Towards a Conceptual Framework of IT Operating Model and its Implications for Emerging Practices in Information Technology

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Abstract

This paper is to establish a fit-for-purpose conceptual framework for the IT Operating model to handle emerging requirements in IT. Currently, there is no standard one size fits all kind of Operating Model. This paper brings a flexible IT Operating model to address emerging requirements. We examined today's various IT operating models suggested by Institutions and experts. Based on our study, we have proposed a conceptual framework for the IT Operating Model by carefully analysing the dimensions and mapping them to elements of IT Strategy and Operations discussed in this paper, giving an adaptive framework that can address various requirements. Our research shows a dearth of consistent framework and definition of an IT Operating Model. Hence, we see many facets of the operating model of organizations. Research, Advisory, and Consulting firms have given definitions and articulated the IT operating model to resolve this challenge. However, they need to be more consistent and address diverse requirements. This paper introduces a conceptual framework of the operating model to address the requirements of digital technology-related disruptions. This paper extends the existing body of knowledge around emerging IT Operating Models, and enhances it to create a conceptual framework. In doing this, we have also tried leveraging the existing knowledge body.

JEL Classification: D26, D80, D83

Keywords: Operating Model, Innovation, DDDD IT Framework, Strategy and Operations, Digital Disruption

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1. Introduction

The general understanding of the operating model shows it is both an abstract and visual representation (model) of how an organization delivers value to its customers or beneficiaries, as well as how an organization runs itself (Kiron et al., 2013; Mallikarjun, 2015; Laukkanen & Tura, 2020). The application of this understanding may vary from organization to organization, sector to sector, and sometimes business to business (Freudenreich et al., 2020). A search of databases of popular journals reveals there needs to be academic research on the definition of an Information Technology Operating Model. Besides, there are significant variations in the various models suggested by consulting and research firms (Vendraminelli et al., 2022). There seems to be a "gentleman's agreement" in the industry about the information technology (IT) operating model with no precise understanding of its scope and coverage.

The current disruptions originating from digitalization are creating complexity (Loebbecke et al., 2015; Xiang, 2018; Vial, 2019). The emergence of new technologies, such as Big Data, the Internet of Things, Blockchain, Digital Workplace, Cloud, and Artificial Intelligence, has a significant impact on products, platforms, channels and operations (Kenney & Zysman, 2016; Reinartz et al., 2019; Zhu et al., 2020). Information Technology's role has also changed in the past, and increased business success closely links with how Information Technology can deliver (Chatterjee et al., 2021). The role is shifting from being a mere support function to being accepted as a strategic driver for organizational growth (Drnevich & Croson, 2013; Lokuge et al., 2019). IT products and services companies are now expected to take a central role in facilitating IT user companies to balance technology and business goals by capitalizing on digital capabilities (Kane et al., 2015; Bordeleau et al., 2020; Ciampi et al., 2021). While these capabilities enable companies to better engage with their customers, unveil innovative business models, enhance process efficiency and augment informed decisions, it is worth mentioning the collaborative role of the IT partners' ecosystem (Brenner, 2018). As the lines between business and technology are blurred, the IT Operating Model is critical to organizational success. The model serves as an outline for the organization of IT resources and is expected to evolve and mature along with the business model and strategy.

1.1 Research Motivation

We find from earlier research that, to a more considerable degree than before, companies invested in high-cost complex resources to deploy digital tools to rebuild their organization's IT landscape (Hess et al., 2016; Brunetti et al., 2020). The result? Such deployments fall short of meeting their objectives or are abandoned. The reasons are operational inefficiencies, slower decision-making due to high ambiguity around role definition, statement of responsibilities and accountabilities, poor interactions between functional units due to low levels of system integration, and increased operational risk are the reasons (Ali & Green, 2012; Invernizzi et al., 2018; Zahid et al., 2021). It would have been wise to identify and focus on digital integration with the existing legacy IT infrastructure resources (Cao & Iansiti, 2022). One of the critical factors in the shortfall stated above is the non-existence of a typical IT operating model for the companies' digital and IT teams. IT operating model is a disciplined and structured approach or a blueprint for executing an IT strategy (Alt, 2022). We know that in the current era of digitalization, the successful execution of a business strategy depends a lot on the business's IT strategy. Nevertheless, what is the driving force of an effective IT strategy? It is the presence of an IT operating model.

We postulate through this research work; an IT operating model helps organizations to align with a well-defined business strategy by developing a solid design foundation. The importance of the operating model has been growing. When we searched the interests in Google Trends on the operating model, it showed a consistent interest increase over time. Several consulting and research firms discussed a positive correlation between the existence of a matured operating model and the improved financial performance of organizations (Rossini et al., 2019). Digital disruptions are causing organizations to reinvent the operating model for success (Iansiti & Lakhani, 2020). Figure 1 presents a snapshot of the Google search results about the "operating model".

