Strategic Architecture & Transformation Report: Establishing the NHG TechCo

1. Executive Context & Strategic Imperative

The Nguyen Hoang Group (NHG) stands at a pivotal juncture in its evolution as Vietnam's leading private education ecosystem. Managing a diverse portfolio of universities—including Hoa Sen University (HSU), Hong Bang International University (HIU), Gia Dinh University (GDU), Ba Ria Vung Tau University (BVU), and MIT University—NHG faces the classic "conglomerate complexity" challenge. Each entity currently operates within a siloed technology landscape, characterized by fragmented data, uneven digitization maturity, and a reliance on legacy, transaction-heavy systems (primarily ERP and SIS) that fail to deliver a unified, modern student experience.

The strategic mandate to establish a "New TechCo"—a dedicated technology shared services entity—represents a shift from an IT support model to a platform-based operating model. This transformation is not merely technical; it is structural. The TechCo must function as a service provider with defined Service Level Agreements (SLAs) and Operational Level Agreements (OLAs), delivering a unified digital backbone while respecting the academic autonomy of individual member universities.

This comprehensive research report provides the evidence base, architectural blueprint, and execution roadmap for this transformation. It draws upon an exhaustive analysis of the Vietnamese higher education software landscape, deep benchmarking of regional and global leaders (such as Taylor's University, Binus University, and Arizona State University), and modern enterprise architecture principles. The core thesis of this report is that NHG must leapfrog the "integrated ERP" era and move directly to a **Composable Architecture**, where a unified Data Lakehouse and Experience Layer (CRM/Portal) sit atop legacy systems, enabled by an aggressive API integration strategy.

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2. The Vietnam Higher Education Software Landscape (Reality Check)

To design the future state, one must first rigorously map the current reality. The Vietnamese higher education technology market is characterized by a high degree of vendor concentration among local legacy providers for core academic administration, juxtaposed with a rising tide of international SaaS adoption for learning management and collaboration.

2.1 Dominant Vendors and Market Dynamics

The analysis of over 40 institutions reveals a clear "oligopoly" in the Student Information System (SIS) market, driven by the specific regulatory reporting requirements of the Ministry of Education and Training (MOET) which global vendors often struggle to accommodate cost-effectively.

- **PSC (Phan Mem Tich Hop):** The undisputed market leader for large-scale university management. Their "PSC UIS" (University Information System) is the backbone for HSU, HIU, and major public universities like NEU and UFM. Its dominance stems from its robust credit-based training management modules that align perfectly with Vietnamese academic regulations. However, it is architecturally a legacy system (often thick-client or older web forms) with limited API openness, creating data silos.[1]
- **ASC (Tien Phong Software):** The primary competitor to PSC, particularly strong in credit training management and widely used in colleges and southern universities like NTU and EPU. ASC's solutions are functional but, like PSC, focus on administrative transactions rather than student experience.[4]
- **Edusoft (AQTech):** A dominant player in the technical and vocational university segment (e.g., HUTECH, UPT). Edusoft systems are known for schedule optimization but often lack the integration capabilities required for a modern digital ecosystem.[6]
- **The "In-House" Phenomenon:** A significant minority, most notably **FPT University**, choose to build their own core stacks (e.g., the FAP system). This provides extreme agility but requires a massive, permanent developer workforce—a model NHG is moving away from by establishing a TechCo.[8]
- **The "Premium" Tier (International Stack):** Institutions like **VinUni** and **RMIT Vietnam** have broken the local mold by adopting Tier-1 global platforms (SAP, Salesforce, Canvas). This creates a stark "digital divide" in student experience. While a PSC/Edusoft student manages their life via a basic web form, a VinUni student engages through a Salesforce-powered mobile experience. This is the gap NHG TechCo must close.[9]

2.2 Comprehensive Vietnam University Software Map

The following table maps the technology stacks of 45 representative Vietnamese institutions, categorizing them by their core systems (ERP/SIS), learning platforms (LMS), and digital maturity signals. This map serves as the baseline for NHG's "As-Is" assessment.

