BEYOND BUREAUCRACY: A MULTI LAYERED FRAMEWORK FOR ORGANISATIONAL AGILITY IN INDIA'S OIL & GAS PSUS

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Abstract

India's oil and gas Public Sector Undertakings (PSUs) live in a contradiction: they must guarantee energy security at the nation's level, but they also compete against the competition in markets that demand rapidity, proximity to the customer and relentless optimisation of the operations. Bureaucratic layering, functionally siloed organisations and sequential approval processes can hamper downstream and upstream value chain responsiveness. This study builds a ***multi-layered organisational*** *agility framework specific to Indian oil and gas PSUs focussing on* ***(i) flattening of hierarchies, (ii) cross - functional team work, (iii) communication structures and (iv) real time decision making structures.*** *Using several case studies of real-world requirements of Indian Oil and Gas Companies (IndianOIL - IOCL, Bharat Petroleum Company Limited - BPCL, ONGC), the paper triangulates evidence from vendor/partner case studies, public disclosures and industry technical papers. The contributions are threefold: (1) a practical "Agility Stack" which relates governance, structure, data, as well as operation decisions; (2) a replicable measurement approach through a structured content - analysis index; and (3) a testable latent variable model amenable to survey-based validation (PLS-SEM). Evidence shows that digitised enterprise backbones, integrated planning and operations platforms, and collaborative environments decrease the latency of decision making, and allow for cross-unit coordination, but delayering, the redesign of the span of control, and delegated decision rights, are still patchy and this is the most critical next step for PSU agility.*

Keywords: *Organisational agility; Bureaucracy; delayering; cross-functional teams; communication architecture; real time decision making; PSUs; Oil & Gas; IOCL; BPCL; ONGC.*

1. Introduction

Organisational agility, i.e., the ability to recognize change and to respond swiftly to it via structures and routines that can be reconfigured, have become pivotal in the asset-intensive sectors as a way of staying competitive in operational terms (Teece, Peteraf, & Leih, 2016; Doz & Kosonen, 2010). Oil and gas businesses have historically developed large and centralised functions to handle risk, technical complexity and compliance, typically leaving decision making rather slow in multi-layered hierarchies (Galbraith, 1974; McKinsey & Company, 2016). In the Indian PSU context, formal rules, multi-layer approvals and silos can increase the impacts of latency - especially in cases where the decisions may cross refinery, marketing, or pipeline activities (downstream) or reservoir, drilling, and production activities (upstream). Recent restructuring research in Indian oil PSUs calls attention to the performance enhancement brought by the communication structure, digital initiatives and cross functionality along with flattened hierarchy designs [1], [9].

This research paper aims to understand the following queries:

Q1. What multi-layered organisational design best enables with the agility in India oil and gas PSUs?

Q2. How do IOCL, BPCL and ONGC provide examples for structural and process mechanism of agility - especially in hierarchy flattening, cross functional team work, communication architecture and real time decision making.

Q3. How to measure and statistically test agility in PSU's ?

2. Literature Review

2.1 Bureaucracy, Hierarchy & Agility

Classic organisational theory relates the level of uncertainty to the increase in information processing demands (Galbraith, 1974) and highlights the decentralised decision rights, short feedback loops and quick coordination required by agility (Teece et al., 2016; Doz and Kosonen 2010). In huge industrial enterprises, layers frequently get to be formed to manage coordination and danger; yet, an overabundance of layers causes an increment in handoffs and approval stages, which makes cycle time higher and decreases local self-governing (McKinsey & Company, 2016) [9].

2.2 Cross-functional teamwork

Cross functional teams minimize delay in coordination by using expertise from different functions to work on projects simultaneously, rather than one after the other (Edmondson, 2012; Hackman, 2002). In process industries, cross-functional structures - say integrated planning departments and integrated operations centres - are particularly useful where asset decisions are based on common functioning operational data and quick trade-offs around production, maintenance, logistics and customer demand (Galbraith, 1974).

2.3 Communication structures "single source of truth" - collaboration environments

Digital backbones (ERP, integrated planning platforms, digital twins) help create a common visibility of operations and reduce the information asymmetry between units and thus help make faster cross-unit decisions (Tushman & Nadler, 1978; Teece et al., 2016). Collaboration environments - dashboards, control towers, virtual co-location - make it easier to "team" across distance and hierarchy (Edmondson, 2012).