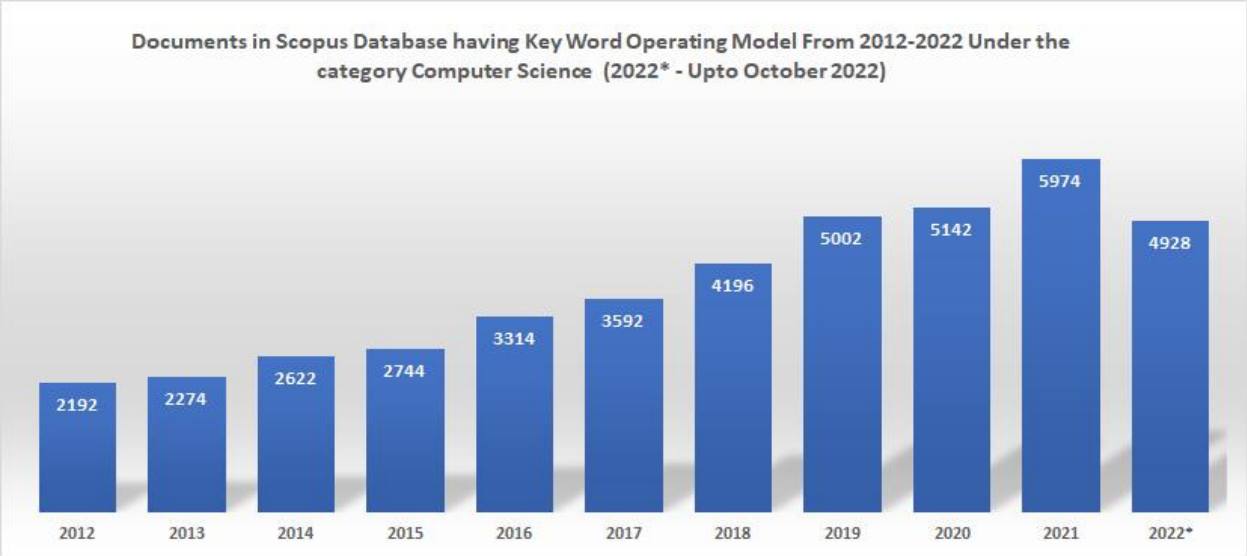

Figure 1 - Interest in Operating Model in google searches *(Source: Google Trends. Date Range 2012-2022)*

In addition, when we searched the number of documents published in Scopus with the keyword "Operating Model", it showed the growing significance of research on the operating model. (Published till October 2022). Most of these documents are associated with computer science, showing the importance of the IT Operating Model.

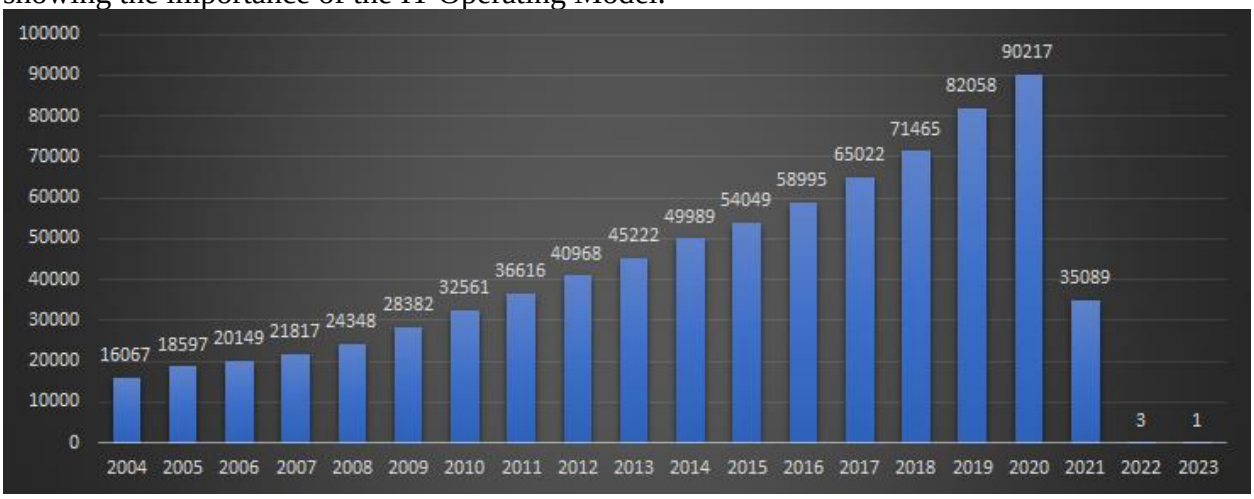

Figure 2 - Growing interest in research around "Operating Model' in terms of the number of documents published. (Source: Scopus. Date Range selected from 2004 to 2023).

Many organizations fail to achieve the desired outcome from their businesses because of the misalignment of the Operating Model between strategy and execution (Galpin & Whittington, 2012). The first reference to the Operating Model came in 1962 when Alfred Chandler, a business historian at Harvard Business School, wrote a seminal book, "Strategy and Structure: Chapters in the History of the Industrial Enterprise". His book is about the theory development and proof that a managerial organization responds to its business strategy (Chandler, 1990). Lately, in the last two decades, much discussion has happened on this concept, though there still needs to be a consistent definition and understanding of how to create one.

This paper comprises seven sections. Section 2 explains the state-of-the-art from existing research works on the IT operating model in detail. Section 3 is about defining elements that will form part of the strategy and operations of IT. Section 4 maps the elements to the dimension of the proposed IT operating model. Section 5 discusses the model's implications on emerging concepts by examining *the crowdsourcing of application code by a typical organization* as a proof-of-concept (POC). Section 6 discusses the critical contribution of this research, and section 7 concludes the paper.

2. State-of-the-art: Different Flavours of IT Operating Model

Without an established definition and a framework for the operating model, we have refined the broader definition of the IT operating model. In addition, we have explored the insights shared by various consulting, research and advisory firms. A closer look at the IT operating models and principles suggested by the research and advisory firms shows that most of them have tried to address the challenges that originate from disruptions brought by digitalization. Business cycles have become faster, and IT organizations' inability to respond to business demand quickly slows growth (Chanias et al., 2019; Iyke & Ho, 2020). CEOs show that growth is the top priority, with high hopes for technology (Gartner, 2019). Organizations with a better operating model perform much better financially (Bain & Company, 2015).

In this research, we have considered the insights from well-known consulting and advisory firms such as Accenture, Bain & Company, Boston Consulting Group, Deloitte, Gartner, KPMG and PricewaterhouseCoopers (PWC), besides the seminal academic research works of the past. The various IT operating models suggested by them were closer to the requirements of this paper. Also, we attempted to investigate the IT Operating Model framework on Scopus, but it only showed a need for more institutional research conducted so far. Hence, we are confident that this research addresses the current gap.