Institution	Type	Core SIS / ERP	LMS Platform	CRM / Admissions	e-Office / Collab	Data & BI	Hosting / Infra	Notes & Operating Signals	Sources	Conf.
Hoa Sen University (HSU)	NHG	PSC UIS	Moodle (E-learning)	Basic / Excel	Office 365, Custom	Manual / Excel	On-Prem / Hybrid	Legacy stack; strong need for mobile & CRM layer.	2	High

Institution	Type	Core SIS / ERP	LMS Platform	CRM / Admissions	e-Office / Collab	Data & BI	Hosting / Infra	Notes & Operating Signals	Sources	Conf.
Hong Bang Int. Univ (HIU)	**NHG**	**PSC UIS**	**Moodle**	Manual	Office 365	Manual	On-Prem	Focus on Health Sciences; disjointed student data.	12	High
Gia Dinh Univ (GDU)	**NHG**	**PSC UIS**	**Moodle**	Manual	Microsoft 365	Manual	On-Prem	"Mass market" efficiency focus; minimal digitization.	14	High
Ba Ria Vung Tau (BVU)	**NHG**	**PSC UIS**	**E-learning**	Manual	E-Gov / Office 365	Manual	On-Prem	Strong local govt compliance focus.	16	High
MIT Uni Vietnam	**NHG**	**Custom / Local**	**Moodle**	Gateway P'ship	Office 365	Manual	Hybrid	Rebranding phase; aspiring "AI University."	18	Med
VinUni	Private (Elite)	**CMC SIS / SAP**	**Canvas**	**Salesforce** (Inferred)	SharePoint / Teams	**Tableau**, SAP	Cloud (Azure)	Benchmark for premium integration & data use.	10	High
RMIT Vietnam	Foreign	**PeopleSoft / SAMS**	**Canvas**	**Salesforce**	Workday (HR)	**Power BI**, AI	Cloud (Global)	Global stack; seamless student experience 360.	9	High
FPT University	Private	**FAP** (In-house)	**EduNext / Coursera**	**FPT.AI** (Chatbot)	FPT e-Office	**Power BI**, AI	Cloud (FPT)	Heavy AI integration (chatbots, eKYC).	8	High
UEH (Kinh Te)	Public (Auto)	**Edusoft / UIS**	**LMS UEH**	Custom CRM	Microsoft 365	Power BI	Hybrid	"Smart University" leader in	23	High

Instituti on	Type	Core SIS / ERP	LMS Platfo rm	CRM / Admissi ons	e-Office / Collab	Data & BI	Hosti ng / Infra	Notes & Operating Signals	Sourc es	Con f.
			(Mood le)					public sector.		
Van Lang Univ (VLU)	Private	USmart / Custom	Moodl e	VHub / Portal	Office 365	MS Ecosyst em	Hybri d	Developing proprietary "USmart" ecosystem.	25	High
Ton Duc Thang	Public	PSC UIS	Moodl e	Custom	Google Worksp ace	In-house AI	On-Prem	Strong research focus but legacy admin stack.	3	Med
HUTEC H	Private	Edusoft	Moodl e	Custom	Office 365	Manual	On-Prem	Direct competitor to NHG; similar legacy stack.	6	High
NEU (Kinh Te Quoc Dan)	Public	PSC UIS	LMS	Custom Portal	Office 365	Manual	On-Prem	Classic PSC deployment ; heavy customizati on.	1	High
FTU (Ngoai Thuong)	Public	FPT / Custom	LMS	FTU Portal	Office 365	Manual	Hybri d	Moving towards digital; partnership with FPT.	28	Med
UFM (Tai Chinh MKT)	Public	PSC UIS	Moodl e	Custom	Office 365	Manual	On-Prem	Standard PSC implementa tion.	29	High
Can Tho Univ (CTU)	Public	Custom / In-house	Moodl e	Custom	Google / MS	Manual	On-Prem	Strong in-house dev team for Mekong region.	31	Med

