VALUATION OF DETECTION DOGS IN SECURITY AGENCIES: PRACTICAL APPROACH AND THE ROLE OF TECHNOLOGY

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INTRODUCTION

- Detection dogs support national security and enforcement roles.
- Possess strong olfactory abilities requiring structured training and care.
- Classified as biological assets with unique cost components.
- Digital tools enable systematic and data-driven valuation approach.

PROBLEM STATEMENT

- Valuation practices are evolving, with room for standardization.
- Often recorded as consumables, not depreciable assets.
- Unclear cost, valuation, and depreciation methods.
- Limited integration of biological and operational factors.
- Minimal use of digital and data-driven valuation tools.

RESEARCH OBJECTIVE

1. Identify the main categories, breeds, and operational disciplines of detection dogs.
2. Determine cost components for acquisition and management.
3. Propose a systematic valuation approach.
4. Explore digital technology’s role in valuation improvement.

RESEARCH OBJECTIVE

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LITERATURE REVIEW

BIOLOGICAL ASSETS

- Animals or plants used for production, research, or service purposes.
- Defined under IAS 41 and MPSAS 27
  - Biological assets controlled by entity for specific purposes.
- In Malaysia;
  - Accounting Procedure for Living Assets (TPH) expands this definition to include functional animals such as detection dogs.
  - Malaysian Agricultural Research and Development Institute (MARDI), classifies biological assets into production, research, and operational/service categories.
- Operational assets (e.g., detection dogs) linked to security and enforcement roles.
- Valuation influenced by biological traits, productivity, care costs, performance, and lifespan.
- Require continuous monitoring and case-specific valuation due to individual variation.



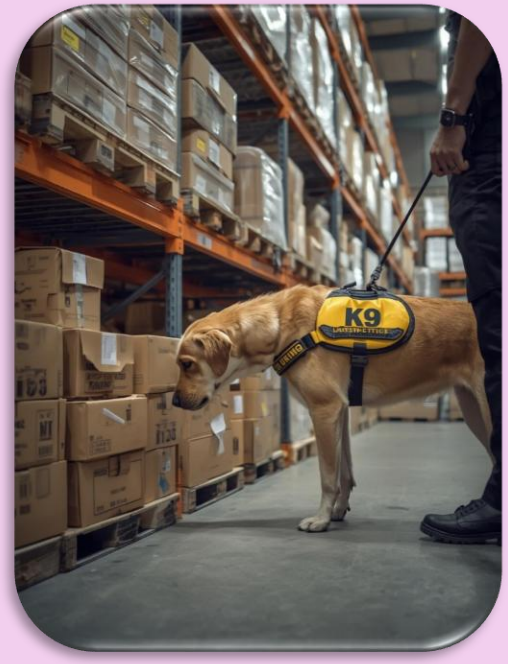


DETECTION DOGS (K9) AS BIOLOGICAL ASSETS

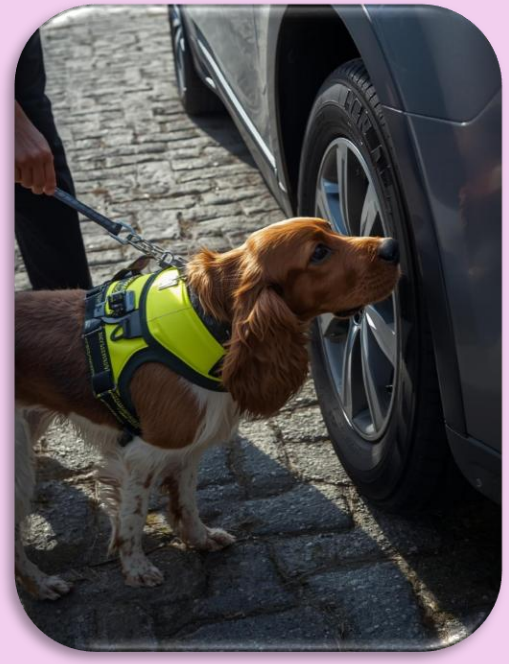
- The term canine derives from Latin Canis meaning ‘dog’.
- Officially used in 1942 with the formation of the U.S. K-9 Corps.
- Trademarked by the U.S. Army in 1959; now widely used globally.
- Detection dogs are working animals for security, customs, military, and SAR operations.
- Considered biological assets due to high acquisition, training, and maintenance costs.
- Their strategic functions remain irreplaceable by modern technology.

