

## Executive Summary

**Data & Analytics in Vietnamese Higher Education (2018–2025):** Universities in Vietnam, both public and private, are increasingly recognizing data as a strategic asset for governance, academic quality, and competitive growth. A national push for digital transformation – exemplified by 87% of public universities adopting Learning Management Systems (LMS) by 2023 <sup>1</sup> – has laid groundwork for data-driven management. Many institutions have digitized core processes (admissions, academic records, finance) and built dashboards to monitor enrollment, dropout, and outcomes, aligning with **key performance indicators (KPIs)** now mandated by the Ministry of Education and Training (MOET). For example, all universities must report metrics like **3-year average enrollment rate, first-year dropout rate, overall dropout rate, on-time graduation rate, and job placement rate** <sup>2</sup> <sup>3</sup>. Leading universities (e.g. National Economics University, Hanoi University of Science & Tech, FPT University) have gone further – developing integrated data platforms for **student progress tracking, learning analytics, and early-warning systems** <sup>4</sup> <sup>5</sup>. Data & Analytics is thus emerging as a **strategic enabler**: public universities leverage it for improved governance, transparency, and autonomy; private universities use it to drive growth, competitive differentiation, and financial efficiency.

**However, significant gaps remain.** Our research finds a wide **maturity spectrum** across institutions. A handful of large or well-funded universities have invested in centralized data warehouses, big data analytics, or AI-driven tools (e.g. personalized learning content at FPT University <sup>5</sup>, academic performance prediction at UEH <sup>5</sup>). In contrast, many others – especially smaller public colleges or regionally based private schools – still rely on **fragmented systems and manual reporting** (spreadsheets, standalone databases) with minimal integration. **Data silos** (separate Student Information Systems, LMS, HR, finance software that don't sync) and **duplication** are common, hampering the ability to get a “single source of truth.” Crucially, **data governance and quality control** are nascent; few institutions have formal data stewardship roles or data quality programs. **Cultural barriers** also slow progress: many faculty and staff remain accustomed to traditional decision-making and are hesitant to fully embrace data-driven approaches <sup>6</sup> <sup>7</sup>. Leadership awareness is growing – *76% of Asian universities (including Vietnam) now see digital transformation as a high institutional priority* <sup>8</sup> – but turning that vision into practice faces hurdles in funding, skills, and change management <sup>9</sup> <sup>10</sup>.

**Value and Risks:** When implemented well, Data & Analytics is delivering measurable benefits in Vietnam's higher education. Notable use-cases include: **streamlining admissions marketing** (using data to target prospective students, which can improve yield rates amid ~19% of admitted students historically not enrolling <sup>11</sup> <sup>12</sup>), **early dropout intervention** (several universities piloting predictive models to flag at-risk students for support, contributing to timely interventions before students leave <sup>13</sup>), **academic performance monitoring** (real-time dashboards of course pass rates and student engagement enabling faculty to adjust instruction), and **operational efficiency** (digitizing processes like course registration and fee payment has cut processing time and increased transparency <sup>14</sup>). For instance, universities that deployed integrated management systems report **faster administration and greater internal transparency** in operations <sup>14</sup>. On the student success front, pilot analytics projects have shown promising results: globally, predictive analytics can reduce student dropout rates by 15–35% in online and blended programs <sup>15</sup> <sup>16</sup>, and Vietnamese universities are beginning to see similar trends on a smaller

scale through early-warning systems for academic advisors. University leaders are starting to track KPIs such as **application-to-enrollment conversion rate, first-year retention, graduation on time, and employment rate** closely, as these reflect institutional performance and are tied to both funding and reputation <sup>2</sup> <sup>17</sup>. These data points increasingly inform strategic decisions (e.g. program offerings, support services investments).

At the same time, **leadership is wary of risks** associated with data misuse or governance failures. High-profile concerns include **student data breaches** – a risk underlined by Vietnam’s new cybersecurity and data protection regulations – and **privacy violations** if data is used beyond agreed purposes. University boards and rectors recognize that a data leak of student personal information or academic records could lead to legal penalties and reputational damage. They are also cautious about **algorithmic bias** (e.g. in any AI-driven admissions or scoring system) and ensure any predictive models are used ethically and transparently. Recent government inspections have put pressure on universities to comply with data laws, with the specter of **audits and fines** if found in violation of regulations on data privacy, cybersecurity, or education reporting. This has elevated data compliance to a board-level issue. Leaders therefore face decisions on where to **invest boldly** (e.g. in proven analytics that enhance enrollment or academic quality), where to **pilot carefully** (e.g. experimental AI tools for learning, used in controlled trials), and where to **avoid or delay** (e.g. any initiative that lacks legal clarity or could breach student trust, such as excessive monitoring of personal behaviors). In short, top leadership is seeking to balance innovation with compliance and ethics – leveraging data for gains in efficiency and quality, while instituting governance to prevent unintended consequences.

**Key Recommendations:** Vietnamese universities should develop a unified **Data & Analytics strategy** that connects all three layers – strategic governance, data architecture, and academic operations – into one cohesive roadmap. We propose: (1) **Strengthening data governance** via clear ownership (e.g. a Chief Data Officer or Data Governance Committee) and compliance alignment (ensuring all data activities meet Vietnam’s Cybersecurity Law, Personal Data Protection regulations, and MOET’s requirements) – this will build trust and sustainability. (2) **Modernizing data architecture** by integrating core systems into a central data platform (a **university data warehouse or lakehouse**) hosted on secure infrastructure (preferably in-country cloud or on-premise to satisfy localization laws <sup>18</sup> <sup>19</sup>). This platform should consolidate student, academic, financial, and HR data, enabling self-service analytics and dashboards for decision-makers. (3) **Prioritizing high-impact use cases** in phases: start with “quick win” analytics for admissions and student retention (where ROI is clear), then expand to learning analytics, resource optimization, and advanced AI applications once foundational data quality is achieved. (4) **Investing in human capital and culture:** train faculty and staff in data literacy, embed a data-driven decision culture, and address fears (e.g. by demonstrating that analytics tools assist rather than replace human judgment). (5) **Phased implementation roadmap** (detailed below) – begin with establishing governance and pilot projects in the first 6 months, scale up infrastructure and key applications over 6–18 months, and pursue advanced innovations and continuous improvement in 18–36 months. By following this roadmap, universities can turn data into real value: improving enrollment efficiency, reducing dropout, enhancing teaching quality, increasing financial transparency, and ultimately boosting institutional reputation in a sustainable, compliant manner.