2.4 Real-time decision-making

Real-time decision structures include (i) low-latency data, (ii) analytics or predictive signals, (iii) clear rules of escalation, and (iv) authority to act. In terms of energy operations, real-time monitoring and predefined analytics can change the course between post-event reaction to proactive intervention (McKinsey & \[\sim] Company, 2016) [9].

3. Conceptual Contribution: The PSU "Agility Stack" (Multi - Layered Framework)

3.1 Framework overview

We propose four mutually reinforcing layers - the "Agility Stack" - to determine transformation of bureaucracy into responsiveness:

1. Structural Layer (Flattening): Delayering, span of control optimisation and delegated decision rights (RACI / decision matrices).

2. Team Layer (Cross - functional): Persistent teams or cells around value streams (refinery planning, terminal operations, drilling operations), rather than functions.

3. Communication Layer: Shared data backbone plus channels for collaborating (single point of truth; dashboards; integrated communications).

4. Decision Layer (Real - time) - Event - based routine, exception - based, predictive alerts, pre - defined escalation pathways.

3.2 Multi-Layered Framework Diagram

Layer 1: Flattening the Hierarchy

Simplify organisation levels and change who reports to whom. Allow people to take decision-making based on a chart of clear responsibilities. When work is needed, use standard procedures which eliminate unnecessary approvals. Respond to changes in the external and internal environment such as price spikes, changes in demand, outages, and safety incidents. Observe, react and learn from these events.

Layer 2: Cross Functional Team Work

Create squads that encompass value streams for things like refinery, retail and pipelines. Use combined planning and operational routines. Have people across boundaries such as IT, operations, safety, finance people to connect everything.

Layer 3: Communication Structure
Maintain a constant reliable source of info through ERP, integrated planning and digital twin. Work in common areas such as war rooms, incident command centers and dashboards. Communicate with stakeholders - Communicate via many channels including field teams, partners and customers.

Layer 4: Real time decision Structure
Provide visibility and KPIs on a real-time basis. Utilize predictive data and alerts. Take decisions rapidly from exception-based loop & elevate issues promptly.