Disciplines And Roles Of Detection Dogs

Security
& enforcement



Narcotics Detection Dog (NDD)

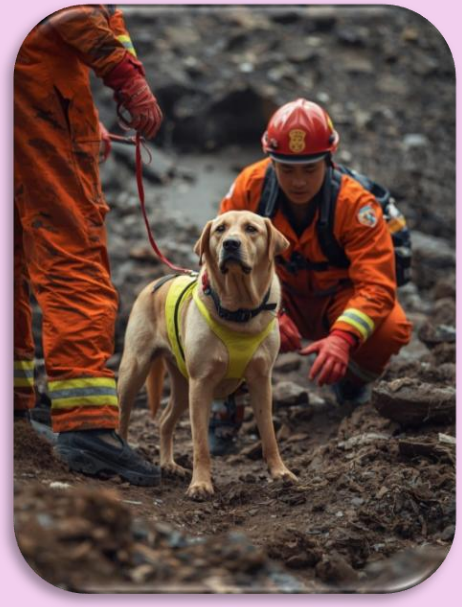
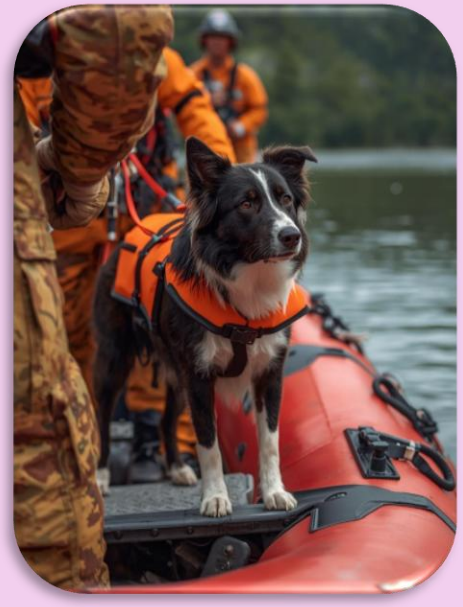
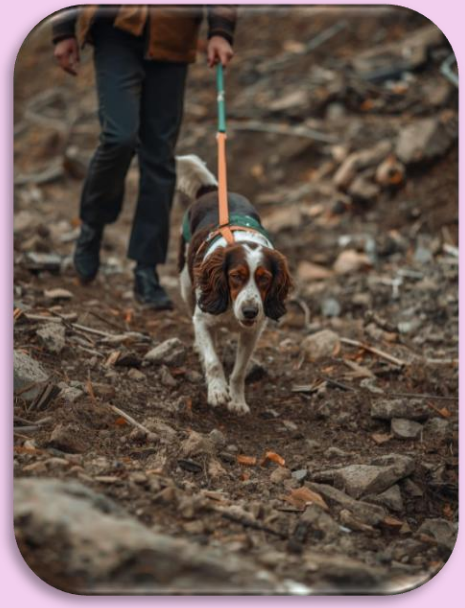
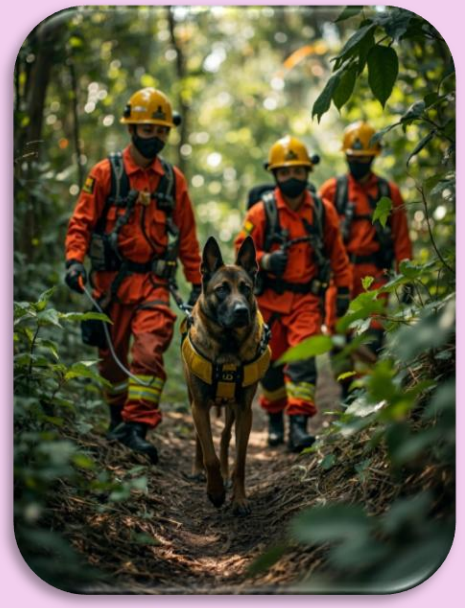


Explosives Detection Dog (EDD)

Contraband detection (drugs, cigarettes, currency).