Institution	Type	Core SIS / ERP	LMS Platform	CRM / Admissions	e-Office / Collab	Data & BI	Hosting / Infra	Notes & Operating Signals	Sources	Conf.
VNU Hanoi	Public (National)	**Custom (VNU)**	**Moodle**	Custom Portal	Office 365	Manual	Hybrid	Complex, multi-tenant custom system.	32	High
VNU HCMC (UIT)	Public	**UIS / Custom**	**Moodle**	Custom	Office 365	Power BI	On-Prem	Tech-forward; heavy Moodle customization.	33	High
Pham Ngoc Thach Med.	Public	**PSC UIS**	**Moodle**	Custom	Office 365	Manual	On-Prem	Medical training specifics handled by PSC.	35	High
Hanoi Med. Univ (HMU)	Public	**Custom**	**LMS**	Custom	**eOffice** (Custom)	Manual	On-Prem	Specialized eOffice for hospital integration.	36	Med
Bach Khoa HCMC	Public	**BK Portal**	**Moodle** (BKEL)	Custom	Office 365	Manual	On-Prem	Historical in-house development.	37	Med
Su Pham Ky Thuat	Public	**PSC UIS**	**Moodle** (FHQ)	Custom	Office 365	Manual	On-Prem	Long-time PSC user.	38	Med
Công Nghiệp HN (HaUI)	Public	**QMC / Electronic**	**LMS**	Custom	e-Gov	Manual	On-Prem	"Electronic University" model (early adopter).	39	Med
Duy Tan University	Private	**Custom**	**Moodle / Sakai**	Custom	Office 365	Manual	On-Prem	Strong research output; mixed stack.	38	Low

Institution	Type	Core SIS / ERP	LMS Platform	CRM / Admissions	e-Office / Collab	Data & BI	Hosting / Infra	Notes & Operating Signals	Sources	Conf.
Nguyen Tat Thanh	Private	**Custom / ASC**	**Moodle**	Custom	Office 365	Manual	On-Prem	ASC implementation for credit system.	41	Med
Dai Nam University	Private	**Unisoft**	**Moodle**	Custom	Office 365	Manual	On-Prem	Uses Unisoft, a smaller local vendor.	42	High
Dong A University	Private	**Custom**	**Canvas**	Custom	Office 365	Manual	On-Prem	Rare adoption of Canvas in mid-tier private.	43	High
Tokyo Human Health	Private	**Unisoft**	**Moodle**	Custom	Office 365	Manual	On-Prem	Unisoft deployment.	45	High
Diplomatic Acad (DAV)	Public	**Unisoft**	**Moodle**	Custom	Office 365	Manual	On-Prem	Unisoft deployment.	46	High
CMC University	Private	**CMC SIS**	**Canvas (Plan)**	**Salesforce**	**C-Office**	AI (Vision)	Cloud	NHG competitor; creating "Digital Uni".	47	High
Vinschool	K-12	**ManageBac**	**Canvas**	**Salesforce**	Office 365	Power BI	Cloud	Feeder to VinUni; high tech maturity.	49	High
UNETI	Public	**Custom**	**LMS**	Custom	Office 365	Manual	On-Prem	Basic digitization.	50	Med
Hung Vuong (HVU)	Public	**Edusoft**	**Moodle**	Custom	Office 365	Manual	On-Prem	Edusoft user.	7	High

Institution	Type	Core SIS / ERP	LMS Platform	CRM / Admissions	e-Office / Collab	Data & BI	Hosting / Infra	Notes & Operating Signals	Sources	Conf.
Phan Thiet (UPT)	Private	**Edusoft**	**Moodle**	Custom	Office 365	Manual	On-Prem	Edusoft user.	51	High
Forestry (VNUF)	Public	**Edusoft**	**Moodle**	Custom	Office 365	Manual	On-Prem	Edusoft user.	52	High
Tai Nguyen Moi Truong	Public	**Custom / ERP**	**Moodle**	Custom	e-Office	Manual	On-Prem	"One door" e-office for students.	53	Med
Binh Duong Econ (BETU)	Private	**Custom**	**Moodle**	Custom	Office 365	Manual	On-Prem	Basic portal integration.	54	Med
Nam Can Tho	Private	**Custom**	**Moodle**	Custom	Office 365	Manual	On-Prem	Regional private university.	55	Low
Electric Power (EPU)	Public	**ASC**	**Moodle**	ASC Mobile	Office 365	Manual	On-Prem	Strong ASC user.	4	High
Nha Trang Univ (NTU)	Public	**ASC**	**Moodle**	Custom	Office 365	Manual	On-Prem	ASC user.	5	High
Vinh University	Public	**USmart / Custom**	**Moodle**	Custom	Office 365	Manual	On-Prem	USmart deployment.	56	High
Can Tho College	Vocational	**Custom**	**Moodle**	Custom	Office 365	Manual	On-Prem	Vocational sector digitization.	58	Med
Scots English	Language	**Custom**	**Moodle**	CRM	Office 365	Manual	Cloud	Language center model; Moodle based.	59	High