Consulting firm PricewaterhouseCoopers (PwC) defines it as *"An operating model translates strategic intent into operational capabilities. It serves as the foundation for execution and provides clear guidelines for an enterprise's leadership team, line managers and operational teams"*. The dimensions PwC has considered for the operating model are People and Organization, Processes, Governance Interactions, Culture, Measures, Tools and Technology (PWC, 2019).

Gartner has also shown a similar definition of the IT Operating model *"An I&T operating model represents how an organization orchestrates its I&T capabilities to achieve its business's strategic objectives. More simply, it makes how things get done here explicit.*" Gartner has considered the

following dimensions: Engage, Enable and Deliver. Engage comprises Financials, Decision Rights, and Performance; Enable comprises Organization Structure, Sourcing & Alliances, Talent and Deliver places, Tools and ways of working (Gartner, 2017).

Accenture has published its findings and insights on an agile operating model named "Adapt to Survive" for the digital age. It describes an adaptive version of the operating model to meet disruptive digital transformations (Accenture, 2017). The findings discuss the alignment of business and operating models as per Accenture. Without making the operating model changes, companies' risk nearly 10 to 20 percent of revenue growth. Accenture discusses key dimensions affecting operating models: Governance, Processes, Organization and Workforce, Technology, Culture, and Metrics & Incentives.

Ross et al. (2006) define the operating model "as the level of business process integration and standardisation for delivering goods and services to customers." They give a two-dimensional quadrant view of the Business Process Operating Model around Integration and Standardization rather than discussing dimensions.

Bain & Company (2014) described the importance of an operating model with a case study of Ford showing how Ford has brought turnaround through significant operating model changes. In its publication, Bain & Company has given five dimensions of the operating model: Structure, Accountabilities, Governance, Ways of working, and Capabilities (People, Process, Technology). The structure involves appropriate boundaries for lines of business and functions. Accountabilities refer to roles and responsibilities. Governance refers to various forums and management processes for decision-making and oversight. Ways of working relate to the organization's culture and capabilities of people, processes and technology and how they are stitched within the organization.

Boston Consulting Group (BCG) proposed the "Agile Operating Model Framework", which has the following dimensions–Governance & Funding, Structure, Processes, Culture and Behaviour, Leadership and Talent, Measurement Framework and Technological Enablers (BCG, 2018). Consulting firm Deloitte (2019) describes the operating model as "An Operating Model that represents how an organization creates value–and by whom within the organization" in its paper "Architecting an Operating Model–A platform for accelerating digital transformation". The following dimensions of the Operating Model are *Governance, Mission, Insights, Process, Technology and Talent*.

KPMG, in its publication "Looking for a better way of working in the cloud?" (KPMG, 2020), has provided dimensions for the operating model as Process, People, Technology, Performance & Insights, Governance and Service Delivery Model. Most of these IT operating models help organizations adapt to digital-related disruptions. However, the dimensions are different, with some similarities and commonalities.

After going through the literature review, we tabulated the various dimensions of the Operating Model. Even though there is no consistent agreement on the Operating Model, some dimensions are referred to more often than others.

We have provided the meaning of various dimensions from the literature review and our assessment below. We will refer to these meanings throughout this paper.

- **Governance & Funding**: How the organization can govern itself and how it can decide, prioritize and allocate resources, manage risks and balance trust and control (Jain, 2010). Almost all research works of the past widely considered Governance and Funding and consulting firms as one of the most critical pillars of the operating model (Hitz & Schwer, 2018; Mikalef et al., 2020)
- **Process**: How an organization can stitch different functions and ecosystems to ensure it performs the tasks so that they can translate into execution (Amrollahi, 2015). De Vries et al. (2011) identified the various operating model deficiencies and requirements for enhancement in terms of practices to enable an enterprise to architect a process reuse opportunity.
- **Organisation Structure**: How the organization is structured and the boundaries between different functions, hierarchies with roles and responsibilities and interfaces (Muhdi et al., 2011). Kates and Kesler (2015) defined five key activators: Unique *value-adding layers, Innovation & Execution Networks, The Business Handshake, Power, Governance and Decision Making and Matrix-Ready leaders.*
- **People & Capabilities**: How the organization brings Talent, upgrades skills, manages competencies, drives motivation, rewards and keeps people, drives engagement, improves productivity and generates empowerment. Drawing from extensive research, Keiningham et al. (2020) tried to establish that "people are our most important asset" in their research. However, most empirical research around Operating Model has ignored "People" as an essential enabler today.
- **Platform & Technology**: This shows what tools and technology platforms, and products an organization deploys to enable its workforce to deliver based on its overall strategy and requirements ((Khasraghi & Tarokh, 2012). Technology tools and platforms continue to develop new businesses and drive changes to IT operating models (Blohm et al., 2018). Ross et al. (2006) discussed three stages of architectural maturity as they learn to enhance strategic capabilities: enterprise coherence, strategic alignment and value creation.
- **Culture**: How in the organization individuals can collaborate, execute, build trust and engagement, connect with others and manage relationships, collaborate to become more effective, adapt to change, take decisions, and take responsibility and accountability (Borowiecki et al., 2016). Peter Drucker once said that "Culture eats strategy for breakfast". Hock et al. (2015) examined the impact of organizational culture on a Firm's capability to innovate the business model. Five of the seven consulting firms studied in this research have put culture at the heart of their operating model.
- **Performance and Measurement:** What measures relate to performance, and what Key Performance Indicators (KPIs) does it place for success; how do they help drive critical business outcomes? As IT and business boundaries are getting blurred, IT and Business performance often depend on each other. In the past, many discussions happened over new concepts, such as DevOps and Agile Development, to drive more agility for improving performance (Kim et al., 2016; Mishra & Otaiwi, 2020; Limaj & Bernroider, 2022). We can improve what we can measure and improve the effectiveness of the IT

Operating model through KPIs, driving continuous improvement and institutionalizing processes around it (Pollock et al., 2019).