Disciplines And Roles Of Detection Dogs

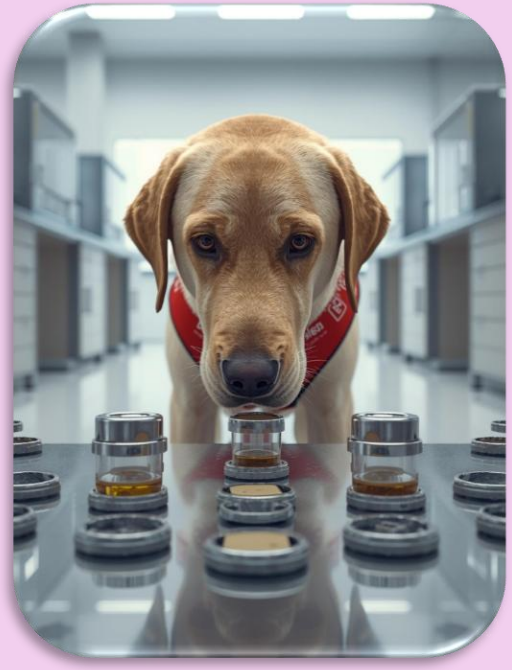
Rescue disciplines

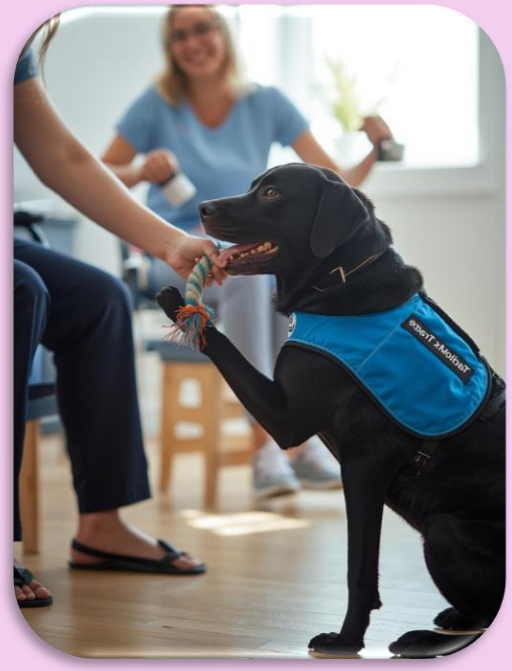
Cadaver Dog; Land and water recovery
Urban Disaster Search and Rescue (UDSAR); earthquake, collapse, flood
SAR Wildness

Disciplines And Roles Of Detection Dogs

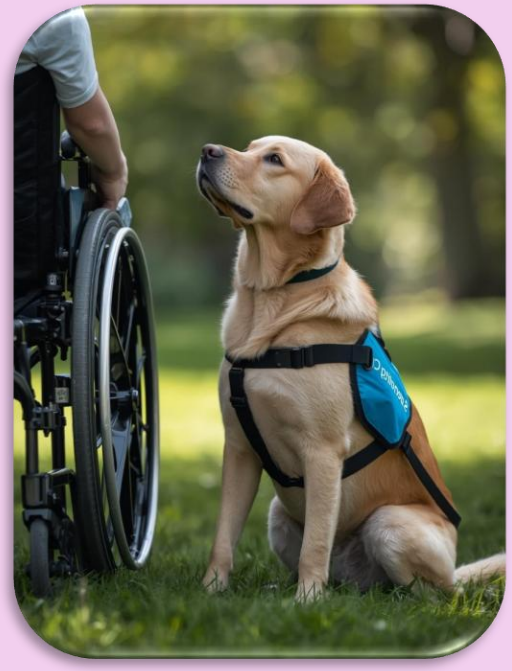
Specialised support



Medical Detection (e.g., COVID-19)