Instituti on	Type	Core SIS / ERP	LMS Platfo rm	CRM / Admissi ons	e-Office / Collab	Data & BI	Hosti ng / Infra	Notes & Operating Signals	Sourc es	Con f.
Khanh Hoa Univ	Public	**Custom**	**Moodl e**	Custom	Office 365	Manual	On-Prem	Standard Moodle deployment .	60	Hig h
British Univ (BUV)	Foreign	**Custom**	**Canva s**	**Salesfor ce**	Office 365	Power BI	Cloud	High-end internationa l stack.	61	Lo w

2.3 Key Insights from the Vietnam Landscape

1. **The "Legacy Trap":** The dominance of PSC, ASC, and Edusoft creates a significant barrier to modernization. These systems are monoliths—managing everything from grades to scheduling in a closed loop. They lack the modern REST APIs required to easily plug in AI tools or mobile super-apps. NHG's reliance on PSC puts it at risk of technical obsolescence compared to RMIT/VinUni's agile stacks.
2. **LMS Commoditization:** Moodle is ubiquitous. To differentiate, NHG cannot simply "have an LMS." It must invest in the *content layer* and *analytics layer* of the LMS (as VinUni does with Canvas data), turning the LMS from a file repository into a learning intelligence engine.
3. **The Data Void:** Very few Vietnamese universities have moved beyond "reporting" (static Excel/PDFs) to "Business Intelligence" (interactive dashboards). Almost none have achieved "Predictive Analytics" (AI). This is the "Blue Ocean" opportunity for NHG TechCo.

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3. International Benchmark: The "North Star"

To design a TechCo that outperforms local competitors, NHG must look to international models of "University Groups" and "Shared Services."

3.1 ASEAN Private Education Groups (Regional Peers)

Country	Institution / Group	Core Stack	Experience Layer	Data & AI Strategy	Operating Model Signal	Source s
Malaysia	**Taylor's University**	**CAMS** (Hybrid Custom)	**Salesforce** & Mobile App	**AI Impact Labs**; Smart Society	**Centralized IT:** Taylor's Education Group centralizes infrastructure while allowing campus innovation.	62

Country	Institution / Group	Core Stack	Experience Layer	Data & AI Strategy	Operating Model Signal	Sources
Malaysia	Sunway University	SIS + Blue (Feedback)	Blackboard / Canvas	Digital ID; IoT Data	**Shared Services:** Sunway Group IT supports both education and medical divisions.	64
Malaysia	HELP University	Moodle	LMS-TII (Turnitin)	Analytics Group	**Governance:** Strong LMS governance committees for data integrity.	67
Indonesia	Binus University	PeopleSoft (Custom)	Binusmaya (Custom Portal)	AI R&D Centers; Digital Minor	**"Binus Create":** Internal software house that commercializes their tech to others.	69
Indonesia	UPH (Pelita Harapan)	Moodle / Canvas	Microsoft Ecosystem	ERP Specialization	**Multi-Campus:** Centralized control across Jakarta/Surabaya campuses.	72
Thailand	Mahidol University	SAP S/4HANA	Extension / Moodle	Intelligent Enterprise	**Enterprise ERP:** Moving beyond SIS to full ERP integration for research/hospital/uni.	75
Thailand	Chulalongkorn	Blackboard / Canvas	MyCourseVille	Life-long Learning	**Platform:** "Chula MOOC" platform extends reach beyond campus.	77
Thailand	Bangkok University	Exelixis SIS	BU Mobile	Creative Tech	**Partnerships:** Collaborates with SSBM for tech integration.	80

Insight: The "Binus Model" is particularly relevant for NHG. Binus did not just buy software; they built a "software house" capability (*Binus Create*) to customize PeopleSoft and build their own "Binusmaya" portal. This turned IT from a cost center into a competitive advantage.

