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Business to Digital Transformation: A Proposed Framework for Achieving Business Intelligence Alignment

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Structured Abstract

With digital disruption comes an emphasis on the importance of organisation alignment, especially prior to any proposed digital transformation (DT). Analysts project that over 70% of the $1.3trillion annual spend on DT will not succeed as intended. Many enterprise transformations begin with brave ambition, yet many CXOs delay making "go / no-go" decisions due to what the authors term the "*Business Intelligence (B.I.) Accessibility Principle*". This refers to the high cost of attaining enterprise-wide understanding, or group-cognition, to sustain the complex changes required.

Strategic Management cannot merely plan to implement and deliver on strategic vision. Leadership need more adaptable frameworks to pre-emptively support enterprise engagement and alignment if we are to succeed in transformation. Action Design Research (ADR) can aid our thinking, helping conceptualise and examine alignment frameworks critically. ADR can support Management to quickly '*sense-categorise-respond*' to both organisational and individual needs prior to transformation decisions. These needs are typically 'dark-data", or data hardly being analysed, to improve decision making. The Gap-Map framework helps expose such tacit knowledge, key to enterprise-wide transformation success. It allows management to predict the propensity of the organisation for change, and address change through focused behavioural intervention. This paper's contribution is a B.I. framework where leaders now invest focused time and resources in DT through earlier understanding of potential impacts. This enables managers to strategically utilise behavioural intervention to enable multilateral group cognition and collaboration earlier. Gap-Map value creation is through flagging potentially costly issues and opportunities earlier, allowing transformation initiatives the propensity to succeed.

Keywords

Digital transformation, business intelligence, Gap-Map framework, behavioural intervention.

Purpose

The art and science of successful Digital Transformation (DT) lies in organisation alignment. Only then can Management implement change that is commensurate with disruptive business forces. It is prudent then to assess why the pace of DT is seemingly unsustainable. Specifically, if Management knew how to predict the propensity, or readiness, of the organisation for change through B.I., such analytics could help shape our strategic business decisions prior to implementation and enable transformation with the required change-momentum.

Across contemporary enterprises, DT is further complicated by distributed organisational structures such as virtual-teams, third-party providers, and dynamic supply chains. Should such entities perceive themselves as side-lined to the main organisation, this inevitably anchors their preconceptions of any proposed transition. Even worse for such entities, unplanned or poorly communicated change may be perceived as being "*forced on us*" by change-sponsors as their mandate was not effectively secured, again impacting transition.

Such consequences to transformation momentum include bottom-line impact, with varying estimates. Simard and Jourdeuil (2013) contend there is a direct relationship between management regimes and knowledge characteristics, as Management ranges from highly structured, authoritarian approaches to unstructured autonomous environments. Knowledge ranges from highly structured and embedded to unstructured and innate in individuals. IDC (2000) estimate Fortune500 companies could be losing roughly *"$31.5b per annum failing to share knowledge"*. In 2018, Forbes report enterprises expect to invest USD$1.3 trillion p.a. in digital transformation initiatives. McKinsey (2018) research states that 70% of these initiatives will not reach stated goals, equating to USD$900 billion in questionable management spend. IBM Research (2017) found 88% of all available data remains 'dark' and define it as "data that is hardly being analyzed, let alone used to improve decision making".A lack of meaningful data may lead some CXOs to delay large digital transformation planning due to the "*B.I. Accessibility Principle*". Negash (2004), and Negash and Gray (2008) define BI as *"systems providing actionable information and knowledge at the right time, in the right location, and in the right form to assist decision makers"*. We define BI Accessibility as the cost of providing Management with the correct decision inputs at the correct time, place and format as to assist in understanding real resource requirements, prior to embarking on substantial change. Examples of such costly resource requirements include employee upskilling, process adaptation, or technology enhancement, and organisation redesign. A broad spectrum, these represent sample people, process, platform and practice (or culture) aspects respectively, and we will analyse only people and practice aspects for this treatise. Without BI, the organisation maintains diverse understanding of resource requirements and needs prior to, during and after key transformation lifecycle stages.

By creating vivid group-cognition prior to DT (*'time'),* and by enabling mutual understanding of respective resource gaps, decision-makers may redress concerns earlier in this change lifecycle. With transparent gap-understanding, change can be introduced smoothly to the organisation *'place'* by change-sponsors and agents (Change Management, CM). *'Format'* or concise analytics earlier in transformation may help us to 'sense-categorise-respond' to respective resource requirement gaps. Such a "time-place-format" framework leading to shared understanding could reduce DT cost through enhanced decision making, with positive human and business outcomes.

Relevant Literature

Oxford Dictionaries define 'format' as "*the way in which something is arranged or set out*". In the context of assessing suitable candidates for DT format, Gartner in 2011 propose three dimensions that are indicative of organisation's readiness for transformation - people, process, and platform. They suggest the "People" dimension may be formatted with respect to the specifics of their organisational role, or fulfilment of organisational tasks, as follows:

- Producer role - typically define and expedite domain-specific and rapid analysis.
- Consumer role –those who process BI results to progress decisions.
- Enabler role – typically support staff such as IT that enable BI for decision making.

In terms of "Process", Gartner suggest our strategic DT view must also encompass decision, business analytics, and information governance processes:

- Decision process - applications utilising analytics and governance for business decisions such as CRM (Customer Relationship Management) or resource planning.
- Business Analytics process - learn, measure, design, analyse, model, publish phases.
- Information Governance process - enterprise capability to deliver business analytics.

With respect to "Platform", many organisations focus on the *technology* of DT, and struggle to get people-roles to adopt them. Conversely, people are focused on the immediacy of fulfilling their role through current technology use, and struggle to adopt new enterprise infrastructure, despite requiring several new platform capabilities:

- Decision capability - build apps to enable enterprises understand their business.
- Analytics capability - portfolio of tools for DT such as Hadoop, Tableau, SAP etc.
- Information capability - infrastructure unifying technologies, services and schemas.