Therapy and Emotional Support



Guide Dogs

Disciplines And Roles Of Detection Dogs

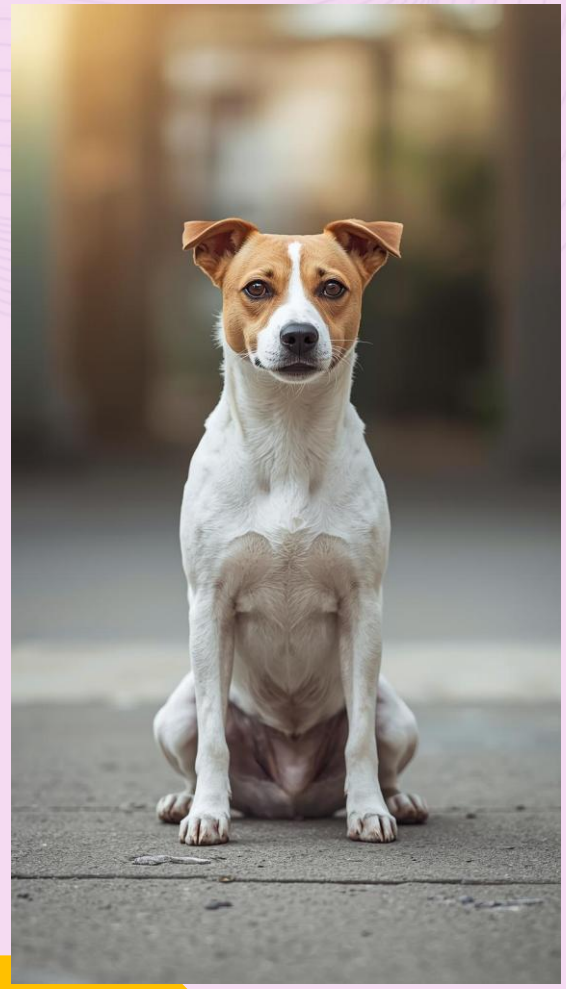
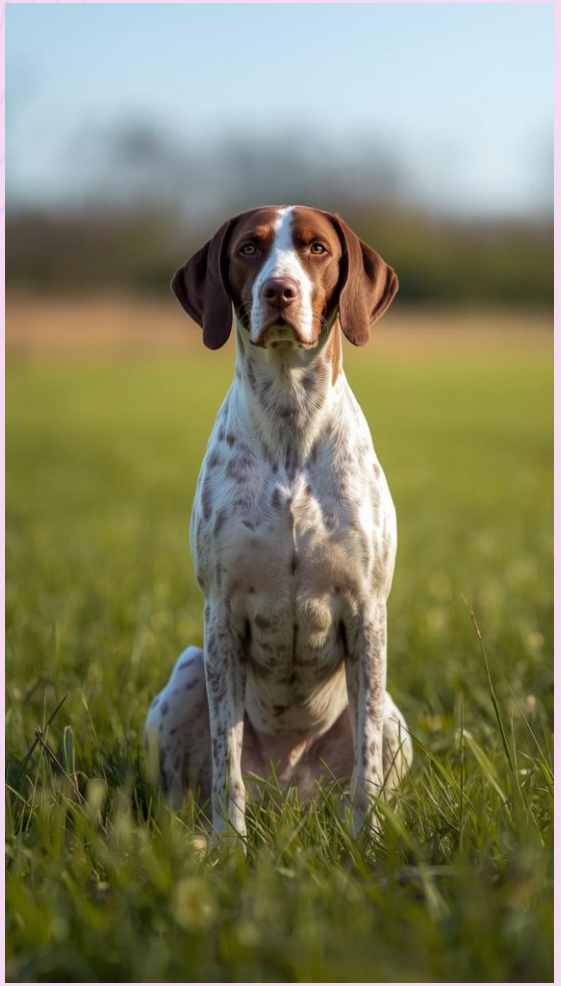
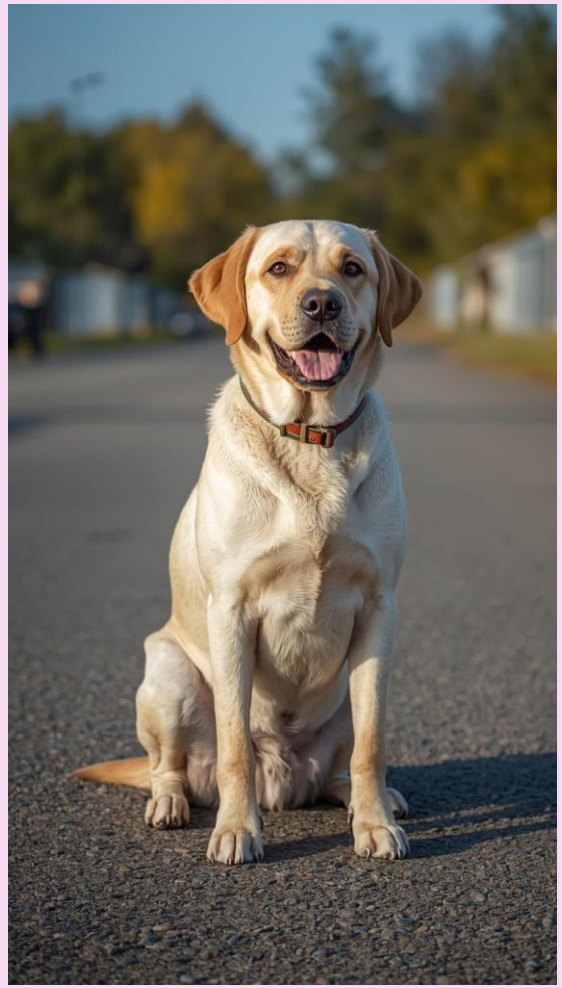
Fire Investigation (FI)

