official recognition, presentations, Shareable assets, Events, Collaboration spaces, events, articles and interviews, digital assets, HR and company promotional assets	(Herbert, 2017), (Agile Practice Guide, 2017)
Disseminate phase	(Herbert, 2017)

Change to bottom-up management to empower staff to keep operations relevant.	(Herbert, 2017), (Kenneth D1, et al., 2018)
Instill sustainable adaptability to ongoing changes as the new way of operations.	(Herbert, 2017), (Ljijana & Dorde, 2018)
Enable proper reactions to major changes by investing in proper talent.	(Herbert, 2017), (Ljijana & Dorde, 2018)
Enable proper reactions to major changes by investing in proper partnerships.	(Herbert, 2017) (Arkhipova, et al., 2016)
Enable proper reactions to major changes by investing in proper infrastructure.	(Herbert, 2017) (Arkhipova, et al., 2016)
Eliminate the tradition plan, build, test, and launch method.	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)
Establish the new iteration method of build, test, learn, and improve.	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)

Reduce internal competition by spreading the cross-functional team model.	(Herbert, 2017), (Kenneth Dl, et al., 2018)
Set universal goals that incentivize cooperation.	(Herbert, 2017), (Ljijana & Dorde, 2018), (Kenneth Dl, et al., 2018)
Enable agility through relevant information and real-time feedback.	(Herbert, 2017), (Kenneth Dl, et al., 2018), (Agile Practice Guide, 2017), (Vukosav, 2020)
Enable self-governing behavior through simple processes and specialist skills.	(Herbert, 2017), (Ljijana & Dorde, 2018), (Kenneth Dl, et al., 2018), (Agile Practice Guide, 2017)
Provide clear and effective way to access required: equipment, developers, and designers.	(Herbert, 2017), (Ljijana & Dorde, 2018), (Agile Practice Guide, 2017)
Provide clear and effective way to access required training on Agile and Design Thinking.	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)
Provide clear and effective way to access required customers to participate in testing.	(Herbert, 2017), (Agile Practice Guide, 2017), (Vukosav, 2020)

Provide clear and effective way to access required external specialists and companies.	(Herbert, 2017)
Tracking and recognition of individual contributions.	(Herbert, 2017), (Ljijana & Dorde, 2018)
Remove silos by creating flexible systems based on common technology.	(Herbert, 2017), (Agile Practice Guide, 2017)
Remove silos by creating flexible systems based on adaptable processes.	(Herbert, 2017), (Agile Practice Guide, 2017)
Remove silos by creating flexible systems based on open communities.	(Herbert, 2017)
Sustain flexible systems by making it modular, open, and consistent to support innovation teams independence.	(Herbert, 2017), (Vukosav, 2020)
Support iterative teams practice within the flexible systems by clear	(Herbert, 2017), (Agile Practice Guide, 2017)

legal and security policies and procedures.

Support iterative teams practice within the flexible systems by clear values and culture.	(Herbert, 2017), (Kenneth DI, et al., 2018), (Agile Practice Guide, 2017)
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Support iterative teams practice within the flexible systems by clear identity and brand.	(Herbert, 2017), (Agile Practice Guide, 2017)
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PROPOSED BLOCKCHAIN-BASED DIGITAL TRANSFORMATION PROGRAMS FRAMEWORK FOR UAE PUBLIC SECTOR

UAE has proactively joined the world's Blockchain-based Digital Transformation race and observed signs indicates the country's intention to lead in this field. This intention was evident in H.H. Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum - Crown Prince of Dubai and Chairman of Dubai Executive Council 2017 announcement for 2020 to be the last year for paper-based Government transactions in Dubai with full adoption of Blockchain. Moreover, the launch of UAE Blockchain Strategy 2021 by H.H. Sheikh Mohammed bin Rashid Al Maktoum - Vice President and Prime Minister of the UAE and Ruler of Dubai, April 2018, spiked the UAE local market demands on Blockchain use-cases to help with UAE Government mandate for Blockchain-based Digital Transformation. This is part of UAE's 2031 Artificial Intelligence Strategy, to become a world leader in adopting technology to improve the quality of life in the UAE and to enhance happiness levels for citizens. The ambitious target is to transform "50

percent of government transactions on the federal level to be conducted using Blockchain technology by 2021," as stated by H.H. Sheikh Mohammed bin Rashid Al Maktoum.

This strategic focus on country level on Digital Transformation with relatively young and still emerging technology inspired the very idea of this research. To improve Public Sector success with Blockchain-based Digital Transformation Programs (BDTP) by devising a Framework that is rooted in the best practices in Programs Management and Digital Transformation, while taking into consideration the specific nature of Blockchain characteristics and challenges.

Based on patterns emerged from literature review, the proposed Blockchain based Digital Transformation Framework (BDTF) for the UAE Public Sector in this study is aiming to enable organizations in the UAE to achieve their desired business outcomes, to meet the aspirations of the country's leadership, through an approach that fosters innovation at all levels. The vast majority of UAE Public sector IT departments are now challenged with how to adopt Blockchain, in response to UAE Government Blockchain-based Digital Transformation Strategy. Therefore, every CIO in UAE Public Sector is in the process of defining strategies and formulating approaches for how to go about changing their organizations with this new technology. However, the process of formulating a successful Blockchain adoption strategy and the implementation of that strategy is far from easy, and therefore, require a structured approach to establish the needed levels of control, and improve chances for success as a result.

The proposed Blockchain based Digital Transformation Framework in this study is intending to bridge the business and technology divide and provide a holistic but pragmatic set of ideas/strategies that can enable considered, consistent, and successful implementation within the

complex organizational constructs of UAE Gov entities. This section describes the building blocks of the study's proposed BDTF, identified from reviewed literature, as discussed in the previous section. To build the BDTF from patterns identified from literature, this section starts with full listing of all factors extracted from literature review to then further classify them into main/sub factors after identified lifecycle phases recognized in reviewed literature.

Each of the identified elements/factors/constructs has details, like PMI Program Strategy Alignment includes: Business Case, Charter, and Roadmap; but for the first attempt in developing the proposed BDTF the main elements were categorized without their details. Those provided the outline structure necessary to cross check and further classify similar elements across reviewed frameworks, to finally eliminate repetition and complement gaps in one framework with relevant details from the others.

Digital Transformation is a complex process; hence, its management efforts are continuous throughout time from its conception to closure. Moreover, to manage such complexity, various focus areas are necessary not to overlook fundamental details that are important for its success. Therefore, the method of classification of identified elements from literature employed observed lifecycle phases and dimensions to focus on across the phases of the proposed framework. The proposed BDTF is therefore a two dimensional structure, where the first dimension represents functional elements required at various phases of Digital Transformation lifecycle, which in turn represents the second dimension.

