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► **To cite this version:**

Ashis K. Pani, Himadri Sikhar Pramanik. Digital Transformation of Organizations – Defining an Emergent Construct. International Working Conference on Transfer and Diffusion of IT (TDIT), Dec 2020, Tiruchirappalli, India. pp.511-523, 10.1007/978-3-030-64861-9_45 . hal-03744762

HAL Id: hal-03744762

<https://inria.hal.science/hal-03744762v1>

Submitted on 3 Aug 2022

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Digital Transformation of Organizations – Defining an Emergent Construct

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Abstract. Focus on digital technology led transformation of institutions revolves around multiple areas including customer experience, operational process and business model. It encompasses varied discussions from smart cities to future of work. This research driven conceptual point of view explores the essence of transformation based on evidences across large global institutions. The paper proposes a clear definition of *what is digital transformation?* Digital transformation is viewed as a complex process, under-taken by institutions – manifested through multiple technology and business initiatives, to capitalize differential benefits. Based on descriptions from existing literature, public narratives from institutions, news, discussions with expert technology practitioners, qualified by grounded theoretical understanding of technology-led transformations, the research identifies specific institutional focus areas. The definition highlights a process perspective around digital transformation. Transforming organizations are at transient maturities based on continued focus over a period of time. A clear definition, elaborates on the key components of transformation. This helps form a relatable common understanding of the digital transformation construct.

Keywords: Digital, Transformation, Technology, Strategy, Process, Innovation, Definition.

Introduction

Technology will increasingly become a prime enabler as our world emerges out of the prevailing pandemic crisis. It will determine newer ways of working for individuals and organizations. Paradigms of business, customer connect, conceptualizations of value chain will increasingly depend on technology. Institutions will adopt digital technologies as default to transform and as a strategic imperative for growth.

There has been significant discussion on ‘digital transformation’ already. It is likely to become prime consideration for institutions, as means to be resilient and generate opportunities. Leading global academics are attempting to understand and define digital transformation. While most operate on some common premise related with the construct of digital transformation there is no established definition yet. Existing descriptions cover varied concepts including smart living, future of work, automation,

industry convergence, and technology. These are sometimes fairly all encompassing, inconsistent and incomparable as a point of reference. Interestingly, major consulting firms, technology promoters, independent influencers and analysts have developed digital transformation solutions, each with own models, descriptions and views.

In this paper, we attempt to develop a definition based on relevant descriptions from existing literature and discussions with expert practitioners qualified by a grounded theoretical understanding of the context in which institutions transform through adoption of digital technologies. *The definition also factors in how the essence of digital transformation itself is transient with scope and opportunities available with new technology innovations and transient environment.* Multiple existing definitions as captured in **Table 1** were analyzed to establish a pattern to structure our definition. While there are some similar practices followed in earlier definition conceptualizations in academic literature [1], [2] the definition proposed here presents a process-centric perspective. Moreover, the definition is built factoring academic and practitioner perspective and studying public narratives from large global institutions.

Table 1. Digital Transformation - Comparing Key Relevant and Recent Definitions.

Authors	Definition
Liu.et.al (2011)	“integration of digital technologies into business processes”
Bharadwaj et.al (2013)	“an organizational strategy formulated and executed by leveraging digital resources to create differential value”
Fitzgerald et.al (2013)	“the use of digital technologies to enable major business improvements”
Lucas et.al (2013)	“altering traditional ways of doing business by redefining business capabilities, process and relationships”
Mithas et.al. (2013)	“the extent to which an organization engages in any activity of IT”
Westerman et.al (2014)	“the use of technology to radically improve performance or reach of enterprise”
Henriette et. al (2015)	“a business model driven by changes associated with application of digital technology in all aspects of society”
Piccinini et.al (2015)	“characterized by the use of new digital technologies to enable significant business improvements”
Schuchmann & Seufert (2015)	“realignment of technology and new business models to more effectively engage digital customers at every touch-point in the customer experience life cycle”
Chanas & Hess (2016)	“reflect the pervasiveness of changes induced by digital technologies throughout an organization”
Hess et.al (2016)	“concerned with the changes digital technologies can bring about in a company’s business model, which result in changed products or organizational structures or in the automation processes”
Morakanyane et.al (2017)	“digital technologies to enable business models, operational processes and customer experience to create value”
Ziyadin1, S (2020)	“organizations digitally change and outlines organizations inspirations, and additionally their triggers”

