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1. Capability Maturity & Delivery Risk Framework

Two interdependent analytical paths converge into a unified transformation roadmap. Both draw on approximately 200 stakeholder interviews spanning 10 branches and 55 directorates, and both resolve onto the same 48 capabilities x 23 criteria grid.

Operational path — what threatens capability delivery today?

The Pain Point Exposure Matrix (68 pain points x 55 directorates, severity scoring) and the Pain Point Impact Assessment (68 pain points x 23 criteria) combine into Capability Delivery Risk (48 caps x 23 criteria, pain-driven threat scores), alongside the current-state Capability Maturity (DCMM) baseline.

Strategic path — where must capability maturity reach?

Strategic vision, mandate and ministerial direction define target-state maturity (48 caps x 23 criteria); Target minus Current yields criterion-level maturity-gap analysis that reveals where investment is needed.

$$\text{Burden} = \text{sum}(\text{severity} \times \text{impact}) \quad \rightarrow \quad \text{Risk} = \text{sum}(w^2 \times \text{burden}) / \text{sum } w^2$$

Operational informs strategic

Current-state maturity and delivery risks must be known before achievable targets can be set — resolve operational hurdles before implementing strategic change.

Strategic prioritises operational

Operational recommendations are weighted by their contribution to strategic goals; those on the critical path to strategic outcomes receive higher priority.

Unified output — the ECCC Digital Roadmap

Operational stabilization, prioritized execution (recs weighted by strategic contribution), strategic transformation (closing maturity gaps), and measurable progress (both models re-run to track gains). 55 directorates · 68 pain points · 48 capabilities · 23 criteria.

2. Unified Relational Architecture

From approximately 200 stakeholder interviews to two complementary capability assessments. The interviews feed three input assets — Branch Maturity Assessments (55 dirs x 23 criteria), Weighted Directorate Capability Contribution (48 caps x 55 dirs), and the Pain Point Exposure Matrix (68 PPs x 55 dirs) — with the Pain Point Impact Assessment (68 PPs x 23 criteria) derived alongside.

$$\begin{aligned} \text{Maturity: } & \text{sum}[w^2 \times \text{Maturity}] / \text{sum } w^2 & \text{Risk: Burden} &= \text{sum}(\text{sev} \times \text{impact}); \\ & \text{sum}[w^2 \times \text{Burden}] / \text{sum } w^2 \end{aligned}$$

These resolve into two terminal outputs on the same plane: the Departmental Capability Maturity Matrix (current-state maturity, 48 caps x 23 criteria) and Capability Delivery Risk (pain-point-driven risk, 48 caps x 23 criteria).

3. The Analytical Hypercube

The framework operates across four independent analytical dimensions — Pain Points (68 values), Directorates (55), Criteria (23), and Capabilities (48). Each data asset occupies a different two-dimensional plane within this four-dimensional space, forming a structure analogous to a tesseract, or 4D hypercube. There are six possible planes — all six are populated:

Pain Points x Directorates — Pain Exposure Matrix

Which pain points hit which directorates (input data).

Pain Points x Criteria — Pain Point Impact Assessment

How pain points degrade each criterion (input data).

Capabilities x Directorates — Weighted Dir. Cap. Contribution

Who delivers each capability (input data).

Directorates x Criteria — Burden Matrix

Intermediate: Stage 1 computation (derived).

Capabilities x Criteria — DCMM + Delivery Risk

Both outputs share this plane: maturity and risk (derived).

Pain Points x Capabilities — Pain Propagation Matrix

Derived: which pain points impact which capabilities.

4. Derivation as Dimensional Contraction

The derivation collapses the 4D space to a 2D output in two stages.

Stage 1 — contract the Pain Point dimension

Exposure Matrix (Pain Points x Directorates, Severity(d, pp)) times Impact Assessment (Pain Points x Criteria, Impact(pp, k)) yields the Burden Matrix (Directorates x Criteria).

Burden(d, k) = sum_pp [Severity(d, pp) x Impact(pp, k)] — 4D collapses to 3D; the P axis disappears

Stage 2 — contract the Directorate dimension (quadratic-weighted)

Burden Matrix times Directorate Capability Contribution ($w^2(\text{cap}, d)$) yields Delivery Risk (Capabilities x Criteria).

Risk(cap, k) = sum_d [w^2 x Burden] / sum w^2 — 3D collapses to 2D; the D axis disappears

Overall: 4D (P x D x K x C) -> Stage 1 -> 3D (D x K x C) -> Stage 2 -> 2D (K x C).

5. Validation & Methodological Rigour

Dual independent runs

Both the Pain Exposure Matrix and the Pain Point Impact Assessment were assessed twice

independently, eliminating single-rater bias.