A gap is been observed in IBM Cloud Adoption Framework, where no clear definition of lifecycle phases is identified and the focus merely is on dimensions of activities to take place.

This gap is argued in this study to pose a challenge on Blockchain programs management due to the missing structure to streamline processes. On the other hand, the Program Closure, although a fundamental phase in Project Management literature, is not being of focus in reviewed Digital Transformation Frameworks. Both BUILD and IBM Cloud Adoption Framework promotes DT programs to be part of the ongoing Business development of the enterprise that once started should never be perceived as over. It becomes the vehicle, which helps the organization constantly adopt to change with Agility to retain competitive advantage on the evolving market demands empowered by new technology.

The proposed BDTF addresses the above two observations, as presented in the five phases lifecycle proposed in this study as part of the framework for the management Blockchain Digital Transformation programs (BDTP).

The extracted constructs from all three sections of literature review evidences and their common arguments and focus that directly support the BDTF are summarised and proposed in the next section. Where the next section summarizes those constructs and outline the proposed BDTF based on them.

The main focus of BDTF, according to IBM, are: thinking and envisioning the Digital Transformation, balance the transformation, and thrive on new foundations and it concerns those who act as catalysts for Digital Transformation and leaders who invests in technology to transform their organizations. The proposed BDTF is intending to bridge the business and technology together through holistic and pragmatic establishment of strategies that can enable

considered, consistent, and successful implementation within the complex Gov organizational constructs.

BDTF will help guiding the decision on how prioritizing Digital Transformation journey, what important dimensions to consider, and how to make integrated decisions that significantly improve the chances of success while reducing risk, while also allowing for replication of Digital Transformation success and extending its impact.

UAE Gov organizational drivers requires change and organizational transformation beyond just adoption of technology considering the very complex Gov organizational constructs, which requires a holistic approach. This approach needs to take into account the requirement to make progress and show success in the short term through quick wins, while also focusing on the long-term goals.

Because of this organizational complexity, success criteria must be defined early in the process and refined as needed to shape the way to achieve quick wins along the way. Quick wins are powerful ways to secure and retain sponsorship. Companies' gain more success over the long term when they build effective, enduring cloud transformation programs that can aligned with strategic intent and business drivers. The recommended BDTP encourages tracking this alignment and adjust as necessary to achieve strategic outcomes.

Towards the end of the proposed BDTP lifecycle, it is good time to revisit the strategic intent to identify more strategic opportunities, which are taking the Digital Transformation effort back to the first and/or second step of the transformation journey.

Table 2 Proposed BDTP Lifecycle Phases and Enablers

Phase	Description	Enablers
<u>Conception</u>	<p>Program Formulation, and Program Preparation.</p> <p>Refocusing the organization on why it exists, rather than merely support how it provides its products or services.</p> <p>Identifying and addressing the internal and external gaps.</p> <p>Determining the required magnitude and speed of DT program, captured in and guided by a Shared Vision.</p> <p>Define Business strategic intent, Technical Evaluation, Organization's change effects.</p>	<p>Customer engagement external gap analysis</p> <p>Customers insights external gap analysis</p> <p>Technology external gap analysis</p> <p>Competition external gap analysis</p> <p>Leadership internal gap Analysis</p> <p>Organization structure internal gap Analysis</p> <p>Blockchain-based Digital Transformation vision development</p> <p>Blockchain-based Digital Transformation objectives prioritization</p> <p>Blockchain-based Digital Transformation program roadmap</p> <p>Leadership buy-in</p> <p>Leadership structure: Sponsors, Champions, and Change agents</p>
<u>Planning</u>	<p>Developing the best routes to DT are proposed by Herbert to</p>	<p>Identify Program Projects</p>

	<p>be based on status quo analysis of internal and external barriers that generally hinders the business adaptability to change, and to Digitally Transform in specific. Barriers, related to: people, processes, platforms, and partnerships; through challenging their underlying logic leading to discoveries and prioritization of required fixes. Identified barriers become the way to realize DT vision.</p> <p>Identification of strategic opportunities, and Ideation and prioritization.</p>	<p>Abstract planning</p> <p>Develop MVPs</p> <p>Evaluate</p> <p>Review BDT program projects and roadmap based on lessons learned from MVPs.</p> <p>2.a- Identify and priorities barriers in people:</p> <p>. How people become barriers: missing the innovation mindset, operating with false logic, poor accountability</p> <p>. Traits to score people: open, adaptable, accountable.</p> <p>2.b- Identify and priorities barriers in processes:</p> <p>1. Barriers symptoms are: Too much consultation, Lack of automation, Too much internal competition.</p> <p>2. Traits to score processes: best practice, measurability, value.</p>
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		<p>2.c- Identify and priorities barriers in platforms:</p> <p>1. How platforms become a barrier: incompatibility with people or other systems, slow to build on and slow to work, overly complicated and under-delivering, restricted in scope and scale.</p> <p>2. Traits to score platforms (determining the FACE value): fast, accessible, clever, and extendible.</p> <p>2.d- Identify and priorities barriers in partnerships:</p> <p>1. How partnerships become barriers: too many partners with no clear oversight, pitting partners against each other, focusing on deliverables instead of outcomes.</p> <p>2. Traits to score partnerships: flexible, transparent, and open.</p>
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		<p>3 – Identify routes to transformation by combining prioritized objectives in shared vision with the barriers that needs mitigation.</p> <p>4 – Establish enhancement of customer experience as the primary route to transformation.</p> <p>5 – Formation of cross-functional team.</p>
<u>PoCs</u>	<p>Component Planning and Authorization, Component Oversight and Integration, and Component Transition and Closure. The right way to manage DT projects that doesn't demand too much upfront clarity to satisfy traditional management techniques, while provides reasonable methodology that avoids embarking on projects that are not clearly aligned to</p>	<p>use relevant cross-functional teams, iterate in short cycles to produce MVPs (replacing the plan, build, test, and launch traditional project lifecycle, with, build, test, learn, improve), test with real users, improve as you go to discover what to scale.</p> <p><u>Tips for success in Iterate: (extract enablers from them)</u></p> <p>If the organization is concerned about damage to its brand by showing customers 'unfinished' or experimental work, early testing and customer engagement can be</p>