## Overall Data & Analytics Landscape in Vietnamese Universities (2018–2025)

Over the past 5–7 years, **Vietnam’s higher education sector has made digital transformation a strategic priority**, creating fertile ground for data and analytics adoption. The government’s National Digital Transformation Program (Decision 131/QĐ-TTg) and Education 4.0 initiatives set ambitious targets for universities to modernize management and improve quality via technology <sup>20</sup> <sup>21</sup>. In practice, this has led to a wave of IT investments across universities, especially since 2020. **Core academic and administrative processes are increasingly digitized**: according to the *National Digital Transformation Report 2023*, 87% of public universities have deployed an LMS and online learning tools like Moodle, Canvas, Microsoft Teams or Google Classroom <sup>1</sup>. This was accelerated by COVID-19, which forced even reluctant institutions to adopt online learning platforms. Many universities now manage coursework, grading, and student–faculty interaction through integrated online systems. For example, Hanoi University of Science and Technology (HUST), National Economics University, and FPT University are cited as pioneers in developing **internal platforms that integrate training management, grading, progress tracking, and student engagement analytics** <sup>4</sup>. These systems generate *rich data* on learning behaviors and outcomes, helping instructors monitor student progress in real time and evaluate learning results with concrete data <sup>22</sup> <sup>23</sup>. Such capabilities were virtually nonexistent a decade ago; today, they are becoming standard expectations.

Alongside academics, **university management processes have been digitized**. Many institutions have built or adopted *integrated University Management Information Systems* to automate tasks like course registration, academic record-keeping, tuition payment, and grade inquiries <sup>14</sup>. Typically, these systems are customized to each school’s needs and accessible via online portals for students and faculty. An integrated administration system not only speeds up service delivery (e.g. faster processing of class registrations and fee payments) but also **improves transparency in governance** <sup>14</sup> <sup>24</sup>. When data flows into a central system, department managers and university leaders can more easily oversee operations and enforce consistent policies. For instance, if all departments use one system, the board can get a consolidated view of student enrollment or finances at the click of a button, instead of chasing separate Excel reports. The result is a gradual cultural shift: decisions are increasingly backed by data. A rector of a large autonomous public university today might review dashboards of enrollment trends or budget utilization in quarterly meetings – a practice that was rare a few years ago.

**Data-driven decision making** is thus gaining traction. Specifically, universities have begun applying analytics in areas such as: **student recruitment, learning outcomes, financial planning, and quality assurance**:

- **Admissions & Enrollment**: With university enrollment becoming highly competitive, especially for private institutions, data analytics is used to refine recruitment strategies. Common practices include analyzing application patterns by region or school, predicting yield (the percentage of admitted students who enroll), and optimizing marketing spend on the most effective channels. This is important given that each year a significant portion of students who are admitted do not end up enrolling – e.g. in 2025, ~19% of students accepted in the first round did not confirm enrollment <sup>11</sup> <sup>12</sup>. By analyzing historical data (e.g. which student profiles or regions have higher “no-show” rates), universities can **forecast enrollment more accurately** and take proactive steps (such as targeted follow-ups or better scholarship offers to high-risk candidates) to improve the conversion rate. Some

large universities have reported that such data-driven outreach helped **increase their enrollment yields and meet intake targets**, although specific percentage improvements are often kept internal. Nonetheless, the emphasis on admissions analytics is evident – many institutions now track metrics like *application-to-admission ratio*, *admission yield*, and *enrollment by demographics* on executive dashboards.

- **Student Retention & Success:** Data is being used to follow the *student lifecycle* from entry to graduation. A number of Vietnamese universities have launched early warning systems to identify students at risk of dropping out or failing courses <sup>13</sup>. These systems typically aggregate data such as class attendance, LMS login frequency, assignment completion, and grades. For example, an analytics tool might flag a freshman who has poor attendance and low first-term GPA as “at risk,” prompting academic advisors to intervene (counseling, extra tutoring, etc.). The *University of Economics Ho Chi Minh City (UEH)* is noted for using big-data analytics to **predict students’ academic results and support academic advising** <sup>5</sup>. Likewise, **FPT University** has implemented a system analyzing student behavioral data (likely from their LMS and other sources) to personalize teaching content <sup>5</sup> – a form of learning analytics aiming to boost student engagement and success. Initial outcomes are promising: institutions piloting these approaches have reported improvements such as *reduced course failure rates and more timely interventions*. While Vietnam-specific statistics are not widely published, global case studies suggest substantial impact (e.g. a Swedish platform using predictive analytics achieved a 35% reduction in dropout rates after deploying early warning models <sup>15</sup> <sup>16</sup>). Vietnamese universities are looking to replicate such success at scale.

- **Academic Quality & Learning Analytics:** Beyond retention, analytics are applied to improve teaching and learning. Universities now routinely collect and analyze *course evaluation surveys*, *grade distributions*, and *exam outcomes* as part of their internal quality assurance. Some have taken this further by mining LMS data to understand learning behavior patterns – for instance, identifying which online resources students use most, or correlating quiz attempt data with final exam performance. This data helps in **evaluating course effectiveness and instructor performance**. If a particular course shows unusually high failure rates or low student engagement in the LMS, the academic affairs office can flag it for review or pedagogical improvement. **Faculty workload analytics** is another use: data from scheduling systems can reveal the teaching load of each lecturer, helping ensure a balanced assignment of classes and preventing burnout. During the COVID-19 online teaching period, many instructors had to monitor student participation remotely; analytics (like tracking who logs into virtual classes) became a necessary tool to gauge attendance and involvement. According to reports, **real-time data has enabled faculty to monitor and adjust teaching approaches**, e.g. providing extra material when analytics show students are spending less time on a topic <sup>25</sup> <sup>26</sup>. Additionally, to uphold academic integrity, some institutions use data tools for **academic dishonesty detection** – for example, plagiarism detection software (Turnitin, etc.) is now widely used for student submissions, and a few have experimented with analysis of exam patterns or even AI-based proctoring to catch cheating in online exams.