Schein (2016), along with Strong and Volkoff (2010), advance that culture, or organisation actions in practice, is a fourth dimension to consider in change practice. Indeed Schein (p.397) further suggests a successful culture in a multinational organisation invokes action through "*sharing common language*". Simard and Jourdeuil (2014, p.16) agree, proposing that an ordered domain shares common practices that dynamically 'sense-categorise-respond' to needs. Several tools facilitate sensing of common-language in a given organisation for example Cameron and Quinn's OCAI[1] (2011), which assesses *readiness* for change. The definition of 'readiness' (adapted from the US Navy/DoD[2], 2018) is the ability of organisation to compete in markets and meet the demands of its business strategy. Navy suggest readiness is the synthesis of several distinct but interrelated levels including:

- Organisation Readiness (Or): Organisation ability to provide capabilities required to execute assigned business and operational objectives, derived unit delivery outputs.
- Individual Readiness (Ir): Employee ability to engage and synchronise readily their expert support functions to execute assigned business or operational objectives.

However, a caveat: during engagement and sychronisation, the expert's vernacular may be wrapped in the semantic meaning and context of those using the terminology (Hockett, 1958; Chomsky, 1964). Each specialist *term* (e.g. Legal, Marketing, Operations, Executive, Technological) reflects the common language in their respective domains, wrapped in the semantic meaning of the perspective of that assignee's role, experience and personality. Chomsky later suggests (1993) that as humans, we cognitively invoke a minimalist program to communicate

[1] Organisation Culture Assessment Instrument (OCAI)

[2] Department of Defence

only the surface-structure of our deep knowledge, leading to a simplification of 'dark-data'. Chen et al (2012, p.1169) suggest Business Intelligence and Analytics version 3.0 (BI&A 3.0) will focus on "*person-centred analysis*". Nagle and Sammon (2017) add that "*context-relevant analyses"* can help to mine the deep-structured, or dark information hidden in unstructured data. Indeed, IBM Research (2017) suggests that 88 percent of all available data is dark to most organisations and define 'dark-data' as "*data that is hardly being analyzed, let alone used to improve decision making*." This is important because our human cognition processes demand we reduce the plethora of information overloading our brain-functions, and inherently reduce it to a subset (Watzlawick et al, 1978. Bandler & Grinder, 1983).

Chomsky suggests that in processing complex information, we innately "reframe" or change its meaning and fit our own perspective. Essentially, we each re-envisage "*another frame that fits the "facts" of the same concrete situation equally well or even better*". Koestler (1964) labels this '*bisociation*', as we facilitate our decision-making with more than transformation programme information, but also organisational connected meanings, and decision context. Osterwalder (p.16, 2004) tries to solve context for decision-making when outlining the Business Model balancing business strategy, ICT and organisation constraints.

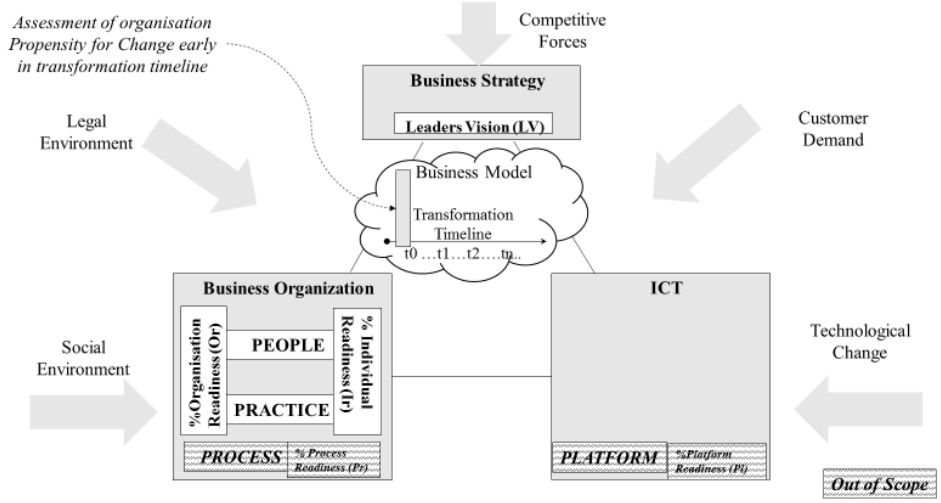

Figure.1 Gartner and Schein's "4Ps" adapted to the Business Model environment (from Osterwalder, 2004 p.16

While the Business Model (Figure1) neatly reflects the "4P" transformation dimensions of Schein and Gartner, it does not deal with unknown dark-data early in transformation timelines. Simard and Jourdeuil (p16) articulate this as "complex, partially knowable" or "chaotic, unknowable" challenges in the disordered domain. Across the 4P dimensions, examples of dark-data challenges needed *prior* to DT decision-making include:

1. ***People*** strategically withholding information, causing knowledge silos; organisation immaturity (e.g. 'perspective filters', Simard & Jourdeuil)
2. ***Process*** inter-operability issues (e.g. Cause /effect apparent in retrospect)
3. ***Platform*** or current technology complexity (e.g. Reactive tools)
4. ***Practice*** or culture: Ability of people to adapt (e.g. crisis Management)

Ipe (2003) and Pérez-Bustmante (1999) focus on people and practice and the interworking dynamic between the organisation to answer these unknown challenges. They propose KS should facilitate the dissemination and sharing of important information that promotes a

culture of creativity and innovation within and between internal staff. On review of current KS methodologies, many are not commensurate with contemporary digital transformation complexity and as such, opportunity exists for new frameworks. Many current frameworks (cf. Table 1 - Ostrowski et al, 2014; Parasuraman et al, 1988; Frost & Kumar,2000; Moteleb & Woodman, 2007) are industry specific, or are detached from I.S. organisational needs; others are possibly too complex and ambiguous, or not specific enough, so limiting immediate apparent utility.

The Oxford English Dictionary defines framework as "*a set of concepts and categories in a subject area or domain that shows their properties and the relations between them*". Gruber's (1993) definition is simpler, "*an explicit specification of a conceptualization*", yet Genesereth and Nilsson (1987) argue the word "conceptualization" is ambiguous. Our definition is based on that proposed by Guarino and Giaretta (1995), being "*a logical theory which gives an explicit, partial account of a conceptualization*". A useful framework is offered by the U.S. Navy's "Readiness Model" (2018), pertaining to the 'battle readiness" of constituent organisations measured in various percentage weights, with an overall total readiness of 100%. While it is understood that business process and platform aspects constitute two major component parts of a plethora of perspectives regarding a planned DT, they are well served with several frameworks regarding DT planning. Examples include the Information Technology Infrastructure Library (ITIL), Kotter's 8-step Change Model, Six-Sigma, and Prosci's ADKAR® model, and so excluded from the scope of this analysis. In reviewing methodologies of utility that assist organisations in mapping, measuring, and aiding complex Business Organisation and Individual readiness for change, we identified several artefacts and themes (Table 1).