Based on literature key relevant themes and concepts were identified. Further, in consultation with experts from practice and academia, a more encompassing definition is conceptualized. The process of conceptualization was iterative, and utilized different keywords and components to ensure rigor and relevance. The definition is further refined based on narratives from large global organizations. The narrative evidences helped to build greater context and applicability to understand how large global organizations digitally transform. Based on assessment of findings from multiple sources we propose the following definition of digital transformation: **“Digital transformation is a complex process, consciously under-taken by institutions in response to their eco-system imperatives, which involves application and exploitation of digital technologies, to capitalize differential benefits for the institutions as well as key stakeholders.”**

It is important to have a clear definition of the construct and its boundaries as the definition guides future research and subsequent scale definitions from an academic perspective. Divergent and varied construct definitions will lead to different sets of items and confusion. ‘The boundaries of the phenomenon must be recognized so that the content of the scale does not inadvertently drift into unintended domains’ [3] Moreover, an ambiguous definition creates difficulty to decide on inclusion and exclusion of specific items, properties and manifestation of the construct. A challenge in relation to defining the construct of digital transformation is how to differentiate it from other related constructs in information sciences and other studies. This differentiation is important for future scale developments and subsequent tests for convergent and discriminant validity of the construct. Therefore while defining the digital transformation, even at a conceptual level; it is important to consider how the construct demonstrates relationship to other relevant constructs. [4],[5] The proposed definition is further scoped into boundary and context through our subsequent discussions based on association among related constructs. Figure: 1 helps understand definition in context to relevant and associated constructs.

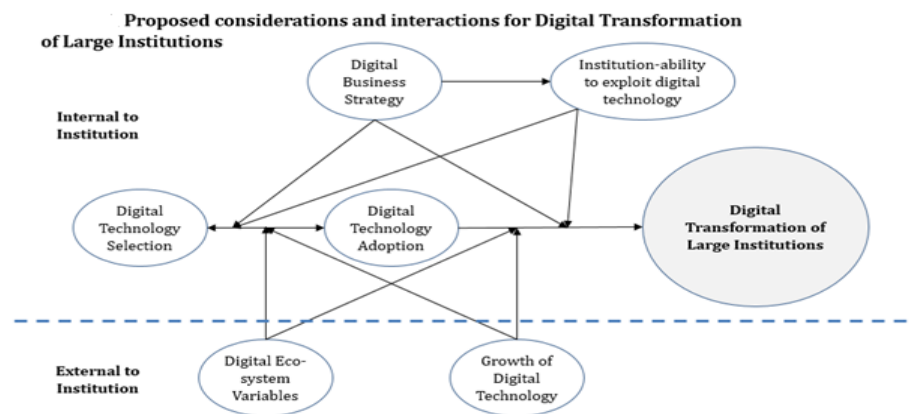


Fig.1. A Conceptual Model - Indicating Interactions among Constructs Related to Digital Transformation of Large Organizations

While most prevailing discussion on digital transformation focuses on larger organizations, even smaller institutions can undertake digital transformation. In fact the level of complexity would be more manageable for them. Further the ability of getting the entire organization to adopt and adapt to the ensuing technology-enabled transformations would be easier. Additionally, the eco-system itself being small would aid in the transformation further. Perhaps a constraint in digital transformation of smaller organizations vis-a-vis larger organizations may be availability of resources including investments in technology and people capability.

The process of selection, adoption and subsequent transformation (if any), we believe, is moderated by multiple internal to organization and external factors. [6] Factors like digital business strategy, institutional ability (readiness), ecosystem, available technology are relevant for transformation. Subsequent discussions in this paper

elaborate the key components of the proposed definition with relatable instances. **There are four components of the proposed definition:** (A) Digital Transformation is a complex process; (B) Digital transformation is under-taken by institutions in response to eco-system imperatives; (C) It involves application and exploitation of digital technologies; (D) Digital transformation helps capitalize differential benefits.