Cohen's Kappa validation

Formal inter-rater reliability: Pain Exposure kappa = 0.84, Impacts kappa = 0.858. Both "Almost Perfect" — far exceeding the 0.61 research threshold.

Rationale traceability

Every non-zero score in both the Exposure Matrix and Impacts Assessment traces back to specific interview evidence — a complete audit trail.

5-question framework

Maturity assessments use five probing questions per criterion, averaged to prevent single-judgment bias.

Evidence-based scoring

The Rubric-4 severity scale constrains scoring to evidence-supported judgments. Pain points are scored only where interview evidence confirms presence.

95th-percentile normalization

Delivery Risk is normalized using a P95 ceiling, preventing outlier compression while preserving meaningful differentiation.

6. From Analysis to Action

The analytical framework exists to drive operational improvement — from diagnostic to prescriptive.

Diagnostic

Pain Exposure Matrix (68 pain points x 55 directorates); Pain Point Impact Assessment (398 criterion-impact relationships); Burden Matrix (directorate-level pain burden quantified); Capability Delivery Risk (1,104 risk scores); Departmental Capability Maturity Matrix (1,104 maturity scores baselined).

Prescriptive — 83 targeted recommendations

Across 47 directorates, 10 branches, 29 pain points addressed: 3 Critical (systemic failures requiring immediate executive action), 47 Primary (high-impact improvements for core operational pain), 33 Secondary (efficiency gains and preventive stabilization). Every recommendation traces back through the analytical chain to specific interview evidence.

7. Operational Priorities & Recommendations

83 recommendations · 47 directorates covered · 29 pain points addressed · 10 branches engaged.

By priority

Critical (3 — 4%): systemic failures — HR case management, legacy DB migration, storage crisis.
Primary (47 — 57%): core operational improvements — AI provisioning, automation, data access.
Secondary (33 — 39%): efficiency gains — training, knowledge management, process optimization.

By implementation timeframe

Quick Win (0-3 months, 27): AI tool deployment, training rollout, data access provisioning, approval digitization. Near-Term (3-6 months, 44): process automation, HR case management, knowledge management, system integration. Medium-Term (6-12 months, 12): AI governance framework, legacy DB migration, platform consolidation.

8. Phased Implementation & Maturity Gains

Sequenced for cumulative impact on operational integrity.

Quick Wins (0-3 months, 27)

AI tool deployment & governance templates; training across 8 directorates; data access for scientific teams; approval workflow digitization; IT procurement fast-track. Reduces acute pain exposure for highest-burden directorates.

Near-Term (3-6 months, 44)

Process automation for 8 directorates; HR case management; knowledge-management frameworks; storage & scalability remediation; cross-platform integration; service-intake tracking. Stabilizes operational integrity across core capabilities.

Medium-Term (6-12 months, 12)

AI governance framework (department-wide); legacy database migration; platform consolidation; information-management remediation; system-integration architecture. Eliminates systemic pain points and modernizes delivery platforms.

Long-Term (12+ months)

Enterprise architecture renewal; cultural transformation; workforce digital fluency; continuous maturity-improvement cycle. Shifts the department from reactive remediation to proactive optimization.

Maturity projection: the roadmap projects improvement at each phase by modelling cumulative recommendation impact on the DCMM. As pain points are remediated, Delivery Risk falls and maturity rises — measurable evidence of roadmap value.

9. Strategic Value & Applications

Current state + threat

The BCMM shows where capabilities stand today; Delivery Risk shows what threatens them. Together they give a complete diagnostic.

Gap analysis

When strategic targets are set, the BCMM baseline reveals the exact gap between current and required maturity for every capability.

Investment targeting

Criterion-level granularity reveals whether a capability needs technology, workforce, process, or information investment.

Cross-directorate diagnosis

Reveals where multiple directorates sharing a capability each contribute different risks, requiring coordinated remediation.

Maturity projection & accountability

As pain points are remediated, both models re-run to project impact; the directorate-to-capability mapping establishes clear accountability for both maturity improvement and risk remediation.

10. The Six Analytical Planes — Detail

Detailed methodology, derivation, and validation for each data asset in the Capability Maturity Platform (CMP) and Capability Delivery Risk (CDR) frameworks.

Branch Maturity Assessments (CMP)

55 directorates assessed · 23 criteria per directorate · 5 questions per criterion · 6,325 individual judgments. AI-assisted analysis of stakeholder interviews across all ECCC branches; each directorate assessed on 23 criteria using a five-question maturity framework (current state, practice definition, measurement, optimization, maturity vs standards); scores averaged to a 1-5 criterion maturity. Four pillars: Information (5 criteria), Technology (6), Process (6), Workforce (6).