A Priori Research	Chandler et al/ Gartner (2011)	Ostrowski et al (2014); Simard (2017)	Gibson & Cohen, 2003 / Davies et al 2004	Simard and Jourdeuil (2014)	New Change Propensity Framework
Artefact Name> Key Aspect Theme↓	Business Analytics Framework	Framework Engineering Ref. Model	Virtual Teams Research Framework	Knowledge Manageability	Framework for Digital Transformation
'4Ps' People Process Platform Practice	Organisation Readiness (Or) √	X	Individual Readiness (Ir) √	Org. & Ind. Readiness √	√
Knowledge Sharing(KS)	X	Organisation Readiness (Or) √	X	Organisation Readiness √	√
Virtual Teams (VT) / Communities of Practice (COP)	X	X	Organisation Readiness (Or) √	X	√
Shared Understanding	Individual Readiness (Ir) √	X	X	Org. & Ind. Readiness √	√

Table 1. Key DT Aspect Themes Emerging from Existing Frameworks

Knowledge Sharing (Ostrowski et al, 2014; Andonie et al, 2007, Simard, 2017) determine that tacit knowledge (dark-data) hides *what* we must transform to achieve any target state, stifling shared understanding. While each Table 1. approach accommodates various constituent parts, there exists an opportunity to advance a new framework that accommodates all themes, recognizing the interdependence of all aspects. This treatise utilises ADR (Action Design Research) in designing a framework that must '*probe-sense-respond*' (Simard & Jourdeuil, 2014) and allowing us to "disagree-then-commit" to change required. It must identify the actual state of 'gap' between current and target states of change across the 4Ps, Knowledge Sharing, and Virtual Teams.

Design Approach

The ADR approach is to generate knowledge of a problem domain through the build and evaluation of a designed artefact (Hevner et al, 2004). ADR artefacts enable practitioners and academics to better understand the problem and ultimately, to end up with a better solution, while the build-evaluate loop is an iterative approach to artefact re-generation in consciously looking for improved utility. Nunamaker, Chen et al. (1990) usefully classify ADR as applied research that utilises knowledge to solve practical problems. Van-Aken (2005) suggests that ADR aims to generate knowledge on advantages and disadvantages of alternate solutions.

The objective of the proposed design approach is shared understanding using ADR, or more specifically ADSR (Action Design Research). The objective evolved when the lead author was engaged as Programme Director of a major DT in a Global Multinational Telecommunications Service Operator based in Capetown. The focus of the DT was to implement a new BI platform, which would pitch the previously defined People roles (Producer, Consumer and Enabler) together. In the course of the change programme, it was realised that the Legal Group were not aware that engineers were creating transcontinental networks, constituting a data-privacy breach. Conversely, engineers were unaware of national, African, and International legal regulatory requirements. We propose a framework based on three ADR facets: empathy, rapid prototyping and radical collaboration (Bogers and Horst, 2014), which considers the value of generating shared understanding when applied in complex DT cases. Our strategic management aim is evolution of a framework that increases DT effectiveness through reduced OPEX costs, maximised ROI returns, and improving business, human and Customer Experience (CX) outcomes in the transformation. The purpose of this study is therefore to answer this research question:

How might we design a framework to assist enterprises in earlier BI visualisation of organisation and individual readiness for digital transformation through group cognition?

The major contribution of this study is evolution of an evaluated framework that facilitates diverse entities in shared understanding of each other's perspective prior to planned change. This assists Managers to overcome barriers in both Organisation Readiness (Or) and Individual Readiness (Ir) aspects, leading to better Practice (culture), better decision making and ultimately realising management strategy. This ultimately contributes to digital transformation effectiveness through reducing OPEX effort costs (and commensurate ROI returns) and improving business and human outcomes.

The remainder of this paper is structured as follows: the next section overviews the research approach based on Design Science literature. The following section presents findings of the resulting framework, or 'Gap-Map' artefact, and then addresses research limitations, and implications. The penultimate section presents an evaluation of the social implications of the proposed methodologies, and finally we assess the originality and contribution value of the artefact against a successful transformation engagement.

Findings

The initial concept behind the proposed framework emerged over a period of eight years, through the lead author's engagement in global ICT transformations for I.S. service-providers (SPs). The first iteration, the '*knowledge trampoline*', was utilised in a Latin-American transformation (Table 2). It was based on the simple premise that a single page specification of people, process, and platform requirements built on lessons learned from a serial Revenue Assurance deployment across 23 countries. Beginning with an initial iteration in a "proof-of-concept" country, the result was that by iteration four, deployment costs had substantially reduced, due to knowledge sharing bringing together the latest best-practice with best available resources. The key success was cost-reduction: initially the approach involved high cost in terms of expert global transformation practitioners, and timelines missed. But through 'lessons-learned" feedback, implementation becomes aligned and synchronised by the fourth iteration. OPEX reduces with local teams supported remotely, and planned timeline success.