- **Rewards:** Rewards associated with the performance of IT organizations in improving various metrics. It can go to employees or providers directly involved in creating a positive impact. People are essential to businesses, and rewards motivate people (Finnerty et al., 2013). Rewards can exist in multiple forms. Though the reward is not a very popular dimension of the IT Operating Model, certain emerging and innovative concepts like Crowdsourcing revolve around rewards. In addition, Innovation and Rewards go hand in hand (Pavlidou et al., 2020; Cepa & Schildt, 2022).
- **Roles & Responsibilities:** Roles and responsibilities of various organizational stakeholders, and interdependencies, usually indicated using RACI (responsible, accountable, consulted and informed) metrics (Ara et al., 2021). Roles and responsibilities often help to bring additional clarity to the stakeholders around the execution of various activities (Sari et al., 2019; Dmytriyev et al., 2021).
- **Leadership and Talent:** Key competencies required to drive an IT organization, providing leadership and direction, and decision-making capabilities associated with various tasks and initiatives (Schwittay, and Braund, 2019; Ooms et al., 2020). Leadership, Talent and closely linked, and Governance are vital pillars of the Operating Model as they influence decision-making. The research report published by Accenture has identified Leadership and Talent as very important. Leadership and Talent are intangible and softer than organizational structure, processes, and technology (Ogbeibu et al., 2021).
- **Mission:** Revolves around the purpose and outcome expected from an IT organization to deliver, which aligns with business objectives (Elazhary et al., 2022). Often vision, Mission and goals form an integral part of the strategy and hence are closer to the Operating Model, which connects the strategy to execution. However, Mission is yet to be considered a dimension of the IT operating model. Garton (2017) highlights this connection between mission and operating model.
- **Knowledge and Insights:** Managing the flow of knowledge and insights, sharing knowledge, ensuring retention of knowledge and further enhancing through various means. As technology and concepts grow, knowledge and skills may also need an upgrade. Keeping knowledge and insights and ensuring that it remains available to everyone, driving productivity through shared knowledge in a fast-changing digital era, is constantly highlighted as an essential requirement by practitioners. Cherman and Azeredo (2020) analyse the importance of organizational wisdom and how it connects with the competitive differentiation of organizations. Competitive differentiation is essential for the execution and success of organizations. Hence, this dimension is an essential part of the operating model that needs a different focus and attention (Moore et al., 2020).
- **Service Delivery Model**: This provides the details about what capabilities are delivered and how and where. Service Delivery is an essential aspect of IT Operations, and IT Operations drive availability, experience, speed and agility (Grossman et al., 2018). It also helps to optimize the cost of operations. Speed is an essential element of digital disruption caused as it is linked to many other dimensions. Horlach et al. (2016) discussed the impact of "two-speed IT"–Traditional IT and Digital IT, which requires different treatment and approaches in dealing from a service delivery perspective. The

paper also describes the expectations around both types of IT and how the service delivery should be structured. However, Service Delivery Model has so far attracted lesser focus in IT Operating Model compared to other dimensions like Governance and Processes.

- **Sourcing and alliances**: The approach to and set of actions for defining and integrating internal and external sources of services that will complement objectives and outcomes (Piezunka & Dahlander, 2015). It also incorporates necessary partnerships that can complement the objectives. Sourcing has changed from cost-focused to value-focused outsourcing. It has become a strategic tool for competitive differentiation and innovation. In their research, Su et al. (2015) showed the strategic importance of Sourcing in furthering strategy, driving innovation and improving business outcomes.
- **Places:** Location where resources are deployed, how they collaborate and interact and contribute to the overall aim. In the IT context, multi-location delivery is a reality and offshoring is considered for various reasons ranging from cost to competency (Elo et al., 2022). In addition, organizations often operate in different markets and geographies, leading to a complexity of location or places in the operating model. A shift from monolithic centralized models towards more decentralized and nimbler organizations will require operating models to be reimagined from this perspective to understand how and from where the services will be delivered (Jenkins et al., 2016). In addition, we also see remote operations and work from home becoming more relevant in the post-COVID-19 era (KPMG, 2020). Table 1 summarizes the literature derived from the state-of-the-art.

Table 1: Dimensions of IT Operating Model suggested by consulting and research firms

Dimensions-> / Consulting/ Research Firms	Governance & Funding	Processes	Organisation Structure	People & Capabilities	Platform & Technology	Culture	Performance & Measures	Rewards	Roles & Responsibilities	Leadership & Talent	Mission	Knowledge & Insights	Service Delivery Model	Sourcing & Alliances	Places
Accenture	Y	Y	Y	Y	Y	Y	Y	Y	Y						
Bain & Co	Y	Y	Y	Y	Y	Y			Y						
BCG	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y					
Deloitte	Y	Y		Y	Y					Y	Y	Y			
KPMG	Y	Y		Y	Y		Y					Y	Y		
PwC	Y	Y	Y	Y	Y	Y	Y								
Gartner	Y		Y	Y	Y	Y	Y					Y		Y	Y

Some dimensions, such as Governance and Funding, Processes, Organization Structure, People and Capabilities, Culture and Performance, are more common across various studies. They are more often used, but we will consider all dimensions we have identified for this paper.

3. Defining elements for Strategy and Operations for IT

The operating model is to connect strategy with execution. Conversation on the Operating Model is complete with an understanding of the elements of Strategy and Operations and their effects. For this purpose, we are grouping IT Strategy and Operations elements under four main categories: Design, Develop, Deliver, and Disrupt. Each category has IT Strategy and Operations elements, which commonly form a part of it (Figure 3). The customization and contextualization of the model should be possible.