- **Financial and Operational Analytics:** Especially for autonomous public universities and private institutions, financial sustainability is crucial. Data analytics is applied in budgeting and cost optimization – analyzing trends in tuition revenue, scholarship allocations, operational expenditures, etc. For example, a university might track *cost per student per program* and *revenue per program*, then use these insights to identify which programs are underperforming financially (perhaps prompting restructuring or marketing to boost enrollment in those programs). Some private universities,

oriented toward profit, regularly monitor metrics like *student-to-faculty ratio*, *classroom utilization rates*, *dormitory occupancy*, and *maintenance costs*. By doing so, they can optimize resource allocation – e.g. merging classes with low enrollment, or renting out facilities during off-peak times for extra income. On the operational side, integrating facilities data (e.g. room booking systems) with student schedules can allow predictive maintenance and better campus space management. These practices are still in early stages, but the more advanced institutions are moving toward a culture of **data-informed operational efficiency**.

Overall, the landscape in Vietnam shows **pockets of excellence amid a baseline of incremental progress**. Every university today has *some form of digital data system* – in fact, **over 80% of all educational institutions (K-12 and HE) in Vietnam use some kind of school management software or electronic record system** <sup>27</sup> <sup>28</sup>, and “most higher education institutions” are included in that count <sup>29</sup>. This means the basic digital data footprint exists. The challenge now is connecting and leveraging these data. Only a minority of Vietnamese universities have an enterprise-level **data warehouse or central analytics platform**. In many cases, data remains siloed: e.g. the admissions office has its own Excel files, the registrar has a separate database, the finance office uses an accounting software – making it labor-intensive to compile a holistic view. A telling indicator is the reliance on **manual reporting to the Ministry**: Vietnam’s MOET requires universities to upload extensive data into the national HEMIS database (Higher Education Management Information System) for state management. Because internal integration is weak at some schools, fulfilling this reporting duty can be a scramble of collecting spreadsheets from different departments. The MOET has recognized this issue and is pushing for standardization. HEMIS itself is a major step toward unifying data definitions and collection across the sector – it covers data on institutions’ programs, faculty, students, research, facilities, finances, etc., all submitted through a centralized portal <sup>30</sup> <sup>31</sup>. This means universities now have *external pressure to maintain good data* (since incorrect or inconsistent data in HEMIS could trigger inquiries). As of 2024, MOET even included digital transformation criteria in the official **university quality standards** (for instance, *Circular 01/2024* on higher education accreditation mentions HEMIS usage and data governance). This regulatory backdrop is gradually raising the floor: even less advanced universities must start treating data as a serious matter, not just an IT issue.

Despite progress, **significant barriers** persist that prevent many Vietnamese universities from fully capitalizing on data:

- **Resource Disparity:** There is a notable gap between top-tier universities (national universities, large metropolitan schools, or well-funded privates) and smaller or local institutions. The former have more financial resources and technical capacity to invest in robust IT infrastructure and analytics talent. They often have dedicated IT centers or digital transformation units. In contrast, many regional or specialized colleges have limited budgets and IT staff, leading to *piecemeal or partial implementations* <sup>32</sup>. Some can only afford basic student management software, lacking advanced analytics modules. This uneven implementation means the **maturity of data use varies widely** – from sophisticated data science applications in a few places, to basic electronic record-keeping in others.
- **Fragmented Systems & Legacy Processes:** Even where systems exist, they may not be well integrated. A number of universities still operate like separate fiefdoms by department – “*mạnh ai nấy làm*” (everyone does their own thing) as one report describes <sup>7</sup>. This fragmentation is partly due to the absence of a common framework or standards for academic data systems. Each institution (or each unit within it) might procure different software, resulting in compatibility issues.

Moreover, many administrative processes remain rooted in **traditional, paper-based workflows**, only superficially “computerized” (e.g. scanning PDFs of forms rather than capturing structured data). Such systems are **not optimized for data analysis** <sup>33</sup> . A telling example: some universities have online course registration, but still handle scheduling conflicts or program advising manually, meaning the data on those aspects isn’t systematically captured. The inertia of legacy methods means the **full benefits of digital tools aren’t realized** – e.g. simply putting lecture notes online (as many did during COVID) isn’t the same as redesigning pedagogy to use learning data for improvement <sup>34</sup> .