Year	Organisation	Nature of Digital Trans.	Nature of Artefact evolution (& *attributes*)	Impact (measurable)	#Interviews (Anonymous) *& Profile*	Work shops	Meet-ings	Surveys (Anon) Y/N
2010	Largest SP in Latin-America (23 countries)	Revenue Management	'Knowledge Trampoline': One-page specification. *(Logarithmic-curve of Knowledge-Sharing through lessons-learned from Consultants & Subject Matter Experts*)	Costly first iteration, cheaper nth iteration. Revenue Savings of €1bn+ OPEX savings of €2m+	Multiple *(VP, Finance, HR, Sales/ Marketing, Engineering, I.T., Ops, Customer Service (at all levels)*	7	36	N
2012	Largest SP in North America	4G/LTE (4th Generation mobile/ Long Term Evolution)	Use-Case Approach: Simplest representation, 1-page diagram of actors & interactions with system, and different scenarios. (W*orkshops, questionnaires, 1-to-1 interview based*)	Get to Market 4G/LTE Reduced churn/increased market-share	Multiple *(VP, Engineering, I.T., Ops, Customer Service (at all levels)*	4	18	N
2014	Largest SP in Canada	Know-ledge Manage-ment	Use-Case-Advanced: Comprehensive 2-4 page representation, 1-page diagram of actors & interactions with system, and selected, prioritised scenarios.	Improved CXM respective of digital.	24 *(CXO, Engineering, I.T., Ops, Customer Service at all levels)*	2	6	N
2015-2016	Largest European and African SP (London based HQ)	Customer Experience Manage-ment (CXM) DT /POPI Digital Transforma tion	Use-Case-Advanced Organisation Gap-Map: 8 Action steps resulting in 2-4 page partial representation diagram & report of actors & interactions to achieve change goal. (*CXO Business Objectives meeting; Line-Mgr. Gap-Map workshop*).	Enhanced CXM Reduced churn/increased market-share Mitigation of POPI Act.	16 *(CXO, Finance, HR, Sales /Marketing, Engineering, I.T., Ops, Customer Service at all levels)*	22	20	N
2017-2018	Market Leading Original Equipment Manufactu rer (OEM)	Enterprise Enable-ment of GDPR	Organisation and Individual Gap-Maps *(spider diagram of current versus target gap needs for Individual key needs and growth needs).* Gap-Map (*Realtime gap dashboard SaaS)*	Gap-Map: Reduced churn/Increased market-share, CX trust, ARPU (rev. per user).	Ongoing Mitigation of GDPR Act. *IGM & Gap-synthesiser (SaaS) impact to be advised*	On-going	On-going	Y (180 partic-ipants)

Table 2. Gap-Map genesis: the build, evaluate, impact empirical chain

The '*use case approach*' second iteration was an improvement on the 'knowledge-trampoline', in that there is less up-front cost (as we used less premium service-resources) and concentrated on facilitated self-management. External experts liaised with the company through workshops, questionnaires and 1-to-1 interviews, culminating in use-case artefacts optimised for knowledge-sharing. The "*Use-case advanced*" approach attempts to further control the scope-of-work through use-case prioritisation. Following initial workshops, surveys and interviews, we followed only 'premium Use-Cases' (selected by the customer, to delimit scope and cost), and advanced only those select cases through for transformation.

The current iteration, the "*Gap-Map"* framework, was utilised in action finding resource gaps. The Gap-Map provides an expeditious, progressive artefact, which adapts to the scale, scope and intricacy of digital transformation prior to "go/no-go" decision for implementation. It quickly and effectively establishes the facts of the transformation at the earliest convenience and from the perspective of all engaged stakeholders. The Gap-Map allows each party to raise their challenges or risks and propose potential business solutions in an ordered sequence. Each step acts as input for subsequent evaluation against subsequent steps. For example, potential technical solutions must undertake risk-reward analysis, and value outcomes for each scenario. Evolution of the Gap-Map was based on not only the ADR approach (Grohowski et al. 1990), but also reflects the Sein et al (2011) definition of IT artefacts as "*ensembles shaped by the organisational context during development and use"*.

Gap-Map is conceptualised as a visual-cue to "sense-categorise-respond" to gaps in the organisation's shared understanding (Simard and Jourdeuil, 2013). The framework is utilised as an iterative process, requiring several evolutions to advance and continuously improve (or sense) a shared understanding of the 'dark-data' of gap requirements among Communities of Practice (COP). Through Gap-Map, articulation of each 'dark-data" fragment eventually builds the organisation's framework of 'real-logic' (categorise). From the sense-categorise functions, elements of our alignment approach can be adjusted (respond). For example, we may adjust the Business Rules engine in decision making of BI algorithms on CRM or ERP systems. This sets a more concise context for change through the gaps identified at each step, increasing the propensity for change engagement and commitment.

In step#1, the board may wish to appoint a Chief Transformation Officer (CTO), preferably someone with whom employees have had close mutual bonds and trust from the board. Bain research (2018) shows the most critical factor is change sponsors getting an early start in building commitment throughout the organisation. The CTO's objective is to connect with their own people's thinking, before evolving initial rationale for the DT from their perspective (based on management insight). Through investing time and resources in early understanding how DT will disrupt and who will be hardest hit, the organisation can engender a sustainable level of mutual 'trust and empowerment'. The CTO begins winning the internal battle through co-involvement and dialogue, enabling the organisation to reconcile their perspectives of the strategic logic with their operational opportunities or constraints. This enablement is supported in step#1 by appointment of a change-steering committee (CS). The CS interpret the Change Sponsor's strategic objectives and devolve them as Business Objectives for supportive change-agents to act on. But in comprehensive transnational DT, these agents are usually globally situated, and in many cases indentured with unique ways of working. This presents a complex landscape to unravel before we embark on a transformation journey, one best planned with the maximum B.I. in the form of an "effort estimate". The CTO and CS can begin at step#1 by dedicating time to "tune-and-trace tours". This means meeting and especially listening to the concerns and opportunities of employees affected by proposed change. Such co-involvement infuses participants with energy to implement and sustain the DT, decreases risk of failure and

contributes to transformation success, through opening dialogue and creating trust with commitment.

Step#2 is a series of highly interactive workshops, deliberately mixing people from different roles, functions and geographies who need to work closely together in the DT. These workshops help build a strong sense of ownership of the DT, but more importantly, strengthen personal relationships between relevant Heads-of-Department or Line-Managers responsible as Change-Agents. Some may demur, but as Gap-Map illustrates the step1 DT Business-Objectives on-screen, this acts as an incentive to engage in discussion. The stakeholders post their departmental challenges, with respect to people, process, platform, or culture issues into gap#2 of the Gap-Map with sticky notes (or e-posts if Virtual-Teams attend). Challenge examples are overcoming operational KPIs, organisational interfaces, or competence gaps.

Each Line Manager (LM) or business stakeholder reviews their business risks in step#3, and preferred associated business solutions at step#4. This step may be iterated with their staff or other technical stakeholders to reverse-engineer risks e.g. to budget or resource constraints. Technical Line-Managers lead step#5, 'ways to solve'. By now there is a noticeable collaboration dynamic engendered between business and technical collaborators, and wider experts (legal, marketing etc). Teams then address potential rewards and value gaps in step#6, which act as motivators to the wider staff in the upcoming transformation program.