Tactical operations

Detection Dog Breeds and Bloodline

- Effectiveness depends on appropriate breed and bloodline selection.
- Breeds vary in physical, behavioural, and olfactory traits for roles like NDD, EDD, and SAR.
- Working bloodlines ensure superior intelligence, scent sensitivity, and temperament.
- In Malaysia, security agencies acquire dogs from Gun Dog and Working Dog lineages through certified international breeders with verified health, pedigree, and behaviour.
- Dog age equivalence: The first year equals ~15 human years, the second ~9, and each subsequent year ~5 (American Kennel Club, 2025).
- Working Lifespan: 8–10 years (depending on discipline).
- Detection dogs are classified into Green Dogs (partially/untrained) and Trained Dogs (fully operational), differing in cost, training needs, readiness, and asset value.

Detection Dog Breeds and Bloodline

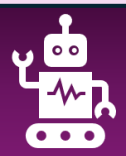

ACQUISITION AND MANAGEMENT COST COMPONENTS OF DETECTION DOGS

ACQUISITION COST

- Represents the initial investment in acquiring detection dogs.
- Selection depends on operational needs and training readiness.
- Dogs are classified as Green Dog (partially/untrained) and Trained Dog (fully operational).
- Costs include base price, import license, quarantine, logistics, and adaptation.
- Trained dogs cost 120–150% higher due to added training and reliability.
- Historical audited cost used in valuation to reflect true investment value.







ACQUISITION AND MANAGEMENT COST COMPONENTS OF DETECTION DOGS

MANAGEMENT COST

- Encompasses expenses throughout the service period to ensure welfare and performance.
- Components: Food, healthcare, training and courses, housing facilities, operational equipment, and retirement care.
- Applies to both Green and Trained Dogs, though annual costs differ.
- Training cost is the key difference — approximately 84% higher for Green Dogs.
- Supports comparative cost analysis and accurate asset valuation.
- Valuers should adjust costs based on age and operational readiness for realistic assessment.





VALUATION APPROACHES FOR DETECTION DOGS

- Determines the **current economic value** of detection dogs for **financial reporting and asset management.**
- Valuation considers **acquisition cost, age, health, training level, functional capacity, and depreciation.**
- Three main approaches under **IVS (2021)** and **MVS (2019):**
  - Market Approach
  - Income Approach
  - Cost Approach

VALUATION APPROACHES FOR DETECTION DOGS

- **Market Approach**
  - Based on **comparable transaction prices.**
  - **Limited applicability** – no active open market for detection dogs.
  - Used mainly as a **supplementary reference** due to **unique individual characteristics.**

- **Income Approach**
  - Estimates value from **projected economic benefits** (e.g., Profit or DCF methods).
  - **Benefits are indirect** – improved safety, reduced smuggling, etc.
  - **Difficult to quantify monetary value,** hence **less suitable for public sector valuation.**

- **Cost Approach**
  - Based on **total acquisition and management cost,** adjusted for **depreciation.**
  - **Most appropriate** for detection dogs – verifiable cost data, no active market.
  - Main challenge: determining **accurate depreciation rate and residual value.**





DEPRECIATION DETERMINATION IN THE VALUATION OF BIOLOGICAL ASSETS

- Depreciation reflects a **realistic measure of current asset value.**
- Represents the **difference between new and existing asset value,** adjusted for wear, obsolescence, and performance decline.
- Involves **biological, functional, and economic factors,** especially for detection dogs.
- **Three main forms of obsolescence:**
  - Physical – ageing, fatigue, reduced olfactory ability.
  - Functional – outdated breed/training or limited genetic capability.
  - Economic – policy shifts, tech advancement, or budget constraints.
- **Three main depreciation methods:**
  - Straight-Line (SLM),
  - Double Declining Balance (DDB), and
  - Unit of Production (UoP).