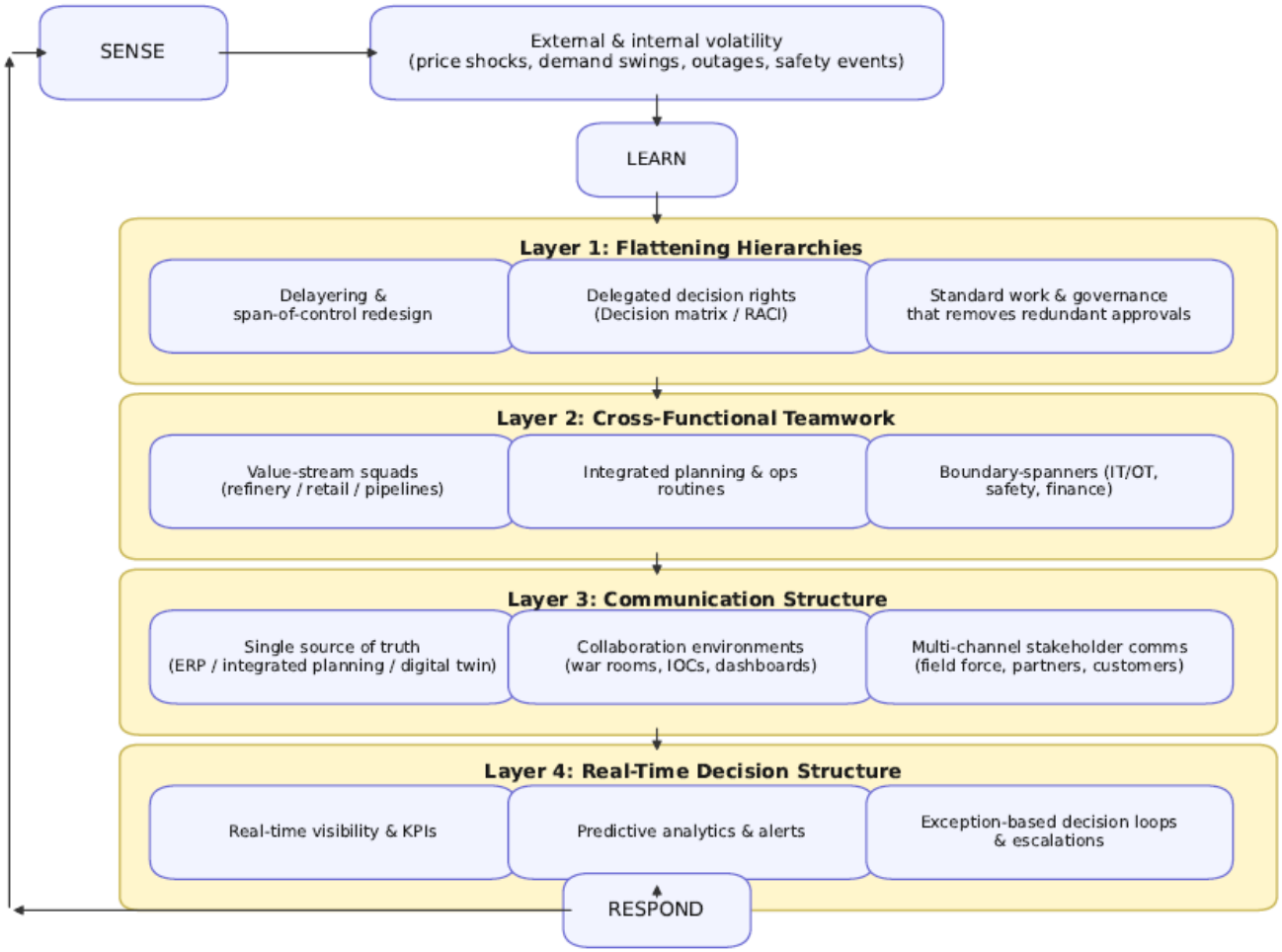

Figure 1 Conceptual Multi Layered Framework Model

4. Methodology

4.1 Research design

The study approach used is the **multiple case study design** (Yin, 2018) for developing and demonstrating the proposed framework in three main public sector undertakings - **IOCL, BPCL, and ONGC.** Evidence is triangulated by using documents and publications produced by the partners that are publicly available. A **mixed-method approach** is adopted so far combining **qualitative and quantitative methods** to understand the multifaceted nature of organisational restructuring in the oil and gas sector in India.

4.2 Research Approach

The **qualitative** component includes in-depth interviews with the senior management and policy makes in the PSUs. The **quantitative** component consists in the gathering of data with the help of structured questionnaires and organisation reports. Having this dual strategy ensures that findings from contextual insights are supported by statistical validation of the results.

4.3 Sampling Technique

A **stratified random sampling** technique has been adopted for obtaining representative distribution according to chosen PSUs (IOCL, BPCL, ONGC, GAIL, HPCL), different department and hierarchical levels.

4.3 Data sources

- **IOCL:** Accelerating ERP implementation and supply chain integration: Partner case studies Refining scheduling digitalisation material [7], [8], [15].

- **BPCL:** Cross business digital programme enabling a unified customer view & real-time communication: partner press release [2].
- **ONGC:** Industry technical paper about the integrated Operations System/digital twin implementation, visualisation centre profile for unlocking real time monitoring and collaboration [10], [14].

4.4 Structured content analysis + index (replicable "lightweight" statistics)
To create an open quantifiable comparison between the three cases, a structured coding scheme has been implemented. Each case is coded on twelve binary indicators (0/1), which are grouped into the four focus areas.
Equation (1): Organisational Agility Enablement Index (OAEI)

$$OAEI = \frac{1}{12}\sum_{k=1}^{12} I_k$$

where I_k= 1 if evidence supports the indicator; else 0.
This index is based on replicability and transparency. It is not intended as a replacement of latent measurement based on surveys, but rather to offer a defensible descriptive comparison of the case evidence.

4.5 Ethical Considerations
All the participants were assured of confidentiality. The data were only used for academic purposes, and informed consent was received. This is a robust methodology that will ensure empirical reliability, as well as contextual relevance, while evaluating organisational structures in India's oil and gas PSUs.

5. Case Evidence (Real Examples)
5.1 IOCL (IndianOil): ERP acceleration+ integrated supply chain planning
(a) Communication structure - "single operational language" via ERP acceleration
An HPE case study outlines IOCL's migration to SAP HANA, as well as a need for a "real-time system" supporting critical applications throughout the value chain, including sales & distribution, material, finance, HR, etc. functional areas. The transition solidifies operational data flows and standardises reporting that therefore enhances the organisation's communication architecture [8].