By measuring "gap-requirements" of DT, we may assist in conversion of specialist tacit terminology to explicit, and shared, understanding through the 'Gap-Map' framework. In essence, we evolve a measurement for organisation propensity for change (PC). PC is represented both diagrammatically and as a formula in Figure2:

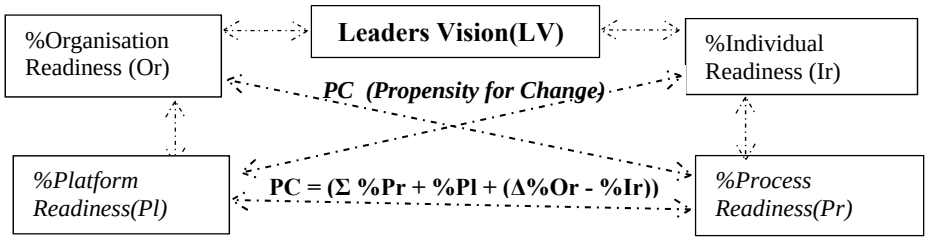

Figure 2. Propensity for Change (PC) in Digital Transformation

In this guiding equation PC represents the organisation propensity for change. Maximal readiness for change equates to 100% (per the U.S. Navy's "Readiness Model"). For calculation simplicity, we assume to allocate each aspect (Pr, Pl, Or, and Ir) a maximum weight of 25% of total readiness respectively. As previously suggested, process and platform readiness will be analysed separately. Operational Consultants will calculate (Pr) Process readiness by assessing factors such as flexibility in policies and procedures in the three process elements (Decision, Business Analytics and Information Governance). It is further assumed that Solutions Architects calculate (Pl) Platform readiness such as logistics and systems support. Platform readiness is assessed utilising the technology elements mentioned, such as Decision, Analytics and Information capabilities respectively. Both (Pr) and (Pl) are then reported in percentage readiness format, each expressed as a portion of their respective 25% total percentage.

Gap-Map's focus is on the delta between the two remaining aspects: Organisation readiness (Or), evaluated in Gap-Map steps 1 through 6, and Individual readiness (Ir), evaluated at

step#7.[3] (Or) example factors are trust in peers, skill variety and perceived participation, and trust in division leadership (Eby et al, 2000, table2). (Or) is measured through asking the change group(s) involved at steps one through six to estimate, based on the Likert rating scale (from 1 through 5), how they rate readiness of the organisation at each step individually. The cumulative evaluation scores are expressed as percentage of 25% and represents the consensual opinion of the change organisation of their readiness for the proposed change, based on their group participation to date.

Step#7 surveys gaps in individual needs sought by employees and measures the delta between any loss of energy (entropy) they may have with respect to the change, so helping us to address these needs. (Ir) format is an individual anonymous Likert survey of those personnel most affected by the proposed change. (Ir) is assessed for the level or role currently held. It is measured by compiling personal basic and growth needs of the employee, expressed as a percentage of capacity to participate in (Or). Sample (Ir) factors are competence, self-efficacy, perceived organisational support, and preference for working in teams (Eby et al, 2000). The cumulative evaluation scores from Gap-Map step#7 represents the (Ir) score, and the sum total is expressed as percentage of 25%. The (Ir) assessment is important to consider as in a private capacity, personal factors may lead to substantial instances of limiting (Ir), thus impacting (Or). Sample factors include fear of change, or job-insecurity associated with the proposed change, suggesting gaps in what people privately maintain as individuals, and that observed when working within their organisations.

The delta in (Or) and (Ir) scores respectively at a given slice in time in the transformation timeline (Figure 1) is a useful effort estimate or indicator of how much the organisation must do in preparation for the proposed change management program. It is a key predicator of propensity for success of the change program, and its outputs can feedback to the organisations change process (such as the ITIL change request procedure). Such BI analytics better support change program decision making through earlier assessment of objectives and obstacles, enabling adaptive measures, and with better resulting budgetary, business and human outcomes. Change managers can now plan behavioural intervention at step#8 through alignment of organisation, change program and individual actions and communication aspects. For example, the BI accumulated at step#8 can be applied as behavioural intervention steps in the phases of a Prosci ADKAR® change program at the Awareness (communications), Desire, Knowledge (training) Ability (competence) and Reinforcement (resistance management) phases. Behavioural intervention is defined as “the use of operant conditioning models, i.e. positive and negative reinforcement, to modify undesired behaviours – e.g. anxiety etc.

Ultimately, the delta or sum of difference between both percentages of readiness (Or and Ir) represents the propensity for the specific change at that moment (prior to transformation launch decision on the transformation timeline). As the Gap-Map objective is to balance the PC equation, then the percentage sum of (Or) and (Ir) readiness considers the organisation’s and individual Likert assessments of gaps (excluding process and platform in this treatise):

Organisation and Individual PC= Σ Or (Gap 1 -6) : Σ Ir = Gap 7

Figure 3 illustrates the Gap-Map framework with delta between CXO Strategic vision (future target state) and reality (the Or and Ir current state).

[3] Navy Infantry Training and Readiness Manual (P.1-2) refers to (Or) and (Ir) as ‘Unit’ and ‘Individual readiness’ respectively.