	<p>organizational strategy.</p> <p>Producing measurable results that enables improved decision making quality, through short cycles to develop MVPs, by cross-functional teams, which are tested with real users to only scale the right innovations. And Innovation labs, hubs, accelerators, internal start-ups and external joint ventures are all possible environments for Iterate to flourish. Piloting, and Scale validated innovations.</p>	<p>done under different brand names or by third parties until ideas are proven successful.</p> <p>When getting started, providing teams with an environment away from their usual space can help encourage innovative thinking and reinforce the organization's commitment to the digital transformation program.</p> <p>Be ready to amend the shared vision and the routes to transformation as you go – they are intended to be living constructs that will be informed throughout the program by the innovation and progress you're about to start making.</p> <p><u>Enabling structure:</u></p> <p>Innovation labs, hubs, and accelerators can be used to when: current organization culture and/or available skills do not allow for the formation of cross-functional teams; digital engagement and technology is far from the core business.</p>
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		<p>Internal start-ups and external joint ventures are bolder structures that launches innovation teams as separate entities. Internal start-ups use seed fund and gets treated as separate business inside the organization, with freedom to create its own platforms, processes, and partnerships away from the parent organization barriers to transformation. They help prove the business case for major investments while provide greater job security to the innovation team. While, on the other hand, external joint ventures are useful to partner with another business to quickly respond to a major direct threat or massive opportunity. The downside of such separate entities is that they are harder to transition into sustainable, company-wide transformation compared to labs, hubs, and accelerators.</p> <p>Maximizing number of projects to only scale those that demonstrate real business results.</p>
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		<p>Keep projects on short cycles.</p> <p>Define what success look like and stick to it.</p> <p>Test with real customers</p> <p>Establishing minimum success criteria.</p> <ol style="list-style-type: none"> 1. Gathering and vetting ideas. 2. Building testable prototypes. 3. Creating and running tests with customers. 4. Interpreting test results and applying changes. 5. Running Alpha and Beta stage testing. 6. Gathering and prioritizing ideas for enhancements along the way. <p>Read page 150 comparison among traditional vs iterative projects.</p> <ol style="list-style-type: none"> 1. Executive sponsor for each iterative project in the program.
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		<p>2. Project team understand and agree with the goals and minimum success criteria.</p> <p>3. Agreed format and timescales for project reviews and decision making.</p> <p>4. Team members properly equipped to fulfil their roles.</p> <p>5. Employ Agile and Design Thinking methodologies.</p>
<p><u>BDTP Products</u></p> <p><u>Implementation</u></p>	<p>Capitalising on DT projects successes to gain support to scale. Defining (measure) strategic outcomes, Capitalize on proven successes, and Enhance with feedback.</p>	<p>Capitalising on DT projects successes to gain support to scale.</p> <p>Project results as leverage, by presenting them in a way that builds all employees pride in the organization, not only the DT team.</p> <p>Team achievements as leverage, by getting better at dealing with change itself, in more efficient and productive that lead to higher job satisfaction.</p>

		<p>Project results and team achievements can be used to remove the following blockers:</p> <ol style="list-style-type: none"> 1. People with vested interests in preserving old ways 2. Unmitigable barriers 3. Risks from major change ... to help people accept new ways of work or new structures by exemplary achievements of projects and DT teams. <p>Process for internal leverage:</p> <ul style="list-style-type: none"> -Set goals, audience, responses measurement criteria. -Map goals to how audience to be engaged -Assign ownership and resources to make it happen -Use an iterative approach to test different methods
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		<p>-Grow projects that work and learn why others failed</p> <p>Methods for internal leverage: Official recognition, presentations, Shareable assets, Events, Collaboration spaces</p> <p>Process for external leverage:</p> <p>-The goals and their audiences are more straightforward</p> <p>-Be prepared to anticipate and prevent internal backlash</p> <p>-Be prepared to counteract added competition and customer scrutiny</p> <p>Methods for external leverage: events, articles and interviews, digital assets, HR and company promotional assets</p>
<u>BDTP Growth</u>	<p>This phase do the needful analysis to loop back to the Conception Phase periodically.</p> <p>Provides guidelines to spread</p>	<p>Provides guidelines to spread innovations in a way that Herbert describes as “sustainable adaptability” to ongoing changes. Empower staff to keep operations relevant by changing</p>

	<p>innovations in a way that Herbert describes as “sustainable adaptability” to ongoing changes. Empower staff to keep operations relevant by changing to bottom-up management. And enable the organization to properly react to major changes by provisioning for proper: infrastructure, partnerships, and talent. Benefits Sustainment.</p>	<p>to bottom-up management. And enable the organization to properly react to major changes by provisioning for proper: infrastructure, partnerships, and talent.</p> <p>Process to disseminate transformation:</p> <ul style="list-style-type: none"> -dissemination through iteration -disseminate can’t be done remotely: disseminate the iterative approach, scale the cross-functional team model, and invest in platforms, partnerships, people, and processes. -instil for sustainable transformation: universal goals that incentivize cooperation and competition, enable agility through relevant information and real-time feedback, and enable self-governing behaviour through simple processes and specialist skills. <p>Process to scale innovation:</p>
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		<p>-establish goals and rewards for innovation:</p> <p>Mission lead, customer focused, and contextually appropriate.</p> <p>-prove your support for innovation by providing clear and effective way to access required: equipment, developers and designers, training on Agile and Design Thinking, customers for customer testing, external specialists and companies.</p> <p>Individual recognition and accountability:</p> <p>1.tracking individual contributions</p> <p>2.reward hard work</p> <p>Scale the iterative team model:</p> <p>-the ultimate goals: no more silos by creating flexible systems to scale: common technology, adaptable processes, reusable assets, open communities.</p> <p>-core principles to guide iterative teams practice within the flexible systems: legal</p>
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		<p>and security, values and culture, and identity and brand.</p> <p>-flexible systems are more than just technology</p> <p>-specialists and team members must play a big role in establishing systems</p> <p>-don't try to plan too far n advance</p> <p>-flexible comes from modular, open frameworks</p> <p>-consistency comes from standardization</p> <p>Investing in growth: platforms, partnerships, people, and processes</p>
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RESEARCH QUESTIONS:

This study is an attempt to answer the following questions:

RQ1: what are the phases necessary to successfully manage BDTP at UAE Gov organizations?