Pain Point Exposure Matrix (CDR)

68 pain points x 55 directorates = 4,828 rating cells · inter-rater reliability kappa = 0.84. AI-assisted deterministic analysis of ~200 interviews; each pain point scored per directorate on the Rubric-4 severity scale (1 Low, 2 Medium, 3 High, 4 Critical); two independent runs (R1 & R2) with Cohen's Kappa validation; full rationale traceability from score to interview evidence.

Pain Point Impact Assessment (CDR)

1,564 assessment cells · 398 impact relationships · kappa = 0.86 · 5.9 average impacts per pain point. Each of 68 pain points analyzed against all 23 criteria for negative impact (1 Low to 4 Show Stopper), two independent runs (kappa = 0.858), detailed rationale for every relationship. The bridge function: translates qualitative pain points into structured capability impacts. Most impacted criteria: Process Efficiency (28), Systems & Applications (27), Data Integration (24), Workflow Automation (18), Collaboration & Handoffs (18).

Weighted Directorate Capability Contribution (shared)

48 operational capabilities x 55 directorates · delivery weight scale 0-4. Maps which directorates deliver each capability and at what intensity (4 primary owner, 3 significant, 2 moderate, 1 peripheral); typically 3-8 directorates per capability. Shared by both frameworks to translate directorate-level data up to capability-level scores, both using the same quadratic weighting (w^2): for the CMP it weights maturity contribution; for the CDR it weights pain-burden propagation.

Departmental Capability Maturity Matrix (CMP)

48 capabilities x 23 criteria = 1,104 maturity scores · department mean 1.81. Algorithmically derived from Branch Maturity Assessments and Weighted Directorate Capability Contribution; quadratic weighting ensures primary owners dominate; unassessed directorates contribute maturity 0, diluting

scores to flag coverage gaps; a living model. Distribution: Optimized 4.0-5.0 (67 cells, 6%), Managed 3.0-3.9 (172, 16%), Developing 2.0-2.9 (215, 19%), Initial/Gap < 2.0 (650, 59%).

Capability Delivery Risk (CDR)

48 capabilities x 23 criteria = 1,104 risk scores · two-stage derivation from three input assets. Stage 1 (Burden): for each directorate, multiply pain severity by criterion impact across all pain points. Stage 2 (Risk): aggregate directorate burdens to capability level using quadratic weighting. Higher scores indicate greater risk to delivery from current pain points. Complementary to the BCMM: maturity shows where you stand, delivery risk shows what threatens you.

11. Derivation — Business Capability Maturity Matrix

How branch maturity scores become capability maturity scores:

$$\text{BCMM}(\text{cap}, k) = \frac{\sum [w_d^2 \times \text{Maturity}(d, k)]}{\sum [w_d^2]}$$

Worked example — Weather Forecast Management, Data Quality:

Directorate	w	w ²	Maturity	w ² x M
C.1 Prediction Services	4	16	3.4	54.4
C.2 Monitoring & Data	2	4	3.4	13.6
C.4 CCMEP	4	16	4.4	70.4
K.1 Digital Transformation	1	1	3.2	3.2
Total		37		141.6

$$141.6 / 37 = 3.83 \quad (\text{verified})$$

Primary owners C.1 + C.4 (both w=4) command 86.5% of the result; K.1 (w=1) influences only 2.7%.

12. Derivation — Business Capability Delivery Risk

How pain points flow through directorates into capability risk.

Stage 1 — Directorate Criterion Burden

$$\text{Burden}(d, k) = \sum_{pp} [\text{Severity}(d, pp) \times \text{Impact}(pp, k)]$$

Stage 2 — Quadratic Aggregation to Capability

$$\text{Risk}(\text{cap}, k) = \frac{\sum_d [w_d^2 \times \text{Burden}(d, k)]}{\sum_d [w_d^2]}$$

The three-relationship chain

(1) Directorate Pain Severity — which pain points hit which directorates, and how badly (Pain Point Exposure Matrix); (2) Criterion Impact — how each pain point degrades each capability criterion (Pain Point Impact Assessment); (3) Delivery Involvement — who delivers each capability, and how heavily (Weighted Directorate Capability Contribution).

Summary

Six core data assets populate a four-dimensional analytical hypercube; two derived outputs from a single shared methodology drive 83 targeted recommendations. The Departmental Capability Maturity Matrix gives current-state maturity (from Branch Maturity Assessments x Weighted

Directorate Capability Contribution via quadratic aggregation); Capability Delivery Risk gives pain-driven risk (from Pain Exposure Matrix x Impact Assessment x Weighted Directorate Capability Contribution). The 83 operational recommendations span 47 directorates, 10 branches and 29 pain points, phased across Quick Win, Near-Term and Medium-Term horizons. All validated through dual independent runs, Cohen's Kappa analysis, and full rationale traceability to approximately 200 stakeholder interviews.

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