- **Cultural Resistance and Skills Gap:** Technology adoption in higher ed requires buy-in from faculty and staff. In Vietnam, many faculty members – especially older generation or those in fields less exposed to technology – have been slow to change their teaching and evaluation methods. Some lecturers view data analytics and online systems with skepticism, seeing them as extra work or even as threats (e.g. fear that transparent data on teaching performance could be used punitively). The research confirms **faculty’s passive involvement is a hurdle**: *“not a few still cling to traditional teaching mindsets, not open to tech integration, or lack skills to create interactive digital content”* <sup>6</sup> <sup>35</sup> . This results in low usage of available tools (for instance, an LMS might have advanced quiz analytics, but a lecturer might ignore them and continue to grade manually). On the administrative side, some department managers are accustomed to making decisions by precedent or personal judgment, and may distrust what data says – e.g. if a dashboard indicates their program has low enrollment, they might question the data rather than address the issue. Additionally, there’s a **shortage of data analytics professionals** within universities. Few universities have roles like data analysts or institutional researchers on staff. IT departments are often focused on maintenance rather than analytics. Thus, even when data exists, the human capacity to interpret and act on it is limited. Training is needed to build a data-savvy workforce.
- **Legal and Ethical Concerns:** The rapid move toward data collection has outpaced the development of clear legal guidelines in some respects. Until recently, Vietnam lacked a specific personal data protection law; the new **Decree 13/2023 on Personal Data Protection** (and an upcoming Personal Data Protection Law effective 2026) imposes strict requirements on obtaining consent and safeguarding personal data <sup>36</sup> <sup>37</sup> . Many universities are still unfamiliar with these rules. For example, universities routinely collect sensitive personal data – admissions forms include ID numbers, health records for dormitory, financial info for fee payments, etc. – now by law they must **obtain explicit consent, disclose purpose and retention, and secure this data** <sup>38</sup> <sup>39</sup> . Non-compliance could lead to penalties. Likewise, the **Cybersecurity Law 2018** (and a 2025 draft update) emphasizes that data (especially large aggregations of personal data) is a national asset that must be protected <sup>40</sup> <sup>41</sup> . It suggests that critical data should be stored onshore and that organizations lacking capability must use safer state-certified data services <sup>18</sup> <sup>19</sup> . These regulations have begun to influence university IT policies – for instance, some schools have stopped using overseas cloud servers for student data, migrating to Vietnam-based clouds or on-premises servers to ensure data doesn’t leave national jurisdiction. Ethical considerations, too, are on the radar: questions like *“What analytics are acceptable?”* or *“How to ensure algorithms are fair?”* are being discussed. Universities are wary of using data in ways that might be seen as invasive (e.g. tracking students’ physical movements on campus via cameras would be controversial, unless clearly justified for security). The lack of clear internal policies previously meant each school decided on their own; now, with stronger laws, universities are working to formalize data governance policies in line with national standards.

In summary, Vietnam's universities are **in transition**: they have embraced the *concept* of data-driven management and made tangible strides in building digital systems and basic analytics. The benefits are already visible in early successes with enrollment management, student support, and efficiency gains. At the same time, the full potential of Data & Analytics is *far from fully realized*, due to uneven adoption, integration challenges, cultural hurdles, and emerging compliance requirements. The next sections will compare how these trends manifest differently in public vs private institutions, and then dive into what an ideal architecture, governance, and roadmap should look like to address current gaps and move toward a mature, value-generating Data & Analytics ecosystem in Vietnamese higher education.

## Comparison: Public vs Private Universities in Data & Analytics

Both public and private universities in Vietnam are part of the overall digital transformation wave, but their **motivations, constraints, and focus areas** with data can differ significantly. Below, we compare key aspects of Data & Analytics between public (including autonomous and non-autonomous state universities) and private (including for-profit and not-for-profit) institutions.

### 1. Strategic Role of Data & Analytics:

- **Public Universities:** In public institutions, especially those gaining **autonomy (tự chủ)**, data is increasingly seen as critical for **institutional governance, accountability, and policy compliance**. Public university leaders use data to support strategic decisions in line with government expectations – for instance, improving transparency of operations, demonstrating educational quality, and managing resources efficiently. With the government pushing autonomy, public universities must operate with more financial and managerial independence, which in turn drives a need for better data on budgets, spending, enrollment, etc., to ensure sustainability. Data helps answer questions like: *Are we meeting our enrollment quotas?, How effective are our programs?, Where can we cut costs without affecting quality?*. Moreover, public institutions face scrutiny from MOET and state auditors; they need data to evidence that they are complying with regulations (e.g. admissions quotas, tuition caps) and achieving outcomes (graduate employment rates, research output). Thus, for publics, Data & Analytics plays a role in **supporting governance and demonstrating accountability**. For example, when universities must publicly disclose their annual performance (as per MOET's transparency regulations), having solid data systems ensures they report accurately on indicators such as dropout and graduation rates <sup>2</sup> <sup>17</sup> . Autonomy also encourages **data-informed strategic planning**: university boards are using data projections (like student population trends, labor market data) to plan new academic programs or adjust capacity. In summary, public universities leverage data primarily to *improve internal management, drive policy goals (quality, equity), and maintain transparency towards regulators and the public* <sup>42</sup> <sup>43</sup> .
- **Private Universities:** Private institutions, on the other hand, tend to view Data & Analytics through the lens of **competitive advantage, growth, and profitability**. These universities compete in a market for student enrollment and often operate on tuition revenues, so data is vital for *business-like decisions*. For them, analytics is a tool to boost **student recruitment (market analytics to attract students), optimize pricing and scholarships (financial analytics), improve student satisfaction (quality metrics leading to reputation), and streamline operations to reduce costs**. A private university's leadership will closely watch data that impacts the bottom line: number of admissions by channel, conversion rates of marketing campaigns, dropout rates (since each dropout can mean lost tuition revenue), and operational expenses per student. Data-driven marketing is especially

prominent – some private universities have sophisticated CRM (Customer Relationship Management) systems where they track thousands of prospective student leads and use predictive scoring to prioritize outreach. **Analytics helps private schools identify which academic programs are in demand**, guiding where to invest or expand. They also often benchmark themselves with data: e.g. comparing their graduate employment rate or average entry scores against competitors to refine their positioning. Notably, many private universities are more agile in tech adoption – they might quickly adopt new solutions (like AI chatbots for student inquiries or analytics dashboards for executives) to gain an edge in student experience. The strategic role of data for privates is thus to *drive growth (through informed marketing and program development) and ensure efficiency (through data-informed management)*, which ultimately supports their profitability or sustainability goals. For instance, **FPT University**, a leading private institution, actively uses data/AI to innovate in teaching and student support as part of its competitive strategy <sup>5</sup>. Private schools also value data to satisfy their investors or trustees by showing metrics of success and improvement.