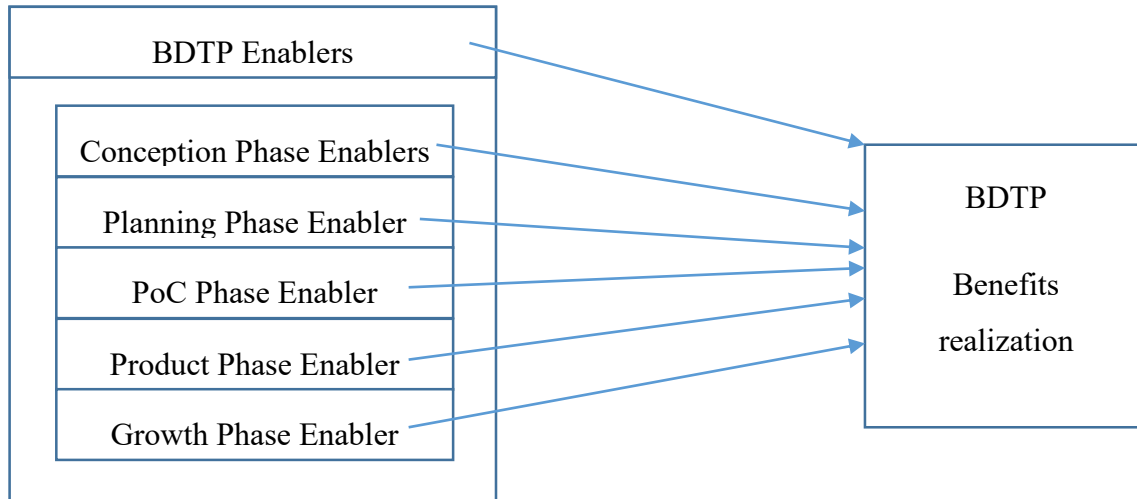
RQ2: what are the enablers recommended for each phase of BDTP at UAE Gov organizations?

RQ3: what are the associations among enablers and the benefits from every phase in the UAE Gov organizations BDTP?

CONCEPTUAL FRAMEWORK

Premised in the literature review outcomes (Creswell & Creswell, 2018), the conceptual framework developed for the purpose of guiding the study work (ref ... Figure). The ultimate goal of this research is to make recommendations for UAE public sector organization to help them successfully manage Blockchain based Digital Transformation Programs (BDTP) for their stakeholders to realize targeted benefits. The constructed conceptual model is an abstract of the study hypothesis and the research approach:

Figure 10 Conceptual Framework



1. BDTP Benefits Realization: Conception Phase, Planning Phase, PoC Phase, Product Phase, and Growth Phase.
2. BDTP Enablers: Conception Phase Enablers, Planning Phase Enablers, PoC Phase Enablers, Product Phase Enablers, and Growth Phase Enablers. (to do ... add details or reference the Table of Factors)

HYPOTHESIS

1. Independent (i.e. Predictor): BDTP Enablers
 1. Conception Phase Enablers
 2. Planning Phase Enablers
 3. PoC Phase Enablers
 4. Product Phase Enablers
 5. Growth Phase Enablers

2. Dependent: BDTP Benefits Realization

Following is the list for this study hypotheses statements:

H1: The BDTP Enablers will be related to the BDTP Benefits realization.

H2: The BDTP Conception Phase Enablers will be related to the BDTP Benefits realization.

H3: The BDTP Planning Phase Enablers will be related to the BDTP Benefits realization.

H4: The BDTP PoC Phase Enablers will be related to the BDTP Benefits realization.

H5: The BDTP Product Phase Enablers will be related to the BDTP Benefits realization.

H6: The BDTP Growth Phase Enablers will be related to the BDTP Benefits realization.

METHODOLOGY AND DISCUSSION

The selection of research methods to investigate enablers of BDTP benefits realization in UAE public sector was based on ontology and epistemology observed in literature review philosophical considerations. Creswell (Creswell & Creswell, 2018) and many other research methodologists emphasize the need for ontological consideration of the investigated phenomena to selected the best fit for purpose research methods. Moreover, the epistemological stance evident from relevant literature also guides the decision on methods to put in use while investigating certain phenomena (Creswell & Creswell, 2018).

Mixed sequential methodology is employed in this research, started with qualitative approach extracting relevant patterns through review literature. BDTP Benefits Realization with five

successful program lifecycle phases, and possible enablers to boost chances of success at each of those phases got identified. Followed by quantitative phase that entailed data collection from UAE public sector Strategy and ICT employees based on factors identified from literature. The significance of those factors got assessed in enabling success in realizing Benefits of BDTP in UAE public sector organizations.

It was assumed that opinions collected from participants using the study questionnaire reflect reliable experiences with the management of digital transformation programs in general, and blockchain based in specific. The sample got selected from employees working for the UAE public sector organizations, particularly the Strategy and ICT functions. It is therefore, representing statistical outcome based on data gathered from real digital transformation experiences in the UAE public sector organizations.

QUESTIONNAIRE DESIGN

As per research methods traditions, the questionnaire template got designed based on the research questions and the Conceptual Framework discussed earlier. The questionnaire, as a result, included factors validated through literature review (Creswell & Creswell, 2018), and hence divided into 8 sections: Introduction, Demographics, BDTP Lifecycle Five Phases, BDTP Conception Phase Enablers, BDTP Planning Phase Enablers, BDTP PoCs Development Phase Enablers, BDTP Products Development Phase Enablers, and BDTP Program Growth Phase Enablers. The questionnaire got loaded electronically using Office 365 Forms, with QR Codes and links utilized for its distribution by emails to 92 candidates, out of which 34 responded within the timeframe from 21st Oct to 18th Dec 2019. Following is description of the research instrument sections:

Section 1: introduction and background for participants on the study goals.

Section 2: 4 questions tapping into participants' demographics.

Section 3: 5 questions measuring the dependent variable, BDTP Benefits Realization; via Likert scale (1 to 7) where 1 for "very unlikely", 2 for "unlikely", 3 for "slightly unlikely", 4 for "I don't know", 5 for "slightly likely", 6 for "likely", and 7 for "very likely"; to measure the participants ranking of the required BDTP successful phases to realize its sought after Benefits.

Sections 4: 9 question measuring the Independent variable, BDTP Conception Phase Enablers required to deliver a successful BDTP Conception Phase; via Likert scale (1 to 7) where 1 for "very unlikely", 2 for "unlikely", 3 for "slightly unlikely", 4 for "I don't know", 5 for "slightly likely", 6 for "likely", and 7 for "very likely"; to measure the participants ranking of the required BDTP successful phases to realize its sought after Benefits.

Sections 5: 14 question measuring the Independent variable, BDTP Planning Phase Enablers required to deliver a successful BDTP Planning Phase; via Likert scale (1 to 7) where 1 for "very unlikely", 2 for "unlikely", 3 for "slightly unlikely", 4 for "I don't know", 5 for "slightly likely", 6 for "likely", and 7 for "very likely"; to measure the participants ranking of the required BDTP successful phases to realize its sought after Benefits.

Sections 6: 17 question measuring the Independent variable, BDTP PoC Phase Enablers required to deliver a successful BDTP PoC Phase; via Likert scale (1 to 7) where 1 for "very unlikely", 2 for "unlikely", 3 for "slightly unlikely", 4 for "I don't know", 5 for "slightly likely", 6 for "likely",

and 7 for “very likely”; to measure the participants ranking of the required BDTP successful phases to realize its sought after Benefits.