(A) Digital Transformation is a complex process: There exist established theories to explain institutional maturity towards technology in terms of selection, adoption and exploitation of technologies for enabling functions, networks, and the organization as an integrated whole. [7] *Studies on technology enabled transformations indicate somewhat staged progression of what institutions can do with technology from localized exploitation, internal integration, business process and network redesign to business scope redefinition.* [8] References of IT-enabled transformation is longitudinal, there is sustained beneficial impact, institutions experience through continuous learning and strategic focus on technology. Institutions undergoing digital transformation in phased manner are best able to realize benefits by continuous selection, adoption, exploitation of digital technology ensuring overall strategic fitment.

Institution's ability to exploit digital technology moderates how new-age technologies are selected, adopted for conceptualized applications. *The ability to exploit technology towards value generation largely differentiates transforming organizations and demonstrates heterogeneity in performance.* Ability to exploit digital technology is dependent on nature, levels of readiness and core capabilities of an organization including its leadership. Chief Digital Officers (CDOs) are increasingly positioned for digital transformation of organizations. [9] Roger's Diffusion of Innovation Theory at firm / institution level discussed how technology adoption and innovativeness are related to independent variables as individual (leader) characteristics, internal organizational structural characteristics of the institution. Such internal capabilities develop over time and continuous learning to become more mature and normative across organization. Ability to exploit technology resources, an acquired competency, is difficult to emulate, may eventually become a core-competency, and a key differentiator.

The complex process of digital transformation is not pre-defined and structured in most institutions. The process can be rather random and unique for institutions as they select, adopt and exploit digital technologies pertaining to functions, their networks and towards integrations. *Large organizations can co-exist in various stages of the process of digital transformation – not representative of a single identity. In other words large institutions may live through various phases of digital transformation not appearing as if they are parts of the same entity.* Plurality of stakeholders, priorities and distribution of resources including budget allocations across institutional functions may lead to intra-institution variances. [10] Large institutions demonstrate instances of systemic, disruptive and somewhat ad-hoc developments like changes in organization and leadership, performance impact by competition, preparation for new regulations etc. *These developments may either accelerate or even impede digital transformation process. It is evident; the process of digital transformation is influenced by internal and external change drivers impacting large organizations.*

Despite the complexity and diversity, in digital transformation of large institutions, some commonalities are identifiable. A prime emergent factor is the **prominence of digital business strategy at institutional level**. As a benchmark, institutions are focusing on development of a strategic perspective around how to leverage digital technologies? Instances across institutions in multiple industries demonstrate a somewhat fuzzy interpretation of what digital business strategy is? How can digital business strategy impact digital transformation?

While at one end there are instances of mature integrative practices towards digital transformation through re-thinking and redesigning of business model taking advantages of technology opportunities and resources; there are also many examples of institutions merely leveraging digital channels as ad-hoc measures to automate, improve and enhance efficiency or customer experience. The behaviors of large institutions are largely impacted by innovations and technologies available. Technology follows a trajectory of development, typically categorized by technology life-cycle; based on how they emerge, evolve and become obsolete. Large organizations applying digital technology demonstrate imagination, ingenuity while improving business efficiency simultaneously. Driving this at one end of the transformation continuum is digital automation and at the other end there is machine intelligence and autonomous behavior with established necessary conditions for connections and collaborations between humans and machines and among machines. Such trajectories of technology-enabled transformation are key outcomes of organizational digital business strategy.