## 2. Use-Case Maturity and Focus:

Public and private universities often prioritize different analytics use-cases, or are at different maturity levels with them:

- **Admissions & Enrollment Analytics:** This is highly developed in **private universities**, where enrollment numbers directly affect revenue. Privates often invest in analytics to identify which recruitment efforts yield the best students, track each stage of the admissions funnel, and forecast incoming class size. They might use dashboards showing real-time application counts, acceptance rates, and expected yield by region or school. In contrast, **public universities** (especially the selective ones) historically didn't need to market aggressively – many have more applicants than capacity – so they are less advanced in marketing analytics. However, with the advent of autonomy and competition, public universities too are starting to use data to target prospective students (especially for lesser-known or regional publics). Still, we can say **maturity is higher on average in private institutions for admissions analytics**, as they treat student recruitment akin to a business sales pipeline. Example: A private university's marketing team might use predictive models to determine which applicants are most likely to enroll if admitted, and focus calling campaigns on them (a tactic not commonly used by public schools until recently).
- **Student Retention & Dropout Prevention:** Both sectors are concerned with dropout, but **private universities often feel the pain more directly** as dropouts mean lost tuition and possibly reputational damage. Thus, some private universities have been early adopters of analytics to monitor attendance, grades, and even student engagement activities to catch issues. They might have “student success” teams that regularly review data and reach out to struggling students. Public universities (especially large ones) also care about retention (as part of quality metrics and to avoid wasting subsidized slots). In fact, MOET's requirement for reporting dropout rates has shone a light on this issue <sup>44</sup> <sup>45</sup>. A few top publics have piloted early warning systems too <sup>13</sup>. However, many public schools still rely on traditional methods (e.g. homeroom professors manually flagging absentees) rather than automated analytics. On balance, **private universities may be a step ahead in deploying formal analytics-driven retention programs**, but public universities are catching up under pressure of accountability. Notably, some public technical universities with high dropout rates (sometimes 20–30% in engineering programs) are now looking to data to understand and address this, after seeing comparative data showing them lagging <sup>45</sup> <sup>46</sup>.

- **Academic and Learning Analytics:** This often depends on institutional culture more than ownership. However, **private universities (especially newer ones)** sometimes have more flexibility to innovate with pedagogy and tech. For example, FPT University integrates learning analytics to personalize content, as mentioned earlier <sup>5</sup>. RMIT Vietnam (an international private) uses its global analytics systems to track student engagement. Public universities, with larger scale, have used learning analytics mainly for monitoring (like checking LMS activity during online learning phases). Both public and private top-tier institutions have centers of teaching excellence exploring data on student learning. But generally, **the concept of learning analytics (beyond basic LMS stats) is still emerging in Vietnam**, so differences here are not stark; it's more about specific champions (which could be in either sector). One difference: public universities must often adhere to state curriculum standards and may be slower to overhaul teaching methods; private ones might experiment more readily with data-driven pedagogical changes (like adaptive learning platforms or competency-based assessments that generate lots of data for analysis).
- **Financial and Operational Analytics:** Here, **autonomous public universities and private universities show similarities**, since both need to manage finances sustainably. A fully budget-dependent public university effectively acts like a private in needing to balance books, so they too have started using financial analytics (budget dashboards, scenario modeling for tuition changes, etc.). Non-autonomous publics (those still heavily state-funded) might be less motivated to optimize costs via analytics, as their budgets are allocated. They still use data for state reports but perhaps not as aggressively for cost-cutting. Private institutions regularly analyze cost per credit hour, faculty utilization, etc., to maximize profit margins or reinvestment. We observe that **private institutions are often leaner in administration and use data to keep it that way** (e.g. monitoring staff-to-student ratios). Public institutions, especially large ones, sometimes carry more administrative overhead and are only beginning to use analytics to streamline (for example, a public university might have redundant staff in faculties – something data could reveal – but reducing that may be sensitive). Also, **public universities have to abide by government financial rules**, which means their data use includes compliance (tracking spending categories for audits), whereas privates have more internal freedom to allocate and thus focus on efficiency metrics of their choosing.
- **Compliance and Ranking Analytics:** Public universities are very focused on data for *accreditation and rankings mandated by the state*. They diligently compile data to meet national accreditation criteria and have started to chase international rankings, which require huge amounts of data (faculty qualifications, research output, citations, etc.). Private universities also pursue accreditation (especially those aiming for international recognition) and similarly build datasets for that. But a nuance: some private universities (like top-tier ones) actively use data to improve their ranking performance year to year. Public universities, particularly the national universities and some key others, do the same. This area is less about public/private and more about the *mission and leadership aspiration* of the university.

To summarize these differences in a **Use-Case Maturity Matrix**:

<b>Analytics Use Case</b>	<b>Public Universities (avg.)</b>	<b>Private Universities (avg.)</b>
<b>Admissions Marketing &amp; Yield</b>	Moderate – traditional outreach dominant; some data use emerging, especially in autonomous schools (basic CRM, analysis of admission stats)	High – critical focus; advanced use of CRM, marketing analytics, predictive yield models in many privates to drive enrollment targets.
<b>Early Dropout Warning</b>	Low to Moderate – piloted at a few large publics; most rely on manual faculty reporting. Gaining attention due to accountability for dropout rates <sup>45</sup> <sup>46</sup> .	Moderate – growing adoption; privates monitor attendance/grades closely and intervene. Some have dedicated student success analytics, given revenue impact of dropouts.
<b>Learning Analytics</b>	Low – Mostly basic LMS usage data. A few top publics use big data to predict academic outcomes (e.g. UEH) <sup>5</sup> , but not widespread.	Low to Moderate – Some innovative privates (e.g. FPT) personalize learning via data <sup>5</sup> . Generally still early stage for in-depth learning analytics in both sectors.
<b>Academic Quality KPIs</b>	High – Strong focus on tracking graduation rates, employability, research output (mandated for public disclosure) <sup>2</sup> <sup>17</sup> . Systems to collect these exist (often manually aggregated).	High – Similarly track outcomes for reputation; also needed for accreditation. Privates often track student satisfaction as well. Methods may be manual but emphasis is there.
<b>Financial &amp; Cost Analytics</b>	Moderate – Autonomous publics use budgeting tools and enrollment data to plan finances; others less so. Data use for cost optimization is just starting in some (pressure to be efficient under autonomy).	High – Essential for sustainability. Most privates monitor expenses, revenue, ROI per program. Likely to have financial dashboards for leadership.
<b>Operational Efficiency</b>	Moderate – Larger publics analyzing space utilization, staff productivity in pockets. Still many legacy inefficiencies.	Moderate – Privates tend to be nimble, using data to adjust class sizes, faculty load etc., but smaller scale means simpler operations. Both have room to improve via analytics.
<b>Compliance &amp; Reporting</b>	High – Must feed data to HEMIS and publish annual reports by law <sup>47</sup> <sup>48</sup> . Strong external driver; many have teams just for compiling reports.	Moderate – Also report to regulators (they use HEMIS too) but generally internal governance is less bureaucratic. Compliance data gathered as needed, with focus more on business metrics.