Sections 7: 14 question measuring the Independent variable, BDTP Product Phase Enablers required to deliver a successful BDTP Product Phase; via Likert scale (1 to 7) where 1 for “very unlikely”, 2 for “unlikely”, 3 for “slightly unlikely”, 4 for “I don’t know”, 5 for “slightly likely”, 6 for “likely”, and 7 for “very likely”; to measure the participants ranking of the required BDTP successful phases to realize its sought after Benefits.

Sections 8: 20 question measuring the Independent variable, BDTP Growth Phase Enablers required to deliver a successful BDTP Growth Phase; via Likert scale (1 to 7) where 1 for “very unlikely”, 2 for “unlikely”, 3 for “slightly unlikely”, 4 for “I don’t know”, 5 for “slightly likely”, 6 for “likely”, and 7 for “very likely”; to measure the participants ranking of the required BDTP successful phases to realize its sought after Benefits.

The demographic statistics of the questionnaire showed that majority of participants, 68% have more than 15 years of experience, and 15% have 11 – 15 years of experience. 97% are UAE Public Sector employees, while 3% work for semi-government enterprises. Moreover, 53% assuming roles in ICT functions and 21% in Strategy.

The analysis of correlation among demographic information and core sections of the administered questionnaire was not part of the study objectives. Therefore, the impact of the above highlighted demographics is outside the scope of this study, hence, SPSS Crosstab descriptive analysis was not utilized to analyse the relationship among these demographics and the variables under investigation (Field, 2013).

CREATING FACTORS

The Conceptual Model of this study is composed of the following variables, for which corresponding Factors were created for them, and their constituting constructs, in SPSS to facilitate analysing their nature using the collected data from the study participants (Field, 2013):

1. Independent (i.e. Predictor) BDTP Enablers Variable, including: Conception Phase Enablers Variable, Planning Phase Enablers Variable, PoC Phase Enablers Variable, Product Phase Enablers Variable, and Growth Phase Enablers Variable.
2. Dependent BDTP Benefits Realization Variable, including: Conception Phase Variable, Planning Phase Variable, PoC Phase Variable, Product Phase Variable, and Growth Phase Variable.

ANALYSIS AND DISCUSSION

Descriptive Statistics

SPSS Descriptive Statistics Analysis used to observe the collected data for the variables under study, for their: central tendency, dispersion, and general closeness to normality (Field, 2013).

Figure 11 Descriptive Statistics 1

It was challenging to exceed the minimum 32 responses (add reference) by two responses for this study from targeted sample of UAE Gov Entity employees assuming various roles in ICT and Strategy functions. The histogram in Figure (add number) depicts the independent variables general tendency to cluster towards the centre, where the dependent variables were right skewed.

Figure 12 Descriptive Statistics2

Internal Consistency and Reliability Test (CRONBACH ALPHA)

Reliability is the degree to which an assessment tool produces stable and consistent results (Cresswell and Cresswell reference). In other words, to validate that the questionnaire is psychometrically sound, Cronbach's Alpha index greater than 0.70 give the confidence that items in the instrument are tapping to the same underlying construct. Therefore, and to maintain the rigor of this study in producing reliable outcomes, reliability test got conducted and measured the internal consistency of the research instrument for all factors created in the previous section in this text. Homogeneity got measured with Cronbach's Alpha SPSS tool and confirmed how close the instrument's items stand as a group (Field add reference).

Comparing results of this test to the agreeable minimum score of 0.70, it is evident that all factors are above 0.70. No items were deleted to improve Cronbach's Alpha index.

All factors		
Reliability Statistics		
Cronbach's		
Alpha		N of Items
.975		79
Benefits	Conception Enablers	Planning Enablers

Reliability Statistics Cronbach's Alpha <hr/> .961	N of Items <hr/> 5	Reliability Statistics Cronbach's Alpha <hr/> .848	N of Items <hr/> 9	Reliability Statistics Cronbach's Alpha <hr/> .926	N of Items <hr/> 14
PoC Enablers		Product Enablers		Growth Enablers	
Reliability Statistics Cronbach's Alpha <hr/> .883	N of Items <hr/> 17	Reliability Statistics Cronbach's Alpha <hr/> .935	N of Items <hr/> 14	Reliability Statistics Cronbach's Alpha <hr/> .959	N of Items <hr/> 20

Figure 13 Cronbach's Alpha

Correlation Analysis

This study is an attempt to understanding the relationships among its stated variables. Person's Correlation Coefficient helped in analysing the existence of such relationships and their nature (Creswell & Creswell, 2018). The test got conducted on SPSS to analyse the relationship between variables indicated by hypotheses, H1, H2, H3, H4, H5 and H6. Those are the relationships among BDTP Enablers in general, and the realization of anticipated Benefits by stakeholders (i.e. H1). As well as, the relationship among the specific BDTP Phase Enablers and the realization of anticipated Benefits by stakeholders, those are H2, H3, H4, H5 and H6.

H1: The BDTP Enablers will be related to the BDTP Benefits realization.

H2: The BDTP Conception Phase Enablers will be related to the BDTP Benefits realization.

H3: The BDTP Planning Phase Enablers will be related to the BDTP Benefits realization.

H4: The BDTP PoC Phase Enablers will be related to the BDTP Benefits realization.

H5: The BDTP Product Phase Enablers will be related to the BDTP Benefits realization.

H6: The BDTP Growth Phase Enablers will be related to the BDTP Benefits realization.

Table 3 Person's Correlation Coefficient test

		Correlations						
		BDTP Enabler s	Conceptio n Enablers	Plannin g Enabler s	PoC Enabler s	Product Enabler s	Growth Enabler s	BDTP Benefits Realizatio n
BDTP Enablers	Pearson	1	.707**	.825**	.824**	.920**	.921**	.445**
	Correlatio n							
	Sig. (2- tailed)		.000	.000	.000	.000	.000	.008
N		34	34	34	34	34	34	34

Conceptio n Enablers	Pearson	.707**	1	.815**	.453**	.528**	.499**	.762**
	Correlatio n							
	Sig. (2- tailed)	.000		.000	.007	.001	.003	.000
	N	34	34	34	34	34	34	34
Planning Enablers	Pearson	.825**	.815**	1	.587**	.639**	.619**	.634**
	Correlatio n							
	Sig. (2- tailed)	.000	.000		.000	.000	.000	.000
	N	34	34	34	34	34	34	34
PoC Enablers	Pearson	.824**	.453**	.587**	1	.684**	.680**	.224
	Correlatio n							
	Sig. (2- tailed)	.000	.007	.000		.000	.000	.202
	N	34	34	34	34	34	34	34
Product Enablers	Pearson	.920**	.528**	.639**	.684**	1	.918**	.302
	Correlatio n							