Digital Business Strategy [11], we believe, moderates the process of digital transformation as indicated in **Figure 1**. *The presence, absence or maturity of an institution's digital business strategy impacts the digital transformation process, orientation towards efficiency or imagination and value generated. There is a fair amount of indicative literature establishing how IT enables business and how important it is to ensure IT and Business alignment. Conventionally in information sciences literature the premise of IT strategy is predominantly function-level aligned to that of institution's overall business strategy. There are multiple studies [12] indicating how business strategy directs IT strategy and alignment. The essence of digital transformation is not about mere IT enablement or alignment. On the contrary, it stems from assessments indicating that, benefits from technology deployment are marginal if superimposed on existing organizational conditions (like strategy, structure, process, culture...) – real advantages of technology are derivatives of institutional transformations.[13], [14], [15] In such instances technology is being leveraged as a key resource to differentiate, compete and generate value. Observations indicate large institutions are increasingly focusing towards technology-centric strategic planning.*

Digital business strategy is defined as ‘organizational strategy formulated and executed by leveraging digital technology resources to create differential value’. Perspectives on digital business strategy includes (1) the scope of digital business strategy, (2) the scale of digital business strategy, (3) the execution of digital business strategy, and (4) the sources of business value creation [11]. Another theoretical perspective of digital business strategy describes it as ‘a set of strategic responses to the collective choices of industry competitors that is shaped by industry conditions, moti-

vates the construct of digital strategic posture' [16] Digital strategic posture indicates digital technology focus relative to the industry norm. The term strategic posture refers 'crucial strengths and weaknesses from a strategic standpoint'. The concept of digital strategic posture focuses on an institution's stance with respect to digital activities of peers in its operating environment. *Digital strategic posture complements others like entrepreneurial posture, market orientation, consumer orientation, competitor orientation, innovation orientation, and technology orientation.* Recent research of large organizations [17] adopting digital business strategies indicate how mature practices focus on integrating across digital technologies, and business functions towards transformation of business models. *Technology as a strategic resource enables institutions to re-imagine and re-think business focus. Digital technologies render capabilities and resources beyond solving discrete problems. It enables institutions to use technology to develop core-competencies and competitive advantage.*

(B) Digital transformation is under-taken by institutions in response to ecosystem imperatives: While there is significant discussion on preferences and adoption of technology at an individual level, our focus here is on the digital transformation at an organizational/institutional level. These institutions may be public, private, profit-making, philanthropic, government etc. These organizations intend to deploy digital technologies aspiring for beneficial social, economic and technology impacts. *At this point, it is important to clearly distinguish between conventional large organizations, where technology enables strategy, and the relatively newer institutions, which are devising strategies focused upon digital technology as the key resource. Digital transformation is more suited to explain technology selection, adoption and exploitation in the conventional institutions vis-à-vis the digital institutions (some of them digital unicorns). A distinction between large traditional organizations embarking on digital transformation vis-à-vis digital technology startups and market disrupters are necessary. This is so, because the large conventional institutions demonstrate the essence of transformation in legacy processes, practices and technology by embracing newer digital technologies. On the other hand the disruptive emergent digital institutions / start-ups (digital unicorns or otherwise) are emerging into prominence by exploiting digital technologies as a prime resource. It is observed in many instances large institutions are collaborating with emergent technology start-ups and other established technology providers to infuse agility in innovative transformations.* The transforming institutions experience challenges such as institutional inertia along with imperatives (economic, social, technological, regulatory, competitive, political, legal, and others) from immediate and wider eco-systems. Large organizations are also influenced by collective choices of industry competitors that may be further shaped by industry conditions; and other opportunities that influence the digital strategic posture. *These imperatives and multiple actors constitute the **Digital Ecosystem Variables** for the large global organizations and influence the choice of technology and institutional dispositions (shown in **Figure 1**). Innovations and associated technologies are stimuli for transforming large institutions achieve beneficial outcomes. The large institutions demonstrate varied levels of technology adoption and diffusion. This heterogeneity in adoption under similar eco-system conditions and the*

associated results may be attributed to multiple factors. The nature of influence of such factors is subtle and may not be known perfectly.