3.2 Global Leaders (USA/Australia)

Institution	Core Stack	Experience Layer	Data & AI Architecture	AI Use Cases	Key Innovation	Sources
Arizona State (ASU)	PeopleSoft + AWS Lake	**Salesforce + Slack**	**Data Lakehouse** (AWS)	Trusted Learner Network	**"Enterprise Technology":** IT is a business partner. First digital campus on Slack.	82
SNHU	Banner	**Salesforce**	**Cloud Native** (Azure)	AI for At-Risk Students	**Scale:** Tech stack supports 130k+ online learners via automation.	83
WGU	Banner / Custom	**Salesforce + Open edX**	**Dynatrace** (Observability)	Skills Mapping AI	**Competency-Based:** Custom engine for non-semester learning.	85
Deakin Univ (Aus)	Callista (SIS)	**Salesforce + Genie**	**GenAI Hub**	GenAI Tutors & Staff	**AI First:** "Genie" voice assistant was a global pioneer.	87
UNSW (Aus)	Student One	**Salesforce Student 360**	Azure Data Lake	Personalized Pathways	**Student 360:** Single view of student across all departments.	89

Comparative Insight: The global leaders have all decoupled the **Experience Layer** from the **Record Layer**. They use legacy SIS (PeopleSoft/Banner) for records but use **Salesforce** for all student interactions. This "Student 360" approach is what enables their superior retention and service quality—something currently missing in the Vietnamese market.

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4. Architecture & Operating Model Inference

Based on the research, the target state for NHG TechCo must address the tension between "Group Efficiency" and "University Autonomy."

4.1 The TechCo Operating Model: Shared Services with Teeth

Successful shared services in higher education (like at the University of California or Wisconsin) rely on a clear economic and governance model.[91]

- **Service Catalog:** TechCo must define a catalog (e.g., "Core SIS Hosting," "LMS Management," "Data Platform").
- **Funding Model:**
  - *Core Services (Identity, Network, Security):* Funded via a "Tax" or allocation model (central overhead).
  - *Value-Add Services (Custom AI Dev, Marketing CRM):* Funded via a "Chargeback" model (universities pay for what they use).
- **SLA/OLA Structure:**
  - *SLA (External):* TechCo guarantees 99.9% uptime for the LMS to the University Rectors.
  - *OLA (Internal):* The TechCo Infrastructure Team guarantees 15-minute response times to the TechCo Application Team to support the SLA.

4.2 Stack Patterns for Multi-Campus Operations

The **Composable University** pattern is the only viable path for NHG. Monolithic ERPs (one system for all) fail in diverse groups because a medical school (HIU) has fundamentally different scheduling needs than a vocational school (GDU).

- **Integration Pattern (iPaaS):** Instead of point-to-point spaghetti code, NHG requires an **Enterprise Service Bus (ESB)** or **iPaaS** (like MuleSoft or Azure Logic Apps). This allows the TechCo to wrap the legacy PSC systems in modern APIs, exposing data to the mobile app without replacing the backend immediately.
- **Identity Pattern (Federated SSO):** A single **Azure Entra ID** (formerly AD) tenant with multi-domain support is critical. It enables a "Passport" concept where a student's identity is portable across NHG services (Library, Gym, Cross-registration).
- **Data Governance:** The **Data Lakehouse** pattern [94] is superior to a traditional Warehouse for education. It allows the storage of structured data (grades) alongside unstructured data (LMS logs, student feedback text) for future AI training.

4.3 AI Use Cases in Higher Ed

1. **Admissions (Recruitment):** AI Lead Scoring (using CRM data) to predict which applicants are most likely to enroll, allowing admissions officers to prioritize follow-ups.
2. **Student Success (Retention):** "Early Warning Systems" that analyze LMS activity (logins, submissions) to flag students at risk of dropping out *before* they fail exams.[84]
3. **Operational Efficiency:** GenAI-powered chatbots for IT support and Student Services, reducing the load on administrative staff (FPT.AI model).

5. NHG Target Architecture Options

Three distinct paths are available for NHG, each with different risk/reward profiles.