(Note: “Moderate/High” above are relative indicators of maturity and focus, based on observed trends; individual institutions may vary.)

### 3. Data Infrastructure and Tools:

Public and private universities also differ in how they acquire and use data systems:

- **Public universities** often use **locally developed or government-endorsed systems**. Many public schools, especially smaller ones, rely on software provided or recommended by MOET or shared among the community. For example, MOET's *HEMIS* platform integrates with some university systems, and public schools must align their data format to HEMIS standards <sup>49</sup> <sup>50</sup> . Some large publics have in-house IT teams that built custom SIS/LMS solutions tailored to their needs. Hanoi University of Science & Technology (HUST), for example, has its own suite of management software and has outlined a comprehensive digital strategy <sup>51</sup> <sup>52</sup> . However, building in-house can lead to isolated systems unique to each school. Publics also tend to host data on-premises or in state-run data centers due to concerns about data sovereignty (as state institutions, they are cautious about putting student data on foreign cloud services without approval, aligning with cybersecurity mandates). **BI tools** in publics are often an afterthought – many rely on the reporting modules of their SIS or basic Excel analysis. Only recently have some started adopting modern BI solutions (e.g. Power BI, Tableau) on top of their databases, often with donor-funded projects or collaborations (the British Council's 2022 report noted that while digital transformation is prioritized, many universities cited lack of expertise in advanced analytics tools <sup>9</sup> ).
- **Private universities** are generally more open to **off-the-shelf commercial solutions** and cloud services. For instance, some private institutions use international ERP/education management systems or cloud-based LMS (e.g. some smaller colleges might use Google Classroom extensively or subscribe to a SaaS student management system to avoid big IT infrastructure costs). They may also be more inclined to adopt new tech like AI-based analytics tools if it promises an advantage. On the BI front, private universities – especially those owned by larger corporations or groups – might leverage corporate analytics platforms. An example is **RMIT Vietnam** (a foreign private campus) which likely uses its parent RMIT Melbourne's data warehouse and analytics environment for all its reporting, giving it very advanced capabilities by local standards. Similarly, **FPT University** (part of the FPT tech conglomerate) benefits from FPT's technology expertise; it has deployed AI in teaching and has likely one of the more sophisticated data environments (FPT's 2024 Educamp highlighted various AI applications in education) <sup>53</sup> <sup>54</sup> . Smaller privates may not have such capacity, but can purchase ready-made solutions (some EdTech vendors in Vietnam offer packaged “university management” systems that include dashboards).

One interesting trend is **vendor-led analytics**: a few Vietnamese tech companies and startups have developed platforms for education analytics that universities can adopt. For example, companies like Viettel and VNPT (major telecoms with IT arms) have offered smart education solutions to universities (like enrollment analytics, e-library systems). Private universities, being less tied to bureaucratic procurement, often pilot these vendor solutions faster.

#### 4. Governance and Decision-Making Structure:

In terms of organizational approach:

- Public universities (especially large ones) are beginning to establish more formal **data governance structures**. For instance, a public university might form a “Digital Transformation Steering Committee” chaired by a vice-rector, including heads of IT, academics, student affairs, etc., to coordinate data initiatives <sup>55</sup> . They may also create a dedicated **Center for Educational**

**Technology or Data** – as noted, several public institutions have set up centers to drive digital transformation and train staff <sup>56</sup>. These central units indicate a more **centralized operating model** for data in publics: decisions and standards often come from the top administration, and faculties implement them. This top-down approach fits the public university governance style, ensuring alignment with national policies (e.g. guidelines on data security, standards for reporting). It can, however, be slow and meet internal resistance if not managed well.

- Private universities usually have **leaner decision chains**. If the president or board wants a data initiative, it can be executed quickly. Some privates have effectively a **central data office** by virtue of a small management team – e.g. the CIO or IT Director at a private university often reports directly to the president and can push data projects rapidly. Alternatively, if part of a larger education group, the group might have a centralized data team serving multiple campuses (for example, Nguyen Hoang Group or others that own many private K-12 and HE institutions might centralize certain analytics functions for economies of scale). In privates, **data stewardship might be less formal** (everyone knows who handles what data due to smaller size), but as they grow, they too face the need for formal policies.

An illustrative contrast: **Data access and sharing**. Public universities are generally more restrictive – data is often seen as “belonging” to the department that collects it, unless policies dictate sharing. A registrar at a public school might be reluctant to share detailed student data with another department without official requests, citing privacy or rules. Meanwhile, a private university oriented toward performance might encourage cross-department data sharing as long as it serves business goals (within legal bounds). That said, *all* universities must obey privacy laws: e.g., **no institution can freely share personal student data externally** due to Decree 13/2023 (universities can’t provide personal info to third parties without consent or official request) <sup>57</sup> <sup>58</sup>. Publics are especially cautious here, often requiring Rector’s approval for any external data sharing from the HEMIS or internal systems <sup>57</sup>.

In summary, **public universities leverage Data & Analytics mainly to enhance governance, transparency, and meet policy/accountability objectives**, though the more autonomous ones also focus on efficiency and competitiveness. **Private universities use Data & Analytics as a critical tool for market competitiveness, student success (as customers), and financial viability**. Publics may lag slightly in agility and certain use-cases (like aggressive marketing analytics) but are driven by national reforms to adopt data-driven practices. Privates often innovate faster but on a smaller scale, and they directly tie analytics to ROI. Both sectors show exemplars of good practice, and both face common challenges of integration, culture change, and compliance. The next section will propose an integrated architecture and governance approach that can benefit both public and private institutions, while respecting the specific legal and operational context in Vietnam.