IMPAIRMENT ASSESSMENT METHOD FOR DETECTION DOGS

Impairment Assessment Method for Detection Dogs

- Assesses **actual operational performance** against **expected functional or economic output.**
- Based on **veterinary research and accounting standards** (Evans, Herwijnen & Cobb, 2020; IASB, 2023).
- Uses **functional or disability rating scales** to evaluate performance capability.
- Provides **objective and consistent assessment** of impairment and value loss.
- Reduces **subjectivity** and improves **accuracy** in determining fair value.

LEVEL OF IMPAIRMENT	PERCENTAGE OF VALUE REDUCTION	DESCRIPTION
Mild	10%–20%	The animal can resume full function after treatment, with minimal impact on performance.
Moderate	30%–40%	Partial loss of function; suitable only for limited operational duties.
Severe	50%–70%	The animal can no longer perform key detection functions effectively.
Critical	80%–100%	The animal is no longer fit for operational tasks; disposal or retirement should be considered.

IMPAIRMENT ASSESSMENT METHOD FOR DETECTION DOGS

Application in Valuation

- Enables valuers to **determine post-impairment book value** objectively.
- Value is **adjusted from acquisition cost** based on **impairment percentage.**
- Allows **modification of depreciation methods** (SLM, DDB, UoP) to reflect performance condition.
- Ensures **accurate, transparent, and accountable valuation** of working animals.
- Supports **better decision-making** for rehabilitation, replacement, or disposal.



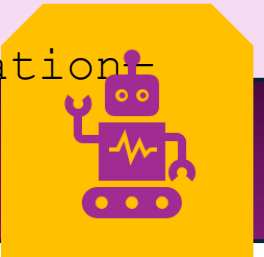


THE ROLE OF TECHNOLOGY IN BIOLOGICAL ASSET VALUATION

- **Digital systems** record health, training, and performance data systematically.
- Improves **accuracy, transparency, and real-time monitoring** compared to manual methods.
- Integration of **IoT, sensors, and AI** enables continuous tracking and performance analysis.
- Supports **data-driven and evidence-based valuation** of detection dogs.
- **Examples:** K9 Activity Tracking System (KATS), Top Dog Tracker, and SmartKennel Management System.
- **AI and predictive analytics** identify performance trends and recovery rates over time.
- Strengthens **evidence-based valuation** by going beyond cost or depreciation-incorporating **performance, health, and productivity factors** for a **comprehensive and accurate framework** within public sector operations.







RESEARCH METHODOLOGY

RESEARCH METHODOLOGY

- **Mixed-methods approach** integrating **quantitative** (cost data) and **qualitative** (interviews, observations) methods.
- **Quantitative data:** acquisition, training, and management costs from selected security agencies and literature review.
- **Qualitative data:** semi-structured interviews with **K9 officers** on training and management
- **Case studies:** two enforcement agencies; using imported detection dogs for comparative cost
- **Primary data:** official cost records and interviews; **Secondary data:** guidelines, reports, and academic literature.
- **Analysis methods:** descriptive (cost comparison) and thematic (operational issues, lifespan).
- Provides a **comprehensive and validated basis** for developing a **standardised valuation framework** for detection dogs.

RESEARCH FINDINGS

RESEARCH FINDINGS – VALUATION OF DETECTION DOGS

- **Mixed-methods approach** integrating **quantitative** (cost data) and **qualitative** (interviews, observations) methods.
- **Quantitative data:** based on findings from the **literature review** — covering **acquisition, training, and management costs** from **RMCD** and **FRDM.**
- **Qualitative data:** semi-structured interviews with **K9 unit officers** on management, training, and valuation practices.
- **Case studies:** two enforcement agencies (RMCD, FRDM) using imported detection dogs for comparative cost and lifespan analysis.
- **Primary data:** official cost data and field interviews; **Secondary data:** circulars, reports, manuals, and academic sources.
- **Analysis methods:** descriptive (cost comparison) and thematic (operational and valuation insights).
- Establishes a **validated, evidence-based foundation** for a **standardised valuation framework** of detection dogs.