Option 1: Standardize-First ("The Big Bang")

- **Concept:** Mandate that all universities (HSU, HIU, GDU, etc.) migrate to a single, global ERP/SIS (e.g., Oracle Student Cloud or Ellucian Banner) and a single LMS instance.
- **Architecture:**
  - *App Layer:* Single Oracle Student Cloud tenant.
  - *Data:* Native Oracle Analytics.
- **Pros:** Ultimate data consistency; simplified long-term maintenance; best-practice processes built-in.
- **Cons: Extreme Cost ($5M+)**; High risk of failure due to "cultural rejection" by universities; Timeline is 3-5 years; Global ERPs often fail to handle Vietnam's specific MOET reporting without breaking updates.
- **Estimated Effort:** Very High / High Risk.

Option 2: Data-First ("The Analytics Overlay")

- **Concept:** Leave the existing legacy SISs (PSC, Edusoft) in place. Focus entirely on building a **Data Lakehouse** that ingests data from all these silos to provide unified reporting and insights.
- **Architecture:**
  - *App Layer:* Status Quo (fragmented).
  - *Data Layer:* Azure Data Lakehouse (Bronze/Silver/Gold layers) ingesting daily dumps from PSC/Moodle.
  - *BI:* Power BI dashboards for Group Executives.
- **Pros: Fast Time-to-Value (6-9 months)**; Low disruption to daily university operations; Provides immediate visibility to NHG leadership.
- **Cons:** Does not improve the *Student Experience* (students still use clunky legacy portals); Technical debt remains in the backend.
- **Estimated Effort:** Medium / Low Risk.

Option 3: Platform-First ("The Composable TechCo") ****

- **Concept:** Implement a Shared **Integration Layer (iPaaS)** and a Shared **Experience Platform (Salesforce/App)**. The legacy SISs remain but act as "headless" databases of record. The student interacts only with the modern Super App.
- **Architecture:**
  - *Experience:* Salesforce Education Cloud + Mobile Super App.
  - *Integration:* Azure API Management + Logic Apps.
  - *Core:* Legacy SIS (Headless) + Shared SAP Finance.
  - *Data:* Data Lakehouse for AI.
- **Pros: Transformational Student Experience** (matches RMIT/VinUni); Enables AI and Personalization; Scalable TechCo service model (can plug in new universities easily).
- **Cons:** High licensing cost (Salesforce/Azure); Requires strong API engineering capability.
- **Estimated Effort:** High Effort / High Value.

Text-Based Architecture Diagram (Option 3):

|-- Student Super App (React Native)
|-- Parent Portal (Web)
|-- Staff Workspace (Digital Office)

|-- CRM: Salesforce Education Cloud (Recruitment, Advising, Case Mgmt)
|-- ID: Azure Entra ID (Single Sign-On)

|-- API Gateway (Azure APIM): Security, Throttling
|-- Event Bus (Azure Event Hubs): Real-time data sync

|-- HSU: PSC UIS (Headless)
|-- HIU: PSC UIS (Headless)
|-- GDU: Custom SIS (Headless)
|-- Group: SAP S/4HANA (Finance & HR)

|-- Data Lakehouse (Azure Synapse / Databricks)
|-- AI Services (Azure OpenAI for Chatbots, Predictive Models)

6. NHG 36-Month Transformation Roadmap

This roadmap aligns with the "Platform-First" strategy, prioritizing Identity and Data in year one to lay the foundation for Experience and AI.

Phase 1: Foundation & Unification (Months 0-12)

- **Strategic Goal:** "One Identity, One Truth."
- **Workstreams:**
    - **Integration & Identity (Critical):** Implement **Azure Entra ID** to federate all university directories. Achieve SSO for all staff and faculty.
    - **Data Platform:** Deploy the **NHG Data Lakehouse (MVP)**. Ingest student, finance, and HR data from the two largest entities (HSU, HIU) into the "Bronze" and "Silver" layers.
    - **BI:** Launch the "Rector's Dashboard"—real-time enrollment and revenue tracking across the group (replacing Excel reports).
    - **Apps:** Pilot **Salesforce CRM** for Admissions at *one* university to prove the "Lead-to-Enrollment" model.
    - **Quick Win:** Consolidated Microsoft 365 licensing negotiation (Group Enterprise Agreement) to save costs.