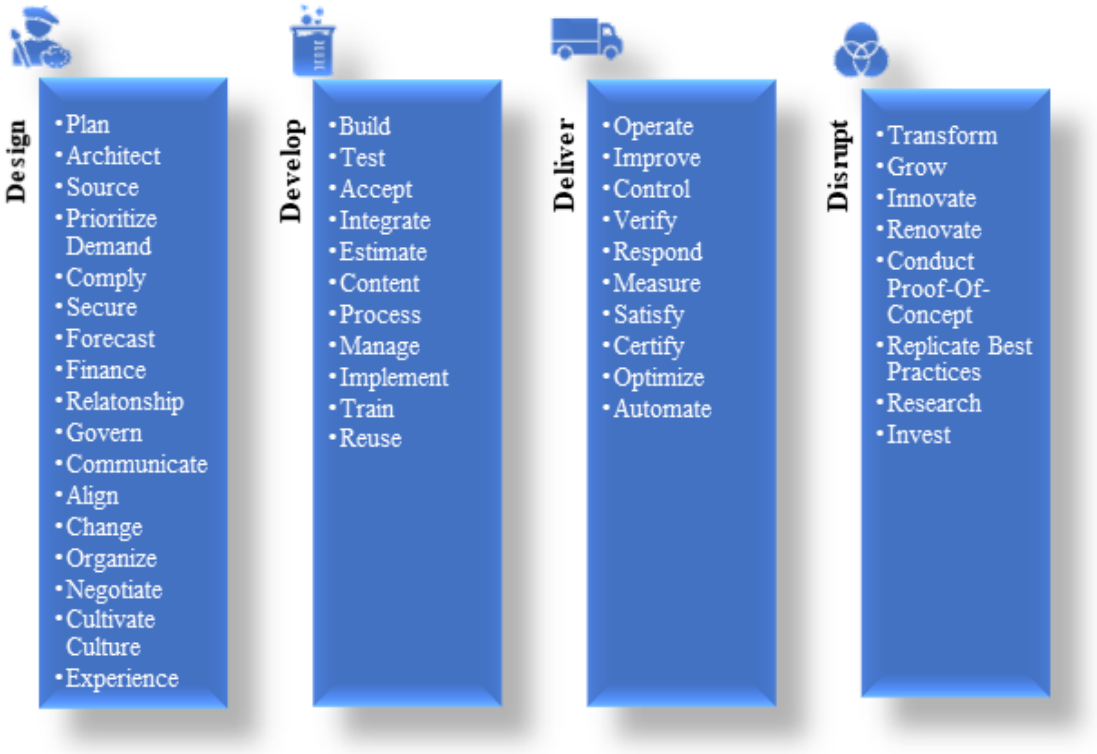

Figure 3 Elements of IT Strategy and Operations for a typical organization

We have discussed mapping the various elements of the IT Strategy and Operations to the Operating Model dimensions below to understand how it is getting covered. The intent is to understand that the proposed operating model should cover every aspect of the strategy to execution. It is an indicative mapping exercise carried out to show the coverage and importance of the operating model to the elements of basic strategy and operations. From organization to organization, this may vary depending on how it operates. Table 2 presents the explanation for the aforesaid four categories:

Table 2: Categories of IT Strategy and Operations

Category	**Description**
Design	Incorporates elements of planning and strategy
Develop	Incorporates elements of building new capabilities
Deliver	Incorporates elements of running the operations for the business
Disrupt	Incorporates the elements of competitive differentiation and growing the business, and that includes constant alignment with the market

The next section comprises explanations associated with the elements of the IT Strategy and Operations.

4. Mapping elements of IT Strategy and Operations to dimensions of IT Operating Model

To test the efficacy of the Operating Model, we tried to map the dimensions identified above to the various elements of IT Strategy and Operations. This approach helps us to understand how they correlate with each other. This model can be used as a framework for many organizations. The purpose of doing this is twofold; (a) to ensure adequate coverage of all elements in the Operating Model and (b) to align the IT Operating Model to the requirements of the IT Organisation. We may need to revisit the Operating Model if we need to map the elements of the Strategy and Operations to a dimension of the Operation Model. Table 3 below presents a conceptual framework to augment IT organizations to prioritize their focus and manage risks associated with a positive deviation. That will also help IT leaders model their Operating Models by identifying potential hotspots, aligning with the right stakeholder, and structure with the right processes. Many IT organizations operate differently as the association with various dimensions of the Operating Model may vary, but the overall framework suggested here will remain the same.

Table 3: Interrelationship between elements of IT Strategy and Operations and Dimensions of Operating Model

Sno	Elements of IT Startegy and Opeations	Descriptions	Governance & Funding	Processes	Organization Structure	People & Capabilities	Platform & Technology	Culture	Performance & Measures	Rewards	Roles & Responsibilities	Leadership & Talent	Mission	Knowledge & Insights	Service Delivery Model	Sourcing & Alliances	Places	Count
Design																		
1	Plan	Planning IT Startegy and Operations	Y	Y	Y	Y							Y	Y	Y	Y		8
2	Architect	Architecting IT for future readiness	Y				Y				Y	Y					Y	5
3	Source	Sourcing, Procurement, Partnerships and Vendor Management		Y	Y	Y	Y		Y		Y					Y	Y	8
4	Priorotize Demand	Demand management and prioritization		Y		Y										Y	Y	4
5	Comply	Compliance to various Strandards and Audits	Y	Y	Y						Y							4
6	Secure	Cybersecurity and Physical Security of Data and Assets	Y	Y		Y	Y	Y			Y			Y				7
7	Forecast	Forecasting future Demand, Workload and Changes to the IT Envrionment	Y	Y														2
8	Finance	Budgeting, Allocation and Spend, Financial Reporting, ROI, Business Case and Comliance & Audits	Y															1
9	Relatonship	Managing Business and Partner Relationships	Y													Y		2
10	Govern	Providing Leadership and Oversight to Overall IT department	Y			Y						Y						3
12	Communicate	Communication with stakeholders, end users, IT team and partners	Y															1
13	Align	Alignment of business and IT and partner ecosystem towards objectives	Y															1
14	Change	Drive change management and transformation	Y		Y	Y		Y				Y	Y					6
15	Organize	Organize and Create Roles and Responsibilties for success		Y	Y						Y							3
16	Neogotate	Negotiate Contracts, Demands		Y												Y		2
17	Cultivate Culture	Drive Cultural Change to align with the Market and Evolving Requirements						Y					Y					2
18	Experience	Improve End User Experience at all levels	Y	Y					Y						Y	Y		5