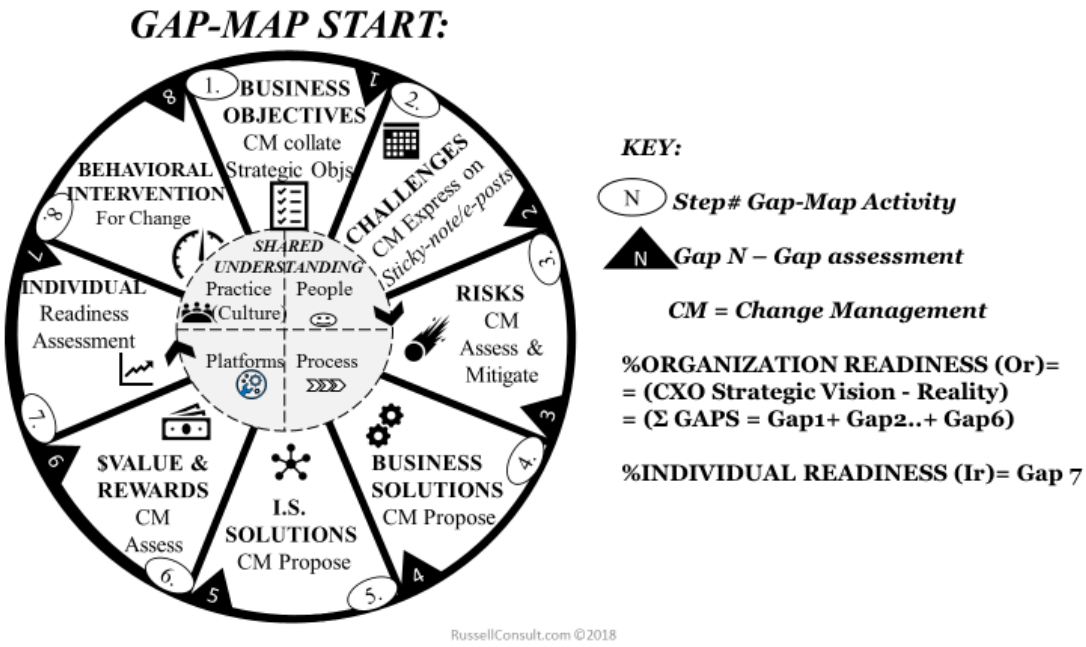

Figure 3. The Gap-Map Framework for Digital Transformation

In step#8, we align the (Or) and (Ir) findings, which we term "Behavioural Interventions", as a prioritised action-list, nominating action owner(s) responsible, and due date. These actions are key to effect communal delivery of our business objectives, business value, and employee intrinsic /extrinsic motivation for communication across departments. They account for the impact of the proposed change on the 4P resources required to fulfil our Target Operating Model (TOM). It is determined by CM consensus following completion of the first seven Gap-Map steps, and is used to align cross-departmental staff, who in turn engage standard existing toolsets and ontologies to derive essential planning data e.g. risk-management tools, budgets, resources etc. Behavioural Intervention acts as a balancer for interdepartmental challenges, exactly what CXOs require to address digital scenarios *at that moment* in time. The Gap-Map is reviewed as a continuous improvement innovation initiative during transformation, so that we proactively adapt to improve emergent resource gaps.

Limitations and Implications

Gap-Map was first evaluated during a major Customer Experience Management (CXM) platform transformation for Europe and Africa's leading Telecommunications Service Provider. The main servers were installed in the London Headquarters, but due to the global nature of cloud business, proof-of-concept testing began in South Africa. It became apparent there was a major data-privacy challenge involved as data migrated across two separate legal jurisdictions. CM worked with groups as diverse as Engineering-Operations (Networks), Customer-Support (Contact-Centre), Legal, Marketing and Executive functions. Through the Gap-Map, we articulated and tracked the digital transformation implications across these diverse groups for action. Figure 4 illustrates a sample output from application of the Gap-Map in development of shared understanding and Behavioural Intervention.

Highlights include Step#1 collation of CIO (sponsor) strategic business objectives during the "tune and track" phase, listening to concerns and reflecting pressing shareholder and customer challenges. Staff-members later commented that "*by calling these out, we save much interpretive time in the employee chain*". This is because in previous transformations to the Gap-Map, intermediaries such as Line-Managers had relayed their subjective interpretation of

CEO strategic requirements from the Annual Report, conveying these as Operational Objectives to employees. However, by workshopping step#2, all impacted stakeholder managers were involved. While many initially cite their own department's operational KPIs, gap articulation highlights action aspects such as political silos, budget deficits, process interface requirements, as well as expected areas such as competence gaps. One interesting anomaly occurred during risk step#3, a data-privacy survey. When asked "*has your organisation adopted data-destruction policies*" (required by General Data Protection Regulation (GDPR) Article 30, record keeping), 81% responded affirmative. Yet when asked if data destruction existed for laptops, smart-phones, cloud, or third-party suppliers, the response dipped to a mean of 26%. It illustrates the re-framing required by collaborative parties who mentally-mapped data as extant on paper, servers, and Storage Area Networks.

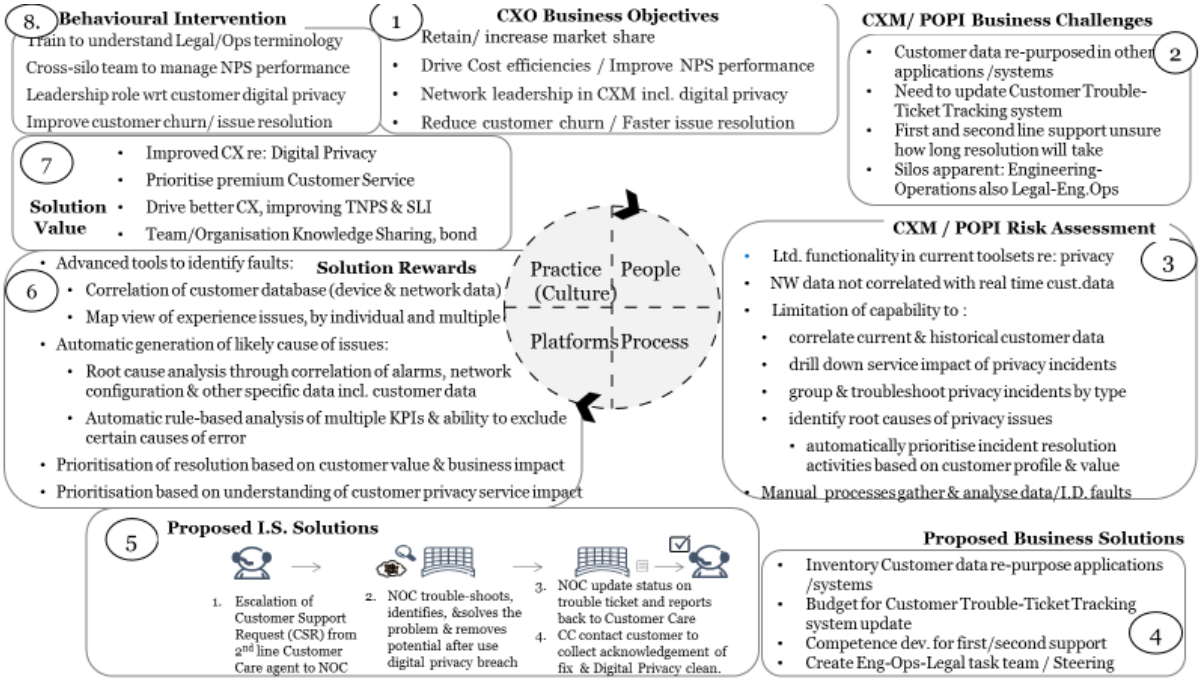

Figure 4. Application of Gap-Map in a GDPR DT scenario

The step findings were later reviewed with respective departmental staff-members, for any new, unusual or innovative solutions (e.g. to reduce budget or resource constraints). Gap-Map enhances the collaboration dynamic between both apposite business organisation entities (e.g. Legal with Engineering), and addressed value potential and staff rewards, key to transformation success. However, the framework could increase in value through a SaaS (Software as a Service) version, to align all staff in realtime, and helping derive essential planning data for other change programs, mitigating through wider risk-management of budgets, resources etc. Gap-Map SaaS helps organisations to visualise and align cross-enterprise challenges, so enabling CXOs to comprehensively address digital transformation scenarios *at a given moment in time*. The Gap-Map facilitates strategic management through articulation of both Organisation and Individual readiness for transformation.