Factors influencing adoption of digital technologies can be somewhat explained by the technology adoption models relevant at an institutional level in information systems literature. The three most popular models are Roger's Diffusion of Innovation (DOI) [18]; Technology, Organization, and Environment (TOE) [19] framework by Tornatzky and Fleischer (1990) and Iacovou's Model [20] studying the influence of Inter-organizational Systems. These models help understand the institutional imperatives, the digital eco-system variables. The TOE framework identifies three aspects of an organization's context as (1) Technological context, (2) Organizational context, and (3) Environmental context. The TOE framework enables Rogers' innovation diffusion theory better explain intra-firm innovation diffusion.[21] Institutional Theory [22] , [23] emphasizes how the institutional environments are crucial in shaping organizational structure and actions, where decisions are not driven purely by rational goals of efficiency, but also by social and cultural factors and concerns for legitimacy. In many cases institutional decisions to adopt technology are not purely internal and driven by rational motives only. Institutions are likely to be induced to adopt and use technology by external isomorphic pressures. [24] These drivers may arise from peers and competitor actions, trading partner influences, collaboration with technology start-ups, customer expectations, advocacies, regulations and government incentives among others – considering most of the dominant actors and imperatives of the institution's eco-system. Mimetic [25] coercive and normative pressures influence disposition towards technology. [26] The institutional theory further adds to the environmental context of the TOE framework including three factors: perceived benefits, organizational readiness, and external pressure. It is interesting to note, that digital technology as a resource for imagination or re-thinking business strategy, towards extension of institutional boundaries, cross-industry leverage, convergence, customization, re-design of product-services offering does not feature explicitly as determinants of technology adoption in the prevalent IS literature. Based on understanding of existing literature and perspectives across large organizations (based on public narratives) **Figure 2** is an indicative non-exhaustive representation of key considerations explored from an eco-system perspective. These have been derived through study of extant literature and views from experts, practitioners and academics. These are particularly relevant for calibrating and scaling digital transformation maturity.

(C) Digital transformation involves application and exploitation of digital technologies: The new and emergent digital technologies demonstrate considerable complementary capabilities. *The ability to derive greater value from adopting these technologies in conjunction, rather than individually, leading to digital technology convergence is one of the most important considerations that go into formulation of digital business strategy.* The individual to individual, individual to institution and institution to institution transactions are presently influenced by level of technology adoption both by individuals and institutions.

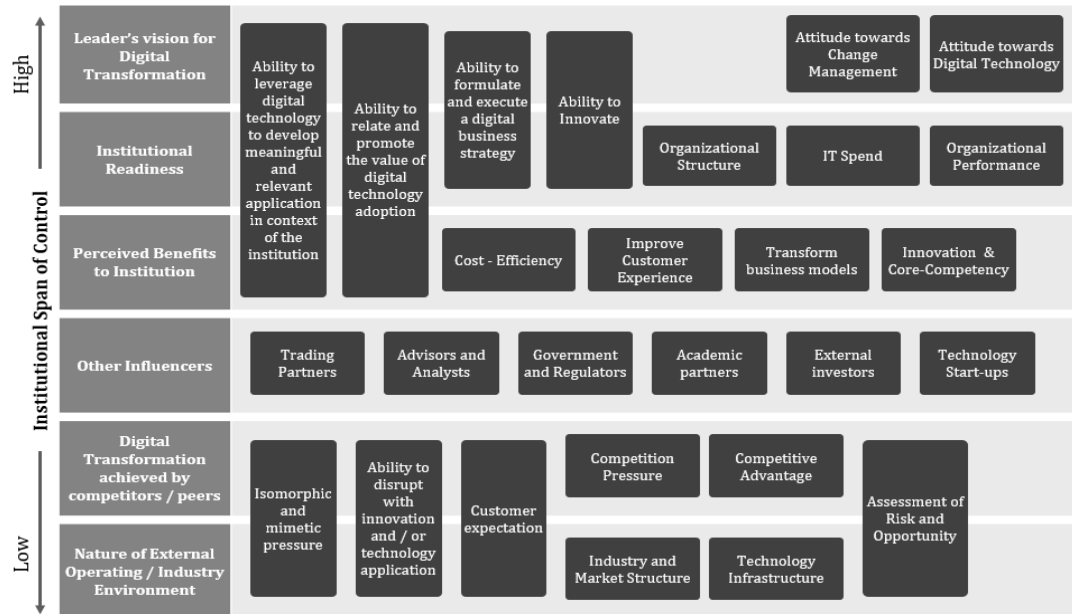


Fig.2. Key Considerations for Organizations - Representations from multiple perspectives