Develop																		
1	Build	Develop new Systems, Applications, Products, Capabilities as per Scope, Budget and Time	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	**14**
2	Test	Ensure Quality of Application and Systems created is as per Specifications		Y	Y	Y			Y		Y				Y	Y		**7**
3	Accept	Ensure Deliverables meets the Required Expectations of End Users		Y	Y						Y							**3**
4	Integrate	Manage the Integration of New Capabilties with the Environment. Evaluate new Platforms		Y	Y	Y	Y				Y			Y	Y	Y	Y	**9**
5	Estimate	Estimate and Validate the Effort, Cost, Capability needed to Build new systems		Y			Y											**2**
6	Document	Create Content required for Execution		Y		Y												**2**
7	Process	Ensure Processes are Built as per the System Requirements and Policy		Y	Y	Y	Y				Y					Y		**6**
8	Manage	Implement Project and Portfolio Management Practices		Y	Y	Y					Y					Y		**5**
9	Implement	Manage and Lead new Implementations and Releases		Y	Y	Y	Y				Y				Y	Y		**7**
10	Train	Provide Internal (IT) and External (non-IT) training and develop new skills							Y	Y				Y				**3**
11	Reuse	Reuse and improve Productiviy, Quality, Speed and Agility		Y		Y	Y		Y	Y	Y							**6**
Deliver																		
1	Operate	Operate as per Documented Processes and Operating Manual		Y	Y	Y	Y				Y				Y	Y	Y	**8**
2	Improve	Drive Improvements to make Environment more Effiicent		Y		Y	Y		Y	Y				Y		Y		**7**
3	Control	Review and monitor the Environment		Y			Y		Y		Y				Y	Y		**6**
4	Verify	Continuously Monitor and Make Environment more Proactive towards Operational Issues		Y			Y		Y	Y	Y				Y	Y		**7**
5	Respond	Manage Service Delivery and deal with Operational Issues		Y	Y	Y	Y		Y		Y				Y	Y		**8**
6	Measure	Continously Measure, Monitor and Improve Peformance		Y			Y		Y		Y				Y	Y		**6**
7	Satisfy	Measure End User Satisfaction and Ensure Improvement from Operations	Y	Y					Y						Y	Y		**5**
8	Certify	Drive Compliance to various Standards and Certifications	Y	Y	Y	Y			Y		Y				Y	Y	Y	**9**
9	Optimize	Drive Operational Efficiency for Business and IT to make to make it Faster, Cheaper and Efficient		Y		Y	Y	Y	Y	Y	Y			Y	Y	Y		**10**
10	Automate	Automate and maximize Cognitive Automation and AI driven IT Environment. Identify new Tools	Y	Y		Y	Y							Y		Y		**6**
Disrupt																		
1	Transform	Identify and drive Transformation Initiatives linked to Business and IT Outcomes	Y			Y	Y		Y		Y	Y		Y				**7**
2	Grow	Enhance the Capabilties to handle better Business Demand and help Business Grow	Y	Y		Y	Y		Y		Y			Y	Y	Y		**9**
3	Innovate & Ideate	Bring Strategic Depth through Innovation and Ideation and Forge Startegic Partnership with Business	Y			Y		Y	Y	Y		Y	Y	Y				**8**
4	Renovate	Identify opportunties for creative destruction for more efficient and forward looking IT	Y	Y	Y	Y	Y		Y	Y	Y			Y	Y	Y		**11**
6	Conduct POC	Conduct proof of concept (POC) for Innovative Point Solutions or Differentiating Products & Services	Y	Y		Y	Y				Y			Y		Y		**7**
7	Replicate Best Practices	Aquire Market Leading Best Practices to Drive better business and IT Outcomes		Y		Y							Y	Y		Y		**5**
8	Research	Conduct Research on New and Emerging Technology Trends and its Alignment to Business	Y		Y	Y				Y		Y	Y	Y		Y		**8**
9	Invest	Incubate Startups for Innovate Products and Invest in Future of the Organisation	Y			Y	Y	Y		Y			Y	Y				**7**
		Total	**23**	**33**	**17**	**28**	**22**	**7**	**18**	**10**	**24**	**7**	**7**	**16**	**16**	**27**	**7**	

The count against each element (rows) shows an association with the operating model. Here, elements such as Build, Optimise, and Renovate may require maximum attention as they touch across multiple dimensions of the Operating Model, showing the need for better monitoring. Similarly, the dimensions like Process, People & Capabilities, and Sourcing & Alliances need closer monitoring. They should be well-structured as they affect the maximum number of IT Strategy and Operations elements.

5. Implication on Emerging Concepts – Proof-of-Concept "Crowdsourcing of application code by a typical organization"

The IT landscape is changing and becoming more complex. Often, we see the change is fast. The IT Operating Model cannot remain static and will require changes with the emerging concepts to align with constant changes in business models and expectations from IT. Our study reiterates the concept of perpetual evolution explained by Bossert and Feldmann (2020).