(b) Real -time decision making : Quantified decision -latency reduction
The HPE case reports that IOCL shortened the time of report generation **from ~5 hours to ~30 minutes**,. This acceleration allows for quicker business decisions and is an example of the purpose of the Decision Layer to present real-time visibility and accelerated analytics [8].

(c) Cross-functional teamwork: integrated planning across refineries and distribution
A Honeywell supply chain success storey is IOCL's integration of planning across **5 refineries** from a sequential planning to an integrated planning approach using synergies between procurement, manufacturing, sales and distribution. There is explicit point in the narrative that "traditionally different departments . . . don't always talk" and makes the integrated model a corrective effort. Moreover, IOCL's refinery scheduling digitalisation is said to have been extended across **nine refineries and one petrochemical complex** using AVEVA's unified supply chain technology, and for integrated plans and dispatch alignment and end-to-end visibility [7], [15].

(d) Flattening hierarchies (process delayering instead of organisation chart delayering)
While explicit hierarchical delayering is not evidenced in these sources, IOCL's shift to paperless operations and automation ambitions are presented as a leadership demand on IT, which implies process delayering characterised by fewer manual handoffs and approvals. Broader research on the topic of PSU restructuring, too, associates flatter structures and the cross functional approach with agility outcomes in Indian oil PSUs [1] , [8].

5.2 BPCL: Unified customer experience programme allowing cross-Unit Coordination
(a) Communication structure: multi channel real time communication with customers
A press release by Deloitte explains BPCL's "Project Anubhav" whose goal is to give its customers access to a common view of products and services across business units, and give customers the ability to have real-time conversations with them through a chatbot ("Urja") on the website and WhatsApp. The release mentions over 25 crore messages and 1.3 crore interactions in 13 languages which indicates a scaled and multi channel communication architecture [2].

(b) Cross functional teamwork: Integration across six business units
The same release offers integration across BPCL's business units (Retail, I&C, LPG, Lubricants, Gas and Aviation) implying a planned cross-functional design to align customer and channel processes [2].

(c) Real time decision enabling access to field force and data driven insights
BPCL's customer facing field force is said to be - able to see Customer information "at a single place" to take fast action and manage relationship. The programme also emphasises on the utilisation of data to understand consumption pattern and use data to drive cross-unit solutions in order to be aligned with real time decision support [2].

(d) Flattened hierarchies (digital self service)
Project Anubhav's "touchless self -service" orientation suggestive of less dependence on ordered approvals and intermediaries in customer journeys i.e. **bureaucracy - reduction through digitisation of workflows** rather than explicit elimination of managerial layers. PSU restructuring research further equates flattened structures and enhanced communication with agility improvement in oil PSUs [1], [2].

5.3 ONGC: Integrated operations system + real-time visualisation hub ("DARPAN")
(a) Communication structure Collaboration environments Digital twin architecture
OnePetro OTC paper documents ONGC's implementation of an **Integrated Operations System (IOPS)** for a deep water field development. The system brings together data collection/ analytics, automation tools along with collaboration enablers and provides a "digital twin" concept that extends from the reservoir to the separator [14].

(b) Real-time decision structure, proactive decision making in predictive way, with measurable targets
The paper describes a shift away from post event reaction to proactive response and the use of big data and predictive analytics. Expected benefits reported include 2-3% production uplift and 10-20% reduction on the OPEX, representing expected results by the integrated system [14].

(c) Cross functional team work: co-location and remote expertise utilisation
The same paper places strong emphasis on the use of advanced digital collaboration environments to mobilise expertise from across geographies to more quickly address complex problems, thereby creating an explicit cross functional coordination mechanism [14].

(d) DARPAN Real time monitoring hub (operational command capability).
A customer profile describes ONGC's Corporate Visualisation Centre, "ONGC DARPAN," as a digital location where all the drill lubrications can be monitored with centralised control and real-time monitoring of wells and drilling units through their offshore operations. The goal for this hub is to minimise the need for human interaction and downtime, predictively maintain or use video conferencing to link up with remote telecommunication facilities such as drilling rigs [10].

6. Cross-Case Empirical Analysis (Structured Index + Descriptive Statistics)
6.1 Coding Dimension and indicator
Dimension 1 - Flatten hierarchies (process delayering evidence): digital workflows involving limiting manual handoffs and approvals.
Dimension 2 - Cross - functional teamwork: Integrated planning & operations among units, Joint teams, Collaboration routines
Dimension 3 - Communication structure: Single source of truth Dashboards and collaboration spaces Multi-channel communication.
Dimension 4 -Real-time decision making: decrease reporting latency; predictive analytics; exception based loops.