## Proposed Data Architecture & Governance for Vietnamese Universities

To unlock the full value of Data & Analytics, Vietnamese universities should establish a robust **data architecture and governance framework**. This framework must cater to the realities of Vietnam’s legal environment and the operational needs of higher education, while being flexible enough for institutions of different sizes and types. Below, we outline a recommended architecture, governance model, and compliance considerations:

## 1. Data Architecture: An Integrated “University Data Hub”

We propose a **hybrid data architecture** that many universities can adopt as a reference. Key components include:

- **Core Source Systems:** All universities have several primary systems (often called “*systems of record*”): Student Information System (SIS) for student records and academic administration, Learning Management System (LMS) for course content and activity data, Finance/Accounting system for budgets and transactions, Human Resources system for staff and payroll, Library system, etc. In many Vietnamese universities today, these systems exist but are siloed. The goal is to **connect and consolidate data from these sources** into a central repository.
- **Data Warehouse / Lakehouse:** At the heart of the architecture should be a **central data repository** that aggregates data from all core systems. For a university, a traditional **Data Warehouse** (relational database optimized for queries) is often suitable for structured data like enrollments, grades, HR records, finance numbers. However, given the rise of unstructured data (like learning logs, survey responses), a more modern **Data Lakehouse** approach could be beneficial – this combines a data lake’s ability to store raw, varied data with data warehouse querying capabilities. The repository would store historical data as well, enabling trend analysis (e.g. 5-year enrollment trends, year-on-year budget comparisons). By integrating across domains, the university can answer complex questions (e.g. correlate student engagement from the LMS with academic performance from the SIS). The data warehouse would be the source for official reports and dashboards, ensuring consistency (“one version of the truth”).
- **Data Integration (ETL/ELT) Pipelines:** To populate the data warehouse, universities need data integration processes. These can be **ETL (Extract, Transform, Load)** jobs that pull data from SIS, LMS, etc., transform it to a consistent format, and load into the warehouse. Many Vietnamese universities currently do this manually (export-import via Excel). The proposal is to automate it: e.g. a nightly job that updates the warehouse with the day’s new enrollment, attendance, financial transactions, etc. Where real-time insights are needed (say, a live admissions dashboard during recruitment season), streaming or more frequent sync could be set up. Importantly, integration must handle **master data alignment** – e.g. making sure a student’s ID links their records across systems. Implementing a **Master Data Management** approach for key entities (Student, Faculty, Course, Department) is recommended so that the same identifiers are used in all systems, avoiding duplicate or mismatched records. This significantly improves data quality and the ability to join data across sources.
- **Business Intelligence (BI) and Analytics Tools:** On top of the data warehouse/lake, the university should deploy BI tools for reporting and analysis. This could be a modern dashboard tool like Microsoft Power BI, Tableau, or even open-source alternatives, depending on budget. The BI layer will provide **interactive dashboards and reports** to various stakeholders: executive leadership gets high-level KPI dashboards (enrollment, revenue, graduation rate, etc.), department heads get more detailed operational reports (course fill rates, faculty teaching loads, etc.), academic advisors might get student risk dashboards, and so on. The BI platform must support **role-based access** (to enforce that users only see data they’re permitted to). Many Vietnamese institutions have started using such tools, but coverage is uneven. The goal is to have an easy-to-use interface so decision-makers at all levels can self-serve data queries without always relying on IT. In the proposed architecture, **data**

**governance rules** will be embedded in the BI layer too – e.g. ensuring sensitive personal data (like individual student grades or health data) is only accessible to authorized users, possibly through data anonymization or aggregation.

- **Advanced Analytics and AI:** With a solid data foundation, universities can add advanced analytics components. This includes predictive modeling (e.g. machine learning models to predict student dropout or forecast enrollment) and maybe AI-driven tools (like recommending courses to students based on their performance). These would typically access data from the warehouse/lake (and possibly external data like labor market stats for job outcome predictions). For instance, a data science team could use Python or R to train models on the integrated dataset. The architecture could incorporate a **sandbox or analytics workbench environment** where such models are developed and then deployed. Some larger Vietnamese universities are already experimenting – recall that UEH uses big data analytics for outcome prediction <sup>5</sup>, and a few have tried AI for personalized learning <sup>5</sup>. To support this, the data platform should be scalable and possibly cloud-enabled (for the heavy computation). We suggest using Vietnam-based cloud services (like Viettel Cloud, VNG Cloud, or AWS/Azure with Hanoi/Ho Chi Minh City regions if available) to comply with data localization requirements while gaining flexibility. The **computing environment** should also enforce security (only de-identified data for analysis where possible, to protect privacy).
- **External Data Interfaces:** Universities must also supply data to external stakeholders (MOET's HEMIS, ranking agencies, etc.) and sometimes ingest data from outside (e.g. MOET's national student ID data or benchmark statistics). The architecture should have defined **APIs or export pipelines** for required reports. For example, data required by HEMIS (which includes fields across students, faculty, finance, etc.) can be generated from the central warehouse to ensure consistency and ease the reporting burden. In fact, aligning internal data structures to HEMIS definitions is wise – HEMIS covers *“information on educational institutions network, program catalog, staff, students, research, infrastructure, finance, and more”* <sup>50</sup>. If the internal warehouse is designed with these categories, it will map directly to national standards. Additionally, any open data initiative (publishing some data for transparency) can take curated data from the warehouse.

In simpler terms, this architecture creates a **“single source of truth” data hub** for the university. It breaks down silos and makes data accessible for decision-making and compliance. Visualizing it: imagine a central circle (data warehouse) connected by arrows to smaller circles (SIS, LMS, HR, Finance systems), with another layer of arrows going out to reporting tools and to MOET's system.

This architecture must be implemented pragmatically. Not every university will go and build a huge data warehouse overnight. For smaller institutions, a scaled-down version (even if it starts as a set of linked Excel PowerQuery or a simpler SQL database consolidating a few key tables) can work initially. The important part is the *principle of integration and centralized analytics* rather than each department doing their own thing.