	Sig. (2-tailed)	.000	.001	.000	.000		.000	.083
	N	34	34	34	34	34	34	34
Growth Enablers	Pearson	.921**	.499**	.619**	.680**	.918**	1	.253
	Correlation							
	Sig. (2-tailed)	.000	.003	.000	.000	.000		.148
	N	34	34	34	34	34	34	34
BDTP Benefits Realization	Pearson	.445**	.762**	.634**	.224	.302	.253	1
	Correlation							
	Sig. (2-tailed)	.008	.000	.000	.202	.083	.148	
	N	34	34	34	34	34	34	34

**. Correlation is significant at the 0.01 level (2-tailed).

Person's Correlation Coefficient test results that revealed a significant correlation among H1 two variables, which proves that BDTP Enablers significantly contribute to the realization of BDTP Benefits. Moreover, as hypothesized in H2, H3, H4, H5 and H6 a positive correlation observed among proposed program management activities in all five phases with the realization of BDTP Benefits. It was interesting to know that proposed program management activities to take place

in the BDTP Conception and Planning Phases in particular are significantly correlated with the realization of BDTP Benefits, which supports H2 and H3 hypotheses.

REGRESSION

Regression Analysis got performed to further understand the impact of various BDTP Enablers on the realization of BDTP Benefits, and as a result on the UAE Gov digital transformation strategy at large. Standard multiple Regression analysis got employed to identify the strongest predictor among the six in explaining the realization of BDTP Benefits than the others.

Table 4 Descriptive Statistics

	Mean	Std. Deviation	N
BDTPBenefitsRealization	31.7059	5.20215	34
BDTPEnablers	452.8235	43.21719	34
ConceptionEnablers	56.5588	5.30404	34
PlanningEnablers	86.0294	9.50434	34
PoCEnablers	103.0294	10.75198	34
ProductEnablers	85.5000	9.81418	34

Table 5 Correlations

		BDTP Benefits Realization n	BDTP Enablers s	Conceptio n Enablers	Plannin g Enabler s	PoC Enabler s	Product Enabler s	Growth Enabler s
Pearson Correlatio n	BDTP	1.000	.445	.762	.634	.224	.302	.253
	Benefits Realization n							
	BDTP Enablers	.445	1.000	.707	.825	.824	.920	.921
	Conceptio n Enablers	.762	.707	1.000	.815	.453	.528	.499
	Planning Enablers	.634	.825	.815	1.000	.587	.639	.619
	PoC Enablers	.224	.824	.453	.587	1.000	.684	.680
	Product Enablers	.302	.920	.528	.639	.684	1.000	.918
	Growth Enablers	.253	.921	.499	.619	.680	.918	1.000

Sig. (1-tailed)	BDTP Benefits Realization	.	.004	.000	.000	.101	.042	.074
	BDTP Enablers	.004	.	.000	.000	.000	.000	.000
	Conception Enablers	.000	.000	.	.000	.004	.001	.001
	Planning Enablers	.000	.000	.000	.	.000	.000	.000
	PoC Enablers	.101	.000	.004	.000	.	.000	.000
	Product Enablers	.042	.000	.001	.000	.000	.	.000
	Growth Enablers	.074	.000	.001	.000	.000	.000	.

Table 6 Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	GrowthEnablers, ConceptionEnablers, PoCEnablers, PlanningEnablers, ProductEnablers ^b	.	Enter

a. Dependent Variable: BDTPBenefitsRealization

b. Tolerance = .000 limit reached.

Table 7 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.786 ^a	.619	.550	3.48825	.619	9.079	5	28	.000

a. Predictors: (Constant), GrowthEnablers, ConceptionEnablers, PoCEnablers, PlanningEnablers, ProductEnablers

b. Dependent Variable: BDTPBenefitsRealization

Table 8 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	552.358	5	110.472	9.079	.000 ^b
	Residual	340.701	28	12.168		
	Total	893.059	33			

a. Dependent Variable: BDTPBenefitsRealization

b. Predictors: (Constant), GrowthEnablers, ConceptionEnablers, PoCEnablers, PlanningEnablers, ProductEnablers

Table 9 Coefficients

Model	Unstandardize		Standardize	t	Sig.	95.0%		Collinearity		
	d Coefficients		d			Confidence		Statistics		
	B	Std. Error	Coefficients			Interval for B		Toleranc	e	VIF
						Lower Bound	Upper Bound			
1 (Constant)	-5.783	7.377		-.784	.440	-20.895	9.329			
ConceptionEnablers	.702	.198	.716	3.536	.001	.295	1.108	.333	3.006	
PlanningEnablers	.116	.126	.212	.925	.363	-.141	.374	.259	3.866	
PoCEnablers	-.062	.081	-.128	-.762	.453	-.229	.105	.480	2.082	
ProductEnablers	.040	.163	.076	.248	.806	-.293	.374	.144	6.921	

GrowthEnablers	-.076	.105	-.218	-.725	.475	-.291	.139	.150	6.646
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a. Dependent Variable: BDTPBenefitsRealization

Table 10 Excluded Variables

Model	Beta	t	Sig.	Partial Correlation	Collinearity Statistics		
					Tolerance	VIF	Minimum Tolerance
1 BDTPEnablers	. ^b000	.	.000

a. Dependent Variable: BDTPBenefitsRealization

b. Predictors in the Model: (Constant), GrowthEnablers, ConceptionEnablers, PoCEnablers, PlanningEnablers, ProductEnablers

Table 11 Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	(Constant)	Variance Proportions				
					Conception Enablers	Planning Enablers	PoC Enablers	Product Enablers	Growth Enablers
1	1	5.977	1.000	.00	.00	.00	.00	.00	.00
	2	.010	24.311	.16	.05	.01	.01	.04	.07