RESEARCH FINDINGS – VALUATION OF DETECTION DOGS

- Valuation of detection dogs is a **key component of asset management** in security agencies.
- Combines financial value (acquisition, training, maintenance) and operational value (performance and readiness).
- Must consider **cost, depreciation, age, health, and training** to reflect true current value.
- Ensures **accurate, transparent, and evidence-based asset assessment** for strategic decision-making.

Factors Influencing Value

- **Age:** affects productivity and lifespan; older dogs show reduced efficiency.
- **Health condition:** impacts operational capacity and requires value adjustment when impaired.
- **Training level:** multi-disciplinary and advanced training increases economic and functional value.
- **Management cost:** higher costs reflect higher standards of welfare and long-term performance potential.These interconnected factors determine both book value and operational performance.

RESEARCH FINDINGS – VALUATION OF DETECTION DOGS

Valuation Approaches

- **Income Approach**
  - Based on future economic benefits or discounted cash flow.
  - **Not applicable** for detection dogs — no direct income generation, only social/operational value.

- **Market Approach**
  - Uses comparable market data.
  - **Unsuitable** — no active market, values vary by breed, skill, and agency contracts.

- **Cost Approach (Preferred)**
  - Based on **replacement cost**, adjusted for **depreciation** and **impairment**.
  - Uses **verifiable data** from procurement and training records.
  - Provides **transparent and auditable valuation** for public sector reporting.

RESEARCH FINDINGS – VALUATION OF DETECTION DOGS

Cost Approach Components

- **Acquisition Cost:** purchase price (green or trained dogs; trained cost 120–150% higher).
- **Time Adjustment Factor:** inflation and market escalation adjustment.
- **Additional Adjustment:** advanced training, acclimatisation (~+80% for green dogs).
- **Physical Depreciation:** value decline with use and age (SLM method; 10% residual).
- **Value per Healthy Dog:** represents full-function condition after depreciation.
- **Impairment Factor:** additional reduction for illness, injury, or loss of sensory capacity.

RESEARCH FINDINGS – VALUATION OF DETECTION DOGS

Key Takeaways

- The **Cost Approach** remains the **most reliable and defensible method** for detection dog valuation.
- Integrates **biological and functional factors** for realism and consistency.
- **Impairment assessment** strengthens valuation accuracy and accountability.
- Ensures **value reflects health, capability, and readiness,** not just cost and age.
- Supports **transparent, evidence-based asset management** for Malaysian security agencies.

CONCLUSION & RECOMMENDATION

CONCLUSION

The study successfully achieved all four research objectives.

- **Objective 1:** Identified key breeds and operational disciplines — e.g. Labrador Retriever and English Springer Spaniel — highlighting their strategic roles in narcotics, fire investigation, and SAR operations.
- **Objective 2:** Analysed acquisition and management costs, showing that valuation must include training, healthcare, nutrition, and operational expenses throughout service life.
- **Objective 3:** Proposed a systematic valuation framework based on the Cost Approach, supported by the Straight-Line Method (SLM) and Impairment Matrix for biological and health-based adjustments.
- **Objective 4:** Demonstrated how digital technologies (K9 software, IoT, GPS, RFID) can enhance data-driven valuation accuracy.
- Overall, the study proves that detection dog valuation can be conducted systematically, objectively, and transparently, providing a foundation for a standardised framework in Malaysian security agencies.

RECOMMENDATION

Practical Recommendations

- Apply the **Cost Approach with an Impairment Matrix** for more consistent, objective health and performance-based valuation.
- **A valuation guideline** should be developed to ensure uniformity, transparency, and credibility across agencies.
- Security Agencies should adopt **digital documentation systems** (K9 software, IoT, GPS, RFID) to record **cost, health, and performance data** for efficient, evidence-based decision-making.

Future Recommendations

- Integrate **digital technologies and AI-driven analytics** for real-time, performance-based valuation.
- Explore **Unit of Production (UoP)** method linking asset value to actual missions or operational hours.
- Strengthen **animal welfare and ethical monitoring policies** to balance performance tracking with wellbeing.
- Encourage **continuous research and innovation** to build a **digitally aligned and sustainable valuation framework** for Malaysia's security agencies.

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THANK YOU