As a proof-of-concept, let us examine the model using one such emerging concept around a typical organization's Crowdsourcing of application code. "Crowdsourcing" is not new, but it became famous in 2006 when Jeff Howe first coined the term in his report "The Rise of Crowdsourcing", published in WIRED magazine (Howe, 2006). Presently, it continues to develop as an alternative to outsourcing as we see significant growth in some crowdsourcing communities in the last several years. The global crowdsourcing market in 2018 was around 9.5 billion in 2018 to USD 155 Billion by 2027, with a CAGR growth of 36.5% (Absolute Market Insights, 2020). Estelles-Arolas and Gonzalez-Ladron-de-Guevara, (2012) analyse Crowdsourcing definitions in their research "*Towards an integrated crowdsourcing definition. Journal of Information Science*" where they extracted and studied various prevailing definitions of crowdsourcing and analysed them to arrive at an integrated definition for crowdsourcing. As per the definition given in the paper, "*Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, variable complexity and modularity, and in which the crowd should bring their work, money, knowledge and experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills. At the same time, the crowd-sourcer will obtain and utilise to their advantage what the user has brought to the venture, whose form will depend on the type of activity undertaken". H*ence, in table 4, we identify the following elements of crowdsourcing from the definitions stated above.

Table 4: Crowdsourcing elements

S. No	Elements of Crowdsourcing	Description
1	Crowd	The paper analysed and concluded that it is a large group of individuals whose number depends on the initiative. The size will depend on the initiative's target and the required knowledge and insights expected. It can be a heterogeneous as well as a homogenous crowd from the skills and knowledge perspective, which depends on the type of initiative and how its execution mode.
2	Task/Activity	The challenge or task that the crowd will solve or contribute to may vary widely. The crowd will need to conduct problem resolution by performing mutable intricacy. The kind of

		challenge or task that the crowd will solve or contribute to may vary widely. The crowd will need to conduct problem resolution by performing mutable intricacy.
3	Reward	The reward is an integral part of crowdsourcing, but it does not necessarily have to be monetary all the time. It can be a financial reward, social recognition, self-esteem, or any indirect benefit like marketing or any other benefit. If the benefit is absent, it will not be construed as crowdsourcing.
4	Initiator	The initiator can be a company, organization, institution, non-profit organization, or even an individual. Initiators of the crowdsourcing task will lead the overall initiative towards a business outcome or value.
5	Outcome	Crowdsources will arrive at a problem solution by fulfilling the action/task expected by the crowd. The efforts, experience and knowledge of the crowd will immensely benefit the crowdsources, particularly in crowdfunding scenarios, from its assets. These outcomes should translate into some tangible benefit to the initiator as cycle time reduction, cost saving, ideation or innovation or any other way. Often, it is a new idea or innovation challenge which is explored.
6	Process	Research shows that crowdsourcing is an online, distributed, and participative environment over the internet. Additional crowd features depend on the initiative proposed. The process may enable different crowdsourcing, for example, production of good or innovative ideas.
7	Call (open or closed)	There can be three types of calls: *Open, limited by community and hybrid*. We can say that to get in touch with the crowd, a flexible open call is suitable. For this research, we will consider Crowdsourcing to be of a hybrid type, which means it will be an open call for a relevant community of people with specific knowledge. If the specific knowledge is available to everyone, then in that case, we consider everyone.
8	Platform	The research shows that there is complete unanimity as far as the medium, which is the internet. There can be various internet-based platforms that may launch the challenge or execute the task.
9.	Team	Crowdsourcing will require structural change: a separate team with accountability to collaborate externally and internally and manage the requirements and delivery, and it requires prioritization of deliverables as well.
10	Architecture	Crowdsourcing will require strategy and architecture, and which part of the code needs to be outsourced is often an architectural choice, as it should not have too many dependencies.
11	Security & Compliance	Crowdsourcing will expose the organizations to security risks or disputes related to the intellectual properties generated. Structuring security considerations often require expert involvement from a security, legal and compliance perspective to examine the risks.

In table 5, we attempt to map the elements of Crowdsourcing strategy and operations against the dimensions of the IT Operating Model.

Table 5: Mapping of Operating Model Dimension to Elements for Crowdsourcing

	Dimensions of Operating Model	Governance & Funding	Processes	Organization Structure	People & Capabilities	Platform & Technology	Culture	Performance & Measures	Rewards	Roles & Responsibilities	Leadership & Talent	Mission	Knowledge & Insights	Service Delivery Model	Sourcing & Alliances	Places	Degree of Impacted Dimension(Y)	Degree of Impacted Dimension(Y)
Sno	Elements of Crowdsourcing																	
1	Crowd				Y												1	3
2	Task/Activity	Y			Y		Y			Y				Y	Y	Y	7	119
3	Reward								Y								1	1
4	Initiator										Y	Y					2	6
5	Outcome											Y					1	2
6	Process		Y	Y			Y	Y		Y			Y	Y	Y		8	144
7	Call (open or closed)		Y														1	5
8	Platform				Y												1	3
9	Team		Y				Y										2	18
10	Architecture	Y	Y			Y											3	27
11	Security & Compliance	Y	Y				Y										3	36
	Degree of Impacted Elements(X)	3	5	1	3	1	4	1	1	2	1	2	1	2	2	1		
	Complexity Scores	39	85	8	27	3	80	8	1	30	2	6	8	30	30	7		

Crowdsourcing elements such as Task/Activity, Process, Platform, Security & Compliance will require total focus as the degree of affected dimension in the operating model (Y) is high. The elements of crowdsourcing, such as People, Capabilities, and Culture, will require maximum effort to accommodate the Crowdsourcing concept as the degree of affected elements (X) appears to be comparatively higher.