3	.006	30.51	.43	.06	.16	.08	.00	.00
		3						
4	.004	38.10	.17	.01	.02	.85	.03	.04
		1						
5	.002	61.13	.23	.87	.81	.06	.00	.00
		1						
6	.001	74.28	.00	.01	.00	.00	.93	.89
		4						

a. Dependent Variable: BDTPBenefitsRealization



Table 12 Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	16.0971	37.7220	31.7059	4.09122	34
Residual	-11.09705	8.70175	.00000	3.21314	34
Std. Predicted Value	-3.815	1.471	.000	1.000	34
Std. Residual	-3.181	2.495	.000	.921	34

a. Dependent Variable: BDTPBenefitsRealization

Figure 14 Histogram Dependent Variable

Figure 15 P-Plot

It was important to rule out multi-collinearity among any of the six predictors to establish the accuracy of this Regression model in predicting BDTP Benefits Realization. Therefore, the values of Pearson Correlation Coefficients for the relationships among the six predictors, as reported in, were examined and the following observations were made. The strength of the correlation of the first predictors that combines all proposed BDTP Enablers on the realization of BDTP Benefits (i.e. H1) got examined and compared to the suggested acceptable minimum threshold of 0.30 by (Creswell & Creswell 2018; Field 2014). This global predictor's Pearson Correlation Coefficients passed the validation criteria, scoring as BDTP Enablers = 0.445, which is greater than the 0.30 suggested acceptable minimum threshold. Moreover, the three predictors

corresponding to H2, H3 and H5 also have Pearson Correlation Coefficients above the suggested acceptable minimum threshold of 0.30, scoring as ConceptionEnablers = 0.762, PlanningEnablers = 0.634 and ProductEnablers = 0.302. On the other hand, two of the remaining five predictors' Pearson Correlation Coefficients went below the suggested acceptable minimum threshold of 0.30, scoring as PoCEnablers = 0.224 and GrowthEnablers = 0.253.

*Table 13*Significance

Correlations		BDTP Benefits Realization
Pearson Correlation	BDTPBenefitsRealization	1.000
	BDTPEnablers	.445
	ConceptionEnablers	.762
	PlanningEnablers	.634
	PoCEnablers	.224
	ProductEnablers	.302
	GrowthEnablers	.253
Sig. (1-tailed)	BDTPBenefitsRealization	.
	BDTPEnablers	.004
	ConceptionEnablers	.000
	PlanningEnablers	.000
	PoCEnablers	.101
	ProductEnablers	.042

GrowthEnablers	.074
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The ConceptionEnablers predictor was the only one that exceeded the maximum threshold of 0.70, (Creswell & Creswell 2018; Field 2014), and scored 0.762. Therefore, there was no need of extra validation of Collinearity to rule out that chances for more than one predictor predicting the same outcome. It was necessary though to examine the developed Regression Model for Normality before assuming its ability to accurately predict realization of BDTP Benefits (Creswell & Creswell 2018; Field 2014). For this purpose Normal P-Plot of Regression Standard Residual was examined and no major deviations were observed for normality of distance from the line of best fit. Moreover, Regression Scatterplot also supported this validation of normality, where roughly an overall triangular distribution was observed across the five plots of predictors, with no major deviation from the triangular centre. Having said that, Casewise Diagnostics listed one case (i.e. Case number 18) above the minimum threshold of Standard Residual of 3, which indicated a discrepancy in case 18 predicted realization of BDTP Benefit of 16, compared to the participant's score of 5.

Table 14 Casewise Diagnostics

Case Number	Std. Residual	BDTPBenefit sRealization	Predicted Value	Residual
18	-3.181	5.00	16.0971	-11.09705

a. Dependent Variable: BDTPBenefitsRealization

Table 15 Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	16.0971	37.7220	31.7059	4.09122	34
Residual	-11.09705	8.70175	.00000	3.21314	34
Std. Predicted Value	-3.815	1.471	.000	1.000	34
Std. Residual	-3.181	2.495	.000	.921	34

a. Dependent Variable: BDTPBenefitsRealization

Based on the above observations, it was confirmed that the Developed Regression Model is reliable in predicting BDTP Benefits realization outcomes and therefore evaluation of its specific values commenced. The R² of 0.619 indicates the model ability to explain around 62% of BDTP Benefits realization. However, the adjusted R² gives more realistic value of 55%, given the relatively small sample size. Having said that, the sample size was considered reasonable for meeting the 15 participants per predictor entering the Regression model. Additionally, the assessment of the statistical significance of the reported R² revealed p-value less than 0.05, **Error! Reference source not found.** of Appendix B, which indicates 55% to 62% model ability to predict outcome beyond chance.

Finally, each predictor in the model got evaluated to identify which contributed most to the prediction of the outcome. ConceptionEnablers scored highest a value of 0.716 and therefore makes the strongest contribution to explaining the outcome in this Regression model, where the variance is explained by all the other predictors (Field 2014). ConceptionEnablers contribution to explaining the outcome is also found statistically significant at sig. value of 0.001, which is less than 0.05 given the configured confidence level for this study's Regression model. Therefore, in this case ConceptionEnablers makes unique statistically significant contribution to explaining the outcome realization of BDTP Benefits. Moreover, the developed Regression model helped to explain how well BDTP Enablers can predict the BDTP Benefits realization in specific, and the resultant positive effect on UAE Gov digital transformation at large.

CONCLUSION AND RECOMMENDATIONS

Blockchain technology is still in the process of roll out stage worldwide, however, due to its sweeping disruption of conventional establishment of trust in value-baring transactions created huge demands in markets. UAE government decided to take the lead in adopting this very promising technology, by setting a strategic goal to move 50% of government transactions to become fully paperless and Blockchain enabled by 2021. The speed of digital change mandated by UAE Gov require its entities to be more cohesive and manoeuvrable than ever before breaking all the norms of slow pace public sector.

This study attempted to focus on a gap found in literature regarding enablers to consider while managing Blockchain based Digital Transformation Programs (BDTP) in the UAE Gov organizations. The ultimate objective was to propose a program management lifecycle of phases packed with value added activities that pulls all enabling threads together into one cohesive

whole to guide the management experience of such programs. Accordingly increase chances of key BDTP Benefits realization for the best interest of the UAE Gov organizations and UAE economy at large. As a result of this research findings, a five phases program management lifecycle is recommended for UAE Gov BDTP, with enabling factors established from literature distributed logically across the lifecycle; those phases are: Conception, Planning, PoC, Product, and Growth (add a figure if possible).

The Conception Phase of BDTP lifecycle is where the program gets formulated and prepared in a way that refocuses the organization on its purpose prior consider how to aid what and how it provides its products and/or services to its customers. This can be enabled by identifying and addressing the internal and external gaps, in terms of: customer engagement, customers insights, technology gaps, competition, leadership, and organization structure gap Analysis. Another proposed enabler at this very first phase in the BDTP lifecycle is the development of a vision for the program that determines the magnitude and speed required. Moreover, the program objectives need to be defined and prioritized and depicted in easy to reference digital transformation roadmap. Most importantly, the enabling power of leadership buy-in and the structure of sponsors, champions, and change agents that they put in place and empower to make the change.