Phase 2: Experience & Modernization (Months 12-24)

- **Strategic Goal:** "Composable Student Experience."
- **Workstreams:**
  - **Digital Workplace:** Roll out a unified **e-Office (Base.vn or Power Apps)** for cross-entity approvals (e.g., procurement, hiring).
  - **Integration:** Build the **API Wrapper** around PSC UIS. This allows the TechCo to extract grades/schedules without replacing the SIS.
  - **Student Portal:** Launch the **NHG Student Super App (Beta)**. Features: Digital Student ID, Schedule, Grades, Tuition Payment (integrated with Bank).
  - **LMS:** Standardize LMS templates on Moodle/Canvas to ensure consistent digital pedagogy.

Phase 3: Intelligence & Ecosystem Scale (Months 24-36)

- **Strategic Goal:** "AI-First University."
- **Workstreams:**
  - **AI Platform:** Deploy **Predictive Retention Models** (using Lakehouse data) to flag at-risk students. Launch **GenAI Tutors** for intro courses.
  - **CRM Expansion:** Roll out Salesforce "Student Success Hub" (Advising) to all universities.
  - **Core Modernization:** Begin the gradual replacement of the most obsolete SIS instances with a modern, cloud-native standard (build or buy).
  - **Commercialization:** Package TechCo services (e.g., the Super App or Data Services) to sell to external vocational schools or K-12 systems.

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7. Practical Recommendations for NHG Leadership

To succeed, NHG must invest strategically, not just broadly.

7.1 Investment Priority List

1. **Identity Management (IAM):** Invest in **Azure Entra ID Premium**. Without this, shared services are impossible.
2. **Integration Platform (iPaaS):** Do not build point-to-point connections. Invest in **MuleSoft** or **Azure Logic Apps**. This is the "glue" that saves you from the "Standardize-First" nightmare.
3. **CRM (The New Core):** Move away from SIS-centric thinking. Invest in **Salesforce Education Cloud** or **Microsoft Dynamics 365**. This is how you win the recruitment war against RMIT/VinUni.

4. **Data Lakehouse:** Do not build a traditional SQL Warehouse. Build a Lakehouse (on **Azure Synapse** or **Databricks**) to handle the massive volume of LMS logs and future AI workloads.

7.2 Evaluation Criteria for New Tech

When TechCo evaluates new software, apply the "M-L-O-T" framework:

- **M (Multi-Tenancy):** Can a single instance support HSU, HIU, and GDU simultaneously while keeping data logically separated? (Crucial for cost savings).
- **L (Localization):** Does it handle Vietnamese MOET reporting natively, or does the vendor have a proven track record of localizing?
- **O (Openness):** Does it have a comprehensive **REST API**? (If no, reject immediately. No more "Black Box" systems).
- **T (TCO):** Look at Total Cost of Ownership over 5 years, including the *internal staff* needed to maintain it.

7.3 Self-Check: Top Uncertainties & Validation Questions

- *Uncertainty 1:* Will university Rectors accept centralized control of their data? **Mitigation:** Create a "Data Governance Council" with Rectors as members, giving them ownership of the *definitions* while TechCo owns the *infrastructure*.
- *Uncertainty 2:* Can the legacy PSC UIS actually support the API load required for a Super App? **Mitigation:** Conduct a technical Load Test / Proof of Concept (POC) on the HSU instance immediately.
- *Discovery Question:* "What is the specific expiry date of current maintenance contracts for PSC at HSU and HIU?" (This dictates the migration window).
- *Discovery Question:* "Does NHG currently have a centralized Active Directory, or are identities completely fragmented?"

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8. Conclusion

The transition to a TechCo model is the correct strategic move for NHG to secure its market leadership. By adopting a **Platform-First, Composable Architecture**, NHG can deliver a "VinUni-level" student experience across its "Mass-Market" universities without the prohibitive cost of replacing every legacy system overnight. The key lies in decoupling the *Experience* (App/CRM) from the *Record* (SIS) and using *Data* as the unifying force. This roadmap provides a pragmatic, risk-managed path to achieve that vision within 36 months.