Practical and Social Implications

The evaluations have shown that the Gap-Map framework assists in arriving at shared understanding of the precise Behavioural Interventions required of each department in the value-chain and measuring empirically the 'end-to-end' interoperability at each transformation step.

The framework has since evolved through application of the Gap-Map in global management engagements, for example saving a company over €2m OPEX through faster best-practice establishment for GDPR. The resultant behavioural intervention through harvesting previously tacit information aligns and narrows focus in effecting suitable transformation solutions, with social implications as follows:

- Better decisions based on concise or better information with a mutually agreed mandate.
- Reduced duplication of effort as units work transparently on projects, not in silos.
- Improved sales because customers find information when they need it.
- Increased productivity because employees can find timely information.
- 'Line-of-sight'-Strategic vision aligned to business, operational,competence objectives.

Gap-Map also has considerable impact in employee competence with focussed transformation training - one survey demonstrated over 85% of staff were initially unaware of change implications. Following a competence update programme (blended learning Instructor Led Training supplemented by Web-Based E-Learning), later surveys measured over 98% awareness of the transformation needs. While the upfront cost of the awareness-programme was substantial (over USD€120k), the change programme was delivered on-time, under-budget and with an Individual Readiness survey rating the programme effectivity at just over 81%, substantiating Gap-Map value. Gap-Map enabled diverse departments mitigate penalties from four regulatory authorities[4]. Research[5] confirms such a 'cross-collaborative" framework enhances decision-making capability, while building a learning organisation, and stimulating cultural change and innovation. In real terms, Gap-Map behavioural intervention has substantial impact to bottom-line OPEX savings, leading to gains in EBITDA, shareholder value, program management cashflow, and customer focus.

Originality and Value

The value of demonstrating to our organisation how to understand our business objectives and constraints then allow us to address real needs in complex environments (Simard and Jourdeuil). An example of such complexity is in the case of GDPR, when considering something as amorphous as "*the spirit of the law*". Our organisations may then deliver an 'ordered-domain', utilising Gap-Maps multifunctional system of scenarios for re-use on a global scale thereby multiplying the effect of the data value. Current digital transformation challenges emphasise the opportunities for continued top-down empowerment, and the art and science, the Gap-Map bottom-up collaboration framework. Our proposed next steps for research are:

- Analysis of (Or) and (Ir) Behavioural Interventions.
- Development of SaaS Business Model and Application.
- Artificial Intelligence derived BI.
- Harvesting opportunities presented by the data "long-tail".

[4] Data Protection, Telecommunications, Financial, Consumer Ombudsperson

[5] Garvin, D. (2003) *Learning in Action: A Guide to Putting the Learning Organisation to Work*, USA: Harvard Business Review Press.

Conclusion

More research is proposed to increase the value of Gap-Map, by understanding how entropy, or loss of energy, in Individual Readiness impacts on the Propensity to Change score. This will place emphasis on individual employee performance, motivation, engagement, as well as addressing 'negative' aspects such as fear and key staff retention. It is proposed to later create a 'gap-synthesiser', a realtime gap dashboard (currently a work-in-progress), envisaged as a SaaS (Software as a Service) based application utilising cloud-tools e.g. behavioural analytics, surveys, e-learning, culture-change measures for realtime inter-collaboration. Gap-Map can test our organisations digital transformation capability and propensity upfront. It helps our strategic management in identifying organisation and individual issues prior to transformation starting. Through behavioural intervention, our organisations have control to create tenable digital transformation policies, and aids alignment across the enterprise.

In essence, the "Gap-Map" demonstrates that strategic management does matter, with BI further facilitating our business transformation decisions by identifying opportunities prior to transformation:

- Leaders invest less time and resources in understanding potential disruption impacts.
- Enable discussion and collaboration through critical factor risk mitigation.
- Ensure organisation commitment through listening to and tracing burdened individuals.
- At DT half way, when CXOs have critical BI to hand, they can sustain and restore organisation faith in the transformation.

Joi-Ito concurs[6]: "*CEOs can't know these adjacent opportunities, so empowerment comes with permissionless innovation, not a small group of smart people*".

[6] MIT Director of Media Lab, Professor of the Practice in Media Arts and Sciences

References

Andonie, R., Russo, J.E., and Dean, R. (2007) 'Crossing the Rubicon: A generic intelligent advisor', *International Journal of Computers, Communications & Control*, 2(1), pp. 5-16.

Bandler, R. & Grinder, J. (1983) *Reframing: Neurolinguistic programming and the transformation of meaning*, USA: Real People Press,U.S.

Bogers, M. and Horst, W. (2014) 'Collaborative prototyping: Cross-fertilization of knowledge in prototype-driven problem solving', *The Journal of Product Innovation Management*, 31(4), pp. 744-764.

Boston Consulting Group, and Ito, J. (2017) *MIT Media Lab's Joi Ito on Digital Disruption and Innovation*, Available at: *https://www.youtube.com/watch?v=2H15q_KD-yw* (Accessed: 18th January 2018).

Cameron, K. S. & Quinn, E. R. (2011) *Diagnosing and Changing Organizational Culture.* San Francisco: Jossey-Bass.

Chandler,N., Hostmann, B., Rayner, N., and Herschel, G. (2011) 'Gartner's Business Analytics Framework', *Gartner Summit Docs*, 11(09), pp. 67-82 [Online]. Available at: *http://www.gartner.com/imagesrv/summits/docs/na/business-intelligence/gartners_business_analytics__219420.pdf* (Accessed: 17th November 2017).

Chen, H., Chiang, R.H.L., and Storey, V.C. (2012) 'Business Intelligence and Analytics: From Big Data to big impact', *MIS Quarterly*, 36(4), pp. 1165-1188.