Planning is the second proposed phase in the recommended BDTP lifecycle, where program's constituent subprograms and projects are defined based on status quo analysis of internal and external barriers that generally hinders the Gov entity's adaptability to change, and to Digitally Transform in specific. Those could be related to people, processes, platforms, and partnerships issues that challenging their underlying logic can lead to the discovery of the required solutions

to address them and accordingly to realize the BDTP vision. Starting with people barriers where they miss the innovation mindset, operate with false logic, and/or exhibit poor accountability. On the other hand, processes barriers can be unleashed by examining areas where frequent consultation is observed, encourage internal competition, and/or lack the basic benefits of automation when applicable. Platforms, however, can be subject for enhancements whenever found incompatible with people or other systems, slow to build on and slow to work, overly complicated and under-delivering, and/or restricted in scope and scale. Finally, in the planning phase, partnerships enhancement projects and/or subprograms can be identified in areas where too many partners unnecessarily exist and found pitted against one another, with main focus on deliverables rather than genuine value adding outcomes. Success in this phase can be further enabled by establishing enhancement of customer experience as the main priority for the program investment and efforts, as well as, the establishment of cross-functional teams that can make the transformation happen.

The innovation process kicks in at the third phase of the proposed BDTP lifecycle, namely proof of concepts (PoC) development, which is enabled with the ideation, prioritization, and development of minimum viable products (MVPs) that pilots identified solutions and regularly evaluate their outcomes to review BDTP roadmap based on lessons learned. While PMI (add reference) calls for thorough constituent subprograms and projects planning, authorization, monitoring, integration, transitioning, and closure. The nature and pace of BDTP cannot afford such time consuming approach, hence, the recommended PoC phase doesn't demand too much upfront clarity to satisfy traditional management techniques, while provides reasonable

methodology that avoids embarking on projects that are not clearly aligned to organizational strategy.

MVPs are developed in short cycles and produce rather measurable results when tested with real users enables improved decision making to only scale the right innovations. It is recommended for this phase to be conducted in innovation labs, hubs, accelerators, as well as, internal start-ups or external joint ventures models for the outcomes of this phase to flourish. It is suggested by reviewed literature that such outsourcing approach can protect organizations brand by avoid showing their customers experimental work, and therefore early customer engagement can be done under different brands. Additionally, literature also addresses the positive impact of providing innovation teams with environments away from their routine workplace and the bundled benefit of reinforcement of the organization's commitment to the success of BDTP.

UAE Gov entities specifically can further benefit from investing in outsourcing this phase to academia, particularly the federally funded one, were their future targeted employee-base mainly reside. This will enable the enhancement of the innovation process by crowd sourcing (reference NASA experience) competing solutions for the same identified problem among students. furthermore, if they particularly partner with federally funded higher education institutions (HEI), that are governed by the same UAE Gov Policies, this can lead to new Blockchain Use Cases to be identified by those HEIs, as part of their research effort and as a product of the challenges they naturally encounter to remain compliant with UAE Gov Policies and Regulations. The latter is a shared target across UAE Gov entities, whither educational or not, and makes any successful Blockchain Use Case identified and proved useful by federal HEI subject for wider adoption by all UAE Gov entities.

The fourth phase of the proposed BDTP lifecycle is the Product development phase, which capitalises on PoC successes that gained support to scale. As a result, full product development and deployment for successful PoCs take place leveraging project team success to inspire and motivate all employees in the organization to support the BDTP and overcome change resistance. In cases where PoC was outsourced to academia, students who won the PoC competition are to get paired with professional developers from the sponsoring organization software development team. Or under partnership agreement with software integrator. Either way, this model not only boosts innovation, but also contribute to the organizations corporate social responsibility (CSR) in providing job opportunities to students. Particularly relevant to UAE Gov entities to meet their Emiratization quotas in a meaningful manner. Official recognition, presentations, shareable project assets, events, and collaboration spaces are all methods that can help leverage the success of the BDTP constituent subprogram or project.

Finally, the growth phase of the proposed BDTP is focused on conducting the needful analysis to loop back to the Conception Phase periodically, as BDTP, unlike other types of programs are perpetual in nature. Once they start they do not end and become the organization new way to keep up with constantly changing dynamics of customer demands, employees' needs, competition and technology advancements. In order to sustain BDTP benefits, employees need to be empowered to keep their operations relevant. This requires changes in management style from top-down approach to bottom-up and expected to be top challenge for Gov sector. Therefore, UAE Gov organizations that manage to provide its employees with such empowerment to react to major changes will certainly lead in the UAE digital transformation era. In addition to

empower employees, provisioning for proper: infrastructure, partnerships, and talent will all play important part is realising and sustaining BDTP benefits.

LIMITATIONS AND FURTHER IMPROVEMENTS

This study focused on the opinions of IT and Strategy professionals working for the UAE Federal Government, however, the views of Executive Leadership teams of those organizations is not incorporated. The latter can represent the strategic decision making layer that can dramatically influence the way in which BDTP are managed and which enablers influence their success the most. It is, therefore, considered a limitation that only operational and middle management levels opinions were investigated in this study, which might limit the utility of the research outcomes and recommendations. In addition to the limited responses to the research instrument, which presents a future improvement opportunity in case it is administered among wider population to validate this research findings based on harder data.

On the other hand, too many enablers identified from literature and only two out of the five recommended phases found significantly correlated with BDTP benefits realization. This presents another opportunity for further research to investigate which enablers are those that are not adding significant value to further fine tune the proposed BDTP lifecycle and make it more agile and practical in turning over the targeted benefits.

The analysis of correlation among demographics information and core sections of the administered questionnaire was not part of the study scope and objectives. Moreover, the sample size did not lend itself to accurate observation of such patterns. Consequently, an opportunity missed to unleash important correlations among demographics and the reliability of provided

input. Crosstab SPSS test can be utilized to analyze correlation among demographics information and core sections of the administered questionnaire to better understand the impact of demographics on the quality of provided input.

Additionally, the Regression Model developed from reported data is able to predict 55% to 62% of BDTP benefits realization, which is above the 50% that is considered decent percentage for prediction from single study (Creswell & Creswell, 2018), yet limited in explaining the full picture, especially when keeping the limited responses limitation in mind.

Research effort in the area of UAE Public Sector blockchain digital transformation can benefit largely from conducting a follow up research focused on gauging the opinions of UAE Government digital transformation teams, especially programs and projects managers. Such research can take multiple forms, ranging from quantitative approach using the same research instrument to generate comparable results, to qualitatively investigate the remaining factors that can explain BDTP Benefits realization.

Finally, gap in literature can be filled with research that measure the actual Benefits sustainment from BDTP, particular value can be achieved by employing qualitatively research to get closer to understanding causation relationships among the proposed BDTP lifecycle phases enablers and the realization of its benefits.

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