We have further made an objective assessment of the complexity and effort required to make the change to evaluate the impact of retrofitting crowdsourcing into the existing operating model. We have measured the complexity using **Table 5**. The row at the bottom gives "**Complexity Scores**," which is a score of each Y in the row
Complexity Scores for each Y in the column(i,j) = $\sum$ x[i]y[j]

We have converted complexity scores (from Table 5) to High (H), Medium (M), and Low (L) ratings, as shown in **Table 6**. Subsequently, we conducted a literature review to identify the effort required to drive change in each operating model dimension, as shown in **Table 7**. We have developed a subjective understanding of the effort needed to drive this change (**Table 6).** Wherever the literature was unavailable, we tried to use other sources of information. The combination of complexity and effort will define the overall impact of the change.

Table 6: Table for aligning numerical weight to complexity and effort

Complexity Score	**Rating**	**Value**
>40	H	3
>20 to < =40	M	2
< = 20	L	1

Effort Identification (literature review)	**Rating**	**Value**
Widespread impact with high effort	H	3
Difficult but impact with moderate effort	M	2
It can be retrofitted easily with less impact	L	1

Impact = (Complexity Score X Effort Value)/100

Table 7: Evaluation of Impact from Complexity and Effort

Operating Model Dimension	**Complexity Score**	**Complexity (H/M/L)**	**Effort (H/M/L)**	**Reference Work(s)**	**Impact**
Governance & Funding	39	M	H	Difficult to drive (Jain, R. 2010) (Mikalef et al., 2020)	0.06
Processes	85	H	H	Wider impact & complex (Amrollahi, 2015)	0.09
Organisation Structure	8	L	M	Retrofit in existing model (Muhdi et al., 2011)	0.02
People & Capabilities	27	M	M	Competency enhancement (Muhdi et al., 2011; Sivula et al., 2014)	0.04
Platform & Technology	3	L	L	Straightforward (Khasraghi and Tarokh 2012; Blohm et al., 2018)	0.01
Culture	80	H	H	Causes Maximum Failures (Borowiecki, et al., 2016)	0.09
Performance & Measures	8	L	M	Can be developed quickly (Pollock et al., 2019)	0.02
Rewards	1	L	L	Can be done quickly (Finnerty et al., 2013)	0.01
Roles & Responsibilities	30	M	M	Clarity of tasks (Sari et al., 2019)	0.04
Leadership & Talent	2	L	L	Retrofit (Schwittay, and Braund, 2019)	0.01
Mission	6	L	L	Alignment of outcome to project mission (Garton, 2017; Elazhary et al., 2022)	0.01
Knowledge & Insights	8	L	L	Emerging concept (Moore et al., 2020)	0.01
Service Delivery Model	30	M	M	Requires customization (Grossman et al., 2018)	0.04
Sourcing & Alliances	30	M	L	Identification of Synergies (Piezunka, and Dahlander, 2015)	0.02
Places	7	L	L	Locational assignment of human experience (Jenkins et al., 2016)	0.01
				Sum	0.48

Now, we can map the magnitude (Table 8) from the sum of impact as

Table 8: Impact Range to Magnitude Mapping

Sno	Range of average	Magnitude
1	0 - 0.25	Low
2	0.26 - 0.5	Medium
3	> 0.5	Complex

Emerging concepts such as DevSecOps, Innovation, Agile IT can use this model to assess the impact on the existing IT Operating Model.

6. Discussion

Based on the approach discussed in this paper, we see a solution for customizing the IT operating model for the digital disruptions caused by the developing IT concepts. We see a significant opportunity for applying this model to existing situations to identify the gaps. The weights and ratings provided in the tables are indicative and can be customised as every organization is different and may need a different treatment. However, we have tried our best to provide the ratings based on our assessment of the importance and what we have uncovered from various literature reviews.

The magnitude assessment can help organizations decide whether it is worth pursuing that change or whether there is any relevant business case that makes sense. It can also help organizations assess the risk and prepare for that level of involvement if it is a complex change. Besides, organizations can then decide to take the call around incremental or big bang depending on the current assessment of risk, assumptions, dependencies, and constraints.

A do-it-yourself (DIY) framework mentioned in this paper makes adopting convenient and less expensive. The model is self-sustaining as it is flexible, and one can customize it to make it fit for purpose. We have undertaken a valiant attempt to develop a model that will require further validation in the industry and may have scope for refinement. As the IT Operating Model develops, future research can focus on evaluating the cost of the change based on the magnitude of impact assessed in Table 8. These will help streamline managerial decisions and justify the business case. Upcoming research may focus on the size, industry, and type of organization to suggest the IT operating model dimensions.

In summary, we discussed the nature of the operating model and tried to retrofit the same into an emerging concept like crowdsourcing. In addition, we devised an innovative concept of elements of Information Technology (IT) strategy and operations, which is unique. An innovative concept like crowdsourced is less explored from the perspective of the operating model, and we managed to understand the various applicable elements of IT Crowdsourcing. Still, we also managed to understand the impact of introducing those elements on the overall dimensions of the operating model, making it easier to understand the overall impact. In essence, we met the objectives we had defined in the purpose. We tried our best to leverage the existing body of knowledge to the extent possible during the process.

7. Conclusion & Future Research Directions

This study creates a new dimension of objectively analysing an operating model. It contributes to the need to link the complexity of research to the effort and cost of driving a change. That area remains an opportunity that can help organisations create robust business cases to drive these changes. In addition, we have used an estimate of complexity based on the scores in Table

8. This estimation can be evolved for each type of change we see in the market to arrive at a more accurate set of complexity ranges to link it to major and minor changes. In addition, we can easily convert the table into a tool for measuring the complexity, effort and cost of making operating model changes.

In addition, we have identified crowdsourcing as a new capability we have explored here. In future, we can identify the different elements and their impact on Operating Model dimensions for creating new capabilities like Integrating IoT or Implementing Sustainability (ESG), Blockchain and many other emerging disciplines. A new study guiding how to identify new capabilities elements also remains an area of investigation.

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