6.2 Organisational Agility Enablement Index (OAEI) — results
Interpreting the numbers: These are evidence-based enablement scores (0–1), not "performance outcomes." They indicate how strongly the publicly documented initiatives support each agility dimension.

Company	Flattening (F)	Cross-functional (C)	Communication (S)	Real-time decisions (R)	OAEI (avg.)
IOCL	0.33	1.00	0.67	0.67	**0.67**
BPCL	0.33	1.00	1.00	0.67	**0.75**
ONGC	0.33	1.00	1.00	1.00	**0.83**

Evidence anchors:
- IOCL real-time analytics improvement (5 hours → 30 minutes). [8].
- IOCL integrated multi-refinery planning and cross-functional integration. [7], [15].
- BPCL cross-unit customer platform + real-time chatbot at scale. [2].
- ONGC IOPS/digital twin + expected uplift and OPEX reduction; DARPAN real-time monitoring hub. [10], [14].

6.3 Key pattern
1. **Technology-enabled visibility is the strongest lever** across all three cases (high S and R). [2], [8], [10], [14].
2. **Cross-functional integration is present**, largely through integrated planning/operations initiatives rather than permanent squad-based org designs. [2], [7], [14].
3. **Flattening remains the weakest**: evidence is mostly about *process delayering* (digital workflow) rather than explicit *structural delayering* (removing management layers / redesigning spans). [1],[2],[8],[10].

7. Statistical Model-Empirical Validation (Proposed PLS-SEM)

The next empirical step is a survey-validated model (latent constructs) tested with PLS-SEM (or CB-SEM if normality/fit assumptions hold). Below is the model specification.

7.1 Hypothesised structural model

Constructs (reflective):

- **FH** = Flattening Hierarchies (decision rights, span of control, autonomy)
- **CFT** = Cross-Functional Teamwork (shared goals, joint routines, boundary spanning)
- **COM** = Communication Structure (single source of truth, transparency, channel richness)
- **RTD** = Real-Time Decision Structure (latency, escalation, exception management, predictive alerts)
- **OA** = Organisational Agility outcomes (speed, adaptability, incident response, customer responsiveness)

Hypotheses:

- H1: FH → OA (positive)
- H2: CFT → OA (positive)
- H3: COM → OA (positive)
- H4: RTD → OA (positive)
- H5: COM mediates CFT → RTD → OA (partial mediation), because teamwork requires shared data and decision loops.

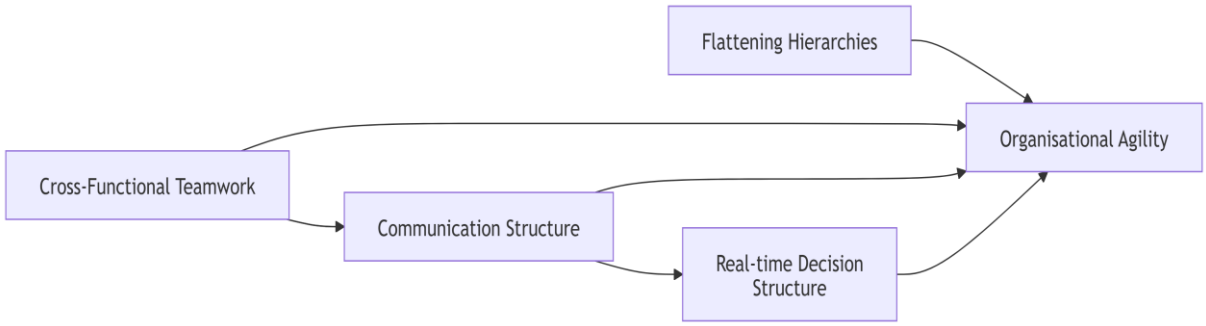

Figure 2 SEM path model

7.2 Measurement items (example; 7-point Likert, "strongly disagree" → "strongly agree")

FH (sample items):

- FH1: "Decision rights are delegated to the lowest competent level."
- FH2: "Approval steps for routine operational decisions are minimal."
- FH3: "Spans of control are designed to empower teams rather than create layers."

CFT:

- CFT1: "Cross-functional teams work on shared value-stream outcomes (not departmental KPIs)."
- CFT2: "We routinely solve problems with members from operations, maintenance, supply chain, and safety together."
- CFT3: "Handoffs between functions are designed as concurrent workflows, not sequential queues."