*Proliferations of digital technology is ushering in multiple opportunities, manifesting in varied forms for considerations at societal and institutional levels – multi-channel, interactivity, virtualization, eco-system networks, sharing resources, internet of services and things, automation, future of jobs, artificial intelligence, convergence, cyber-physical systems, autonomous machines among others. This is changing the rules of generating value and deriving competitive advantage across industries. Technology enabled business models in many ways are resulting in the emergence of complex, overlapping and dynamic ecosystem. [27] Increasingly it is being observed that institutions are breaking the distinctions between products and services rendering them as activity-based ‘offerings’ for customers to create value independently or collectively. The role of large institutions along-side digital revolution translates into reconfiguration and integration of core-competencies, eco-system actors and customers where value creation and capture is happening by coalition of different economic agents. [28] A majority of the respondents across a survey of 4,800 executives across 27 industries indicate digital technologies are disruptive in nature [17]. Other researches indicate many digitally enabled institutions focused on business strategy, process, and quality [29] while demonstrating transformation life-cycles [30]. The institutions adopting new-age digital technologies play a critical role in diffusion of innovations integrating social, mobile, analytics, cloud, internet of things, artificial intelligence, 3D printing, blockchain and augmented / virtual reality. Our experience indicates a broad-based categorization of these emergent digital technologies into interface technologies and underlying enablers as shown in **Figure 3** indicating how transformation trajectories drive value; improve experience aligned to industry opportunities.*

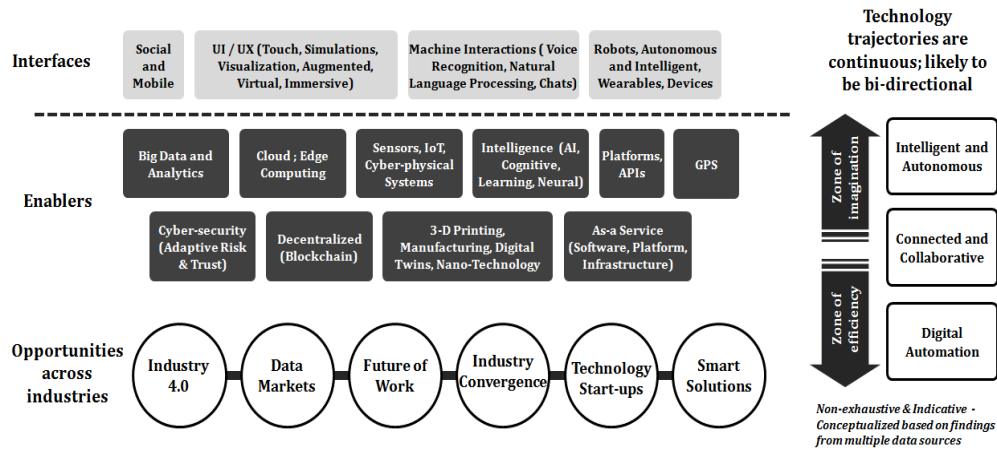


Fig.3. Digital technology led transformation trajectories drive value; improve experience aligned to industry opportunities

Social and mobile interfaces are transforming user interfaces and experiences. Increasingly humans will be interacting with intelligent and autonomous machines empowered by natural language processing, voice recognition and robotic chat technologies. Wearables, sensors and other devices will become interfaces in consumption of many products and services and for interaction with institutions. Such technology proliferations generate large amount of unstructured data that will be further used, analyzed to personalize and improve experiences. To enable these interfaces to be even more relevant, ubiquitous and contextual – delivering value; we see the growth of multiple enabling components. These include analytics, cloud and as a service models, edge computing, a truly connected and collaborative cyber-physical system, artificial intelligence and distributed models along with disruptions in manufacturing. Data and security are at the center of most interface and enabling components. Technology providers are improving protocols, methods of standardization, inter-operability in pursuit of truly open, secure, connective and collaborative technologies.