Chomsky, N. (1964), *Current issues in linguistic theory*, The Hague: Mouton

Chomsky, N. (1993), *A minimalist program for linguistic theory*, MIT occasional papers in linguistics no. 1. Cambridge, Massachusetts, MIT Working papers in linguistics.

Department of the Navy (2018) *Infantry training and readiness manual*, Available at: *http://www.marines.mil/Portals/59/Publications/NAVMC%203500.44B.pdf* (Accessed: 1st May 2018).

Davies, J., Duke, A, and Sure, Y. (2004) 'OntoShare – An Framework-based Knowledge Sharing system for Virtual Communities of Practice', *Journal of Universal Computer Science*, 10 (3), pp. 262-283.

Eby, L.T., Adams, D.M., Russell, J.E.A., and Gaby, S.H. (2000) 'Perceptions of Organisational readiness for change: Factors related to employees reactions to the implementation of team selling', *Human Relations*, 53(3), pp. 419-442.

IDC Inc./ Feldman, S., and Sherman, C. (2001) *The high cost of not finding information*, U.S.A.: IDC Information and Data.

Forbes Inc. / Zobell, S. (2018) *Why digital transformations fail: Closing the $900 Billion hole in enterprise strategy*, Available at: *https://www.forbes.com/sites/forbestechcouncil/2018/03/13/why-digital-transformations-fail-closing-the-900-billion-hole-in-enterprise-strategy/2/#3d9ba6531270* (Accessed: 21st May 2018).

Frost, F.A., and Kumar, M. (2000) "INTSERVQUAL – an internal adaptation of the GAP model in a large service organisation", Journal of Services Marketing, Vol. 14 Issue: 5, pp.358-377.

Garvin, D. (2003) *Learning in Action: A Guide to Putting the Learning Organisation to Work*, USA: Harvard Business Review Press.

Genesereth, M.R. and Nilsson, N.J. (1987) *Logical foundation of Artificial Intelligence*, Los Altos: Morgan Kaufmann.

Gibson, C.B., Cohen, S.G.,Hines, P.J., and Weisband, S.P. (2003) *Virtual teams that work*, U.S.A.: Jossey-Bass.

Grohowski, R., McGoff, C., Vogel, D., Martz, B., and Nunamaker, J. 1990. “Implementing Electronic Meeting Systems at IBM: Lessons Learned and Success Factors,” *MIS Quarterly*, (14:4), pp. 368-383.

Gruber, T. (1993) 'A translation approach to portable Framework specifications', *Knowledge Acquisition*, 5(2), pp. 199-220.

Guarino, N., and Giaretta, P. (1995) 'Ontologies and Knowledge Bases Towards a Terminological Clarification', in Mars, N.J.I. (ed.) *Towards Very Large Knowledge Bases: Knowledge Building & Knowledge Sharing.* Netherlands: Ios Pr Inc., pp. 25-32.

Hevner, A. (2007) 'A three cycle view of Design Science Research', *Scandinavian Journal of Information Systems*, 19(2), pp. 87-92.

Hevner, A., and Chatterjee, S. (2010) *Design Research in Information Systems: Theory and practice: 22 (Integrated series in Information Systems)*, 2010 edn., USA: Springer. Hockett, C. (1958) *A course in modern linguistics*, USA: Collier Macmillan Ltd.

IBM Research (2017) *The new era of marketing*, U.S.A.: IBM Corporation.

Ipe, M. (2003) 'Knowledge sharing in organisations: A conceptual framework', *Human Resource Development Review*, 2 (4), pp. 337-359.

Koestler, A. (1964). *The Act of Creation*, Penguin Books, New York.

Moteleb, A.A. and Woodman, M. (2007) 'Notions of Knowledge Management Systems: A Gap Analysis', *Electronic Journal of Knowledge*, 5(1), pp. 55-62.

Nagle, T., & Sammon, D. (2017). The Data Value Map: a Framework for Developing Shared Understanding on Data Initiatives. ECIS.

Negash, S. (2004) "Business Intelligence," *Communications of the Association for Information Systems*: Vol. 13 , Article 15. Available at: http://aisel.aisnet.org/cais/vol13/iss1/15

Negash S., Gray P. (2008) Business Intelligence. In: Handbook on Decision Support Systems 2. International Handbooks Information System. Springer, Berlin, Heidelberg

Nunamaker, J.F., Chen, M. & Purdin, T.D.M (1990) Systems Development in Information Systems Research, Journal of Management Information Systems, 7:3, 89-106

Osterwalder, A. (2004). *The Business Model Ontology – A Proposition in a Design Science Approach.* Ph.D. l'Université de Lausanne.

Ostrowski, L., Helferta, M. and Gamab, N. (2014) 'Framework engineering step in design science research framework: a technique to gather', *Behaviour & Information Technology*, 33(5), pp. 443–451.

Parasuraman, A; Zeithaml, V.A. and Berry, L.L. (1988) 'Servqual: A multiple-item scale for measuring consumer perceptions', *Journal of Retailing*, 64 (1 (Spring 1988)), pp. 12-23.

Schein, E.H. (2016) *Organisational Culture and Leadership*, U.S.A.: John Wiley & Sons.

Sein, M.K., Henfridsson, O., Purao, S., Rossi, M., and Lindgren, R. (2011) 'Action Design Research', *MIS Quarterly*, 35(1), pp. 37-56.

Simard, A. (2017) 'Organisational social context: The foundation of tacit Knowledge Management', in Jaziri-Bouagina, D, and Jamil, G.L. (ed.) *Handbook of research on tacit knowledge management for organisational success.* U.S.A.: I.G.I. Global, pp. 76-88.

Simard, A. J., & Jourdeuil, P. (2014) 'Knowledge manageability: A new paradigm', in Al-Bastaki, Y., and Shajera, A. (eds.) *Building a competitive public sector utilising knowledge management strategy* . Hershey, PA: Business Science, pps. 16 -23.

Strong, D.M. and Volkoff, O. (2010) 'Understanding organisation-Enterprise System fit: A path to theorizing the Information Technology artifact', *MIS Quarterly*, 34(4), pp. 731-756.

Watzlawick, P.,Weakland, J.H., Fisch, R. (1978) *Change: Principles of problem formation and problem resolution*, 3rd edn., USA: W. W. Norton & Company.