COM:

- COM1: "We have a single source of truth for operational data."
- COM2: "Dashboards make bottlenecks visible to all relevant stakeholders."
- COM3: "Communication channels enable rapid coordination across sites."

RTD:

- RTD1: "Operational decisions are supported by near real-time data."
- RTD2: "Alerts and exceptions trigger predefined decision routines."
- RTD3: "Predictive insights inform interventions before failures occur."

OA outcomes:

- OA1: "We respond to disruptions faster than before."
- OA2: "We reconfigure resources quickly when priorities shift."
- OA3: "Frontline teams can act quickly without waiting for escalations."

7.3 Recommended analysis protocol (publishable)

- Reliability: Cronbach's α, Composite Reliability (CR) ≥ .70
- Convergent validity: AVE ≥ .50
- Discriminant validity: HTMT < .85
- Path significance: bootstrapping (5,000 resamples)
- Controls: asset type (refinery/marketing/upstream), digital maturity, safety criticality, unionisation intensity.

8. Discussion: What "Beyond Bureaucracy" Means for PSUs

8.1 From "control by approvals" to "control by design"

The empirical evidence shows us that public-sector undertakings (PSUs) can maintain strong governance while also driving faster execution by having controls embedded in their information systems, for instance, audit trails, standardised flow of work and exception handling mechanisms. For example, the Indian Oil Corporation Limited's (IOCL) ERP acceleration has significantly cut down the reporting latency and therefore directly enabled faster decision cycles.[8]

8.2 Cross-functional operating rhythm - the glue that is missing

The Integrated planning of IOCL and Integrated operations planning system (IOPS) of ONGC demonstrates the importance of cross chain integration between the technical and commercial domain. BPCL's integrated customer platform also integrates product lines and business units. Nevertheless, institutionalising these partnerships as permanent "squads," with stable rights to decision-making - beyond the bounds of individual projects - is the next frontier.[6],[14], [11],[12]

8.3 Real-time decision structures require governance clarity

ONGC's integrated systems have an explicit focus on proactive operations and measurable operational improvements, including uplift and reduction of operational expenses expectations. The hub design in DARPAN is a signal of shift in the direction of collaboration at the command level instead of decentralised escalation. [10],[14]

8.4 The weakest link Structural delayering

While there is strong evidence from **process delayering** by digitised workflows, explicit **structural delayering**, i.e. decrease in levels of hierarchy and redesign of span capacities, is less apparent in public documentation. Research on PSU restructuring argues that such changes, combined with a redesign of communication structure and cross functional teams have material impact on efficiency and innovation of decision making. [1]

9. Managerial Implications-Actionable Blueprint for PSU Leaders

9.1 A 90-day "Agility Retrofit" (pragmatic for asset-heavy PSUs)

1. **Develop a Decision Rights Map** (based on a combination of RACI principles combined with a delegation matrix) for the top 30 recurring operational decisions, including maintenance deferrals, procurement thresholds and supply re-allocation.
2. **Establish three pilot value stream squads**, for example, refinery scheduling, terminal dispatch, and drilling performance; these squads need to have clear metrics and clear authority.
3. **Deploy a "single truth dashboard"** that utilizes existing ERP and integrated-planning feeds and hold weekly meetings for exception review.
4. **Standardise escalation rules**: what decisions must escalate, what can be solved at squad level.

9.2 Metrics

- Decision cycle time (hours) for defined decisions
- Number of approvals per workflow
- Cross-functional rework rate / handoff count
- Mean time to detect (MTTD) and mean time to resolve (MTTR) for operational deviations
- Forecast accuracy / schedule adherence (downstream); non-productive time (upstream)

10. Conclusion

The study represents an advancing PSU tailored, multilayered agility framework that illustrates the interplay between **hierarchy flattening, cross-functional teamwork, communication architecture,** and **real-time decision structures** that are integral to a system of interacting components called an "Agility Stack." IOCL is a good example of ERP acceleration and integrated planning to minimise latency and improve coordination. BPCL provides an example of platform-based cross unit integration and scaled real-time customer communications and ONGC of integrated operations and digital twin aspirations in conjunction with real-time collaborative monitoring hubs for upstream operations. Across these cases some of the least developed lever is **structural delayering with explicit decision delegation** - a forceful move to transcend bureaucracy and achieve sustainable agility within India's oil and gas PSUs. [2],[7],[8],[10],[14],[15]

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