(D) Digital transformation is to capitalize differential benefits for institutions as well as key stakeholders: With the advent and growth of new-age digital technology consumers are being empowered leading to greater power parity between individuals and institutions. These technologies have created a state of somewhat perfect information by reducing information asymmetries between institutions and individuals. [31] These technologies are increasingly rendering boundaries between hardware and software somewhat fuzzy. Embedded hardware is increasingly intelligent executing contextual and cognitive functions based on underlying codes and decision systems. Value generation is not only dependent on products and services alone (where IT can be an enabler) but also on generation of digital offerings and choices [32] propositions and platforms enabling customers to also participate in value definition and creation to varying extent. Embedding technology within the products and services

[33] leading to an integrated customizable and configurable offering. Technology transformations extend organizations into newer industry eco-systems. This is leading to convergence, new set of customers, partners generating in value shift. Competitive forces likely to rise as existing and emergent players will target key parts of value chain, bypass incumbents and seize customer relationship opportunities. [28]

Technological developments and their manifestations, applications by individuals and institutions are leading to development of digital consumers (may extend beyond customers to include employees, partners and others). The demands of digital consumers are unconventional and institutions need to factor that into the products, services and offerings. *For many of the digital consumers the new-age digital technologies render bundled experiences. As an instance it can be discussed how high-speed internet, ubiquitous computing, mobility, digital connectivity on smart devices all seems as a bundled technology experience enabling digital consumers. Similarly from a specific customer perspective - for digital consumer interactions with a retailer, or a bank, or a healthcare provider over digital channels all create spill-over effects of expectations and demands across disparate industries. For example, customers who regularly receive retail deliveries at home expect that as an institution a bank or a hospital also needs to be offering at home services.* This is evidenced in multiple instances as well, banks are adopting video-engagement initiatives, healthcare providers are conceptualizing digital homecare/ ubiquitous solutions by capturing data from wearables and other sensors and will become increasingly relevant post pandemic. *There will be increased instance of vertical and horizontal consolidations within the value stream ensuring greater degree of overlap among suppliers, aggregators, manufacturers and service providers. Within this changing value network, profits and competitive advantages reside dynamically at control points that are the positions of greatest leverage.* [34] Digital business strategy needs to factor these considerations. Innovative transformations increasingly shift value networks from static, vertically integrated within industry to more loosely coupled cross-industry networks - shift towards multi-sided market models are likely.

Evidences across multiple large organizations and their public narratives on benefits indicate non-exhaustive benefit articulations across a few broad categories. The narrative analysis of the institutions revealed benefits that may be broadly classified into **business benefits, operational benefits, growth through digital technology, better marketing and brand positioning through awards and accolades received by institutions achieving digital technology leadership and ability to deliver greater social good** through use of digital technology. [35] *Key business benefits include ability to improve customer acquisition, satisfaction, efficiency, agility through digital technology towards better brand recognition leading to better market share. Ability to realize savings and growth by streamlining, optimizing workflows and overall simplification with digital technology is also viewed as key business benefits. Ability to achieve benefits like simplification and agility of processes, reduction of errors, enhancing customer and employee experience – addressing convenience and other value-add technology enablers promoting self-service, virtual and lower manual interventions for processes are evident operational improvements. Ability to reach newer markets and including newer customer segments is possible including*

suppliers and partners. Adoption of technology towards transformation promotes organizations to digital technology leadership position helps to demonstrate capabilities, to earn trust and respect from customers and investor community.

Conclusion: A clear construct definition is important for academics and practitioners. Amidst lack of unified perspectives this point of view paper provides a comprehensive definition of digital transformation. A clear definition of digital transformation in the context and consideration of large conventional organizations operating globally is discussed. While extending on existing point of views it clearly establishes digital transformation as a process undertaken by organizations. The process centric perspective is important for continuous improvement and maturity. It further discusses how the essence of transformation is more relevant to large conventional institutions vis-à-vis emergent technology start-ups. This definition will help establish a common point of reference; understanding key consideration including digital business strategy. It helps understand associations among related constructs - will enable large institutions focus accordingly. In doing so it clearly indicates variance in performance and benefits realized by institutions undergoing transformation. The definition has been deconstructed to elaborate with relatable context and key insights, which provide contextual relevance, guiding institutions towards digital transformation. A construct definition can be taken further into scale development helping organizations calibrate progression and maturity on technology enabled transformation.

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