**Security & Infrastructure Considerations:** Given legal requirements, the data warehouse should ideally be hosted on **Vietnam-based servers or cloud**. The Cybersecurity Law (2018) and its expected updates emphasize local storage of Vietnamese users' personal data and critical data systems <sup>18</sup>. Many public universities already host data on VinaREN or government data centers. Private universities might use private sector data centers in Vietnam. Cloud adoption is possible and can provide modern infrastructure – e.g. some might use Viettel's cloud, as Viettel is a local provider and likely compliant, or services like AWS Outposts (local deployments) if needed. **Access controls, encryption, and backup** are vital parts of

architecture: data should be encrypted at rest and in transit, databases should have proper user authentication, and regular backups should be maintained (preferably in-country as well). A formal **disaster recovery plan** should be in place for critical databases, especially as reliance on data grows.

## 2. Data Governance Model:

Technology alone won't succeed without governance. We recommend establishing a **Data Governance structure** with the following elements:

- **Data Governance Committee or Council:** This is a cross-functional team including representatives from academic affairs, student services, IT, institutional research, finance, etc., ideally chaired by a senior leader (e.g. Vice-Rector or Dean in charge of Quality/Strategy). The committee sets data policies, priorities for analytics projects, and resolves inter-departmental data issues. For a public university, this might be formalized by a Rector's decision; for a private, it might be a working group under the Director. This body ensures that data efforts align with university strategy and that there is accountability for data quality and usage. It also reviews any sensitive data usage proposals (e.g. if someone wants to analyze student CCTV footage, that would need a policy decision).
- **Chief Data Officer (CDO) or equivalent:** If resources allow, appoint a CDO or assign the role to an existing executive (sometimes the CIO or a Vice Rector for Planning). This person is the *data champion*, responsible for driving the data strategy, liaising between technical and business sides, and ensuring compliance. In the Vietnamese context, a "CDO" title is still rare, but some universities have positions like Head of Data Analytics or Director of Information Center that could fulfill this role. The British Council found that **73% of surveyed HEIs had specific persons assigned to digital transformation** responsibilities <sup>59</sup> <sup>60</sup>, which is a positive sign that many schools have someone playing this coordinating role.
- **Data Stewards:** Assign **data stewardship** roles for key domains – e.g. a Registrar might be the Data Steward for student academic data, HR manager for personnel data, etc. These stewards are responsible for data definitions, data quality in their domain, and approving access requests. For instance, if an analyst needs detailed student data, the request goes to the Registrar/Steward who ensures privacy is respected and the data provided is correct. By having stewards, you create accountability at the source of data entry and maintenance, which improves overall quality.
- **Data Policies and Standards:** The governance group should develop clear policies on data usage, access, and quality. Some key policies needed in Vietnam's context: **Personal Data Protection Policy** (complying with Decree 13/2023 and the upcoming law – outlining how consent is obtained, how data subjects can access or correct their data, how long data is retained, etc.), **Data Classification Policy** (categorizing data into public, internal, confidential, sensitive – student personal info would be sensitive and handled with extra care, whereas aggregate statistics might be public), **Access Control Policy** (who can see what data – for example, only authorized staff can see individual student health records, but aggregated data might be widely accessible), and **Data Sharing Policy** (rules for sharing data with third parties or researchers, requiring anonymization unless legally mandated otherwise <sup>57</sup>). Also, **Master Data Management standards** (for consistent codes for faculties, courses, etc.) should be documented, possibly aligning with MOET's coding schemes.

- **Compliance Checkpoints:** Under governance, ensure processes to regularly check compliance with Vietnamese laws: e.g. conducting an annual review to ensure all personal data processing has documented consent and purpose, as required by the PDP Decree <sup>38</sup> <sup>39</sup> . Also auditing security measures against Cybersecurity law requirements – some universities may be considered operators of “critical information infrastructure” if they hold large data sets, so they should self-assess and strengthen accordingly. For example, a public university might need to coordinate with the Ministry of Public Security for cybersecurity assessments.
- **Transparency and Ethics:** Universities should incorporate guidelines for ethical use of data. This could include an **Ethics Board or Review** for analytics projects that use student data in novel ways (similar to research ethics review). For instance, if the university decides to use an AI to analyze student social media for wellbeing (hypothetically), an ethics check would question if that’s appropriate. More commonly, ensuring algorithms used (say for admissions or scholarship decisions) are fair and do not discriminate unjustly is part of governance. This ties with international best practices and builds trust in analytics.
- **Training and Data Culture:** Governance should not just be enforcement; it should promote a data-informed culture. This means regular training sessions for staff and faculty on using data tools, interpreting dashboards, as well as on data privacy and security protocols. A governance plan might set targets like “All department heads will be trained in basic data analytics by end of year” or “Include data literacy in faculty professional development.” By improving data literacy, the university ensures that insights from the data warehouse are actually understood and acted upon. The earlier-cited barrier of *lack of interest or skill among faculty/staff* <sup>9</sup> <sup>10</sup> can be tackled by such capacity building.

### 3. Regulatory & Compliance Alignment:

To ensure the architecture and governance work within Vietnamese law, here is a summary compliance table that the university’s data framework should adhere to:

Legal Framework	Requirements for Universities’ Data	Implications
<b>Law on Cybersecurity 2018 (and draft 2025 update)</b> <sup>40</sup> <sup>41</sup>	Localize and secure important data; treat data as national resource. Protect systems from cyber threats; may require data localization for personal data of Vietnamese users.	– Host servers in Vietnam or use local cloud for student/staff data.  – Implement strong cybersecurity measures (firewalls, incident response).  – Expect audits or inspections on data security for compliance.

Legal Framework	Requirements for Universities' Data	Implications
<b>Decree 13/2023 on Personal Data Protection (and Personal Data Protection Law 2025 forthcoming)</b> 36 38	<p>Obtain clear consent from individuals for data collection/use, especially for sensitive data (health, biometrics, etc.). Inform data subjects of purpose, retention, third-party access.</p> <p>Protect personal data via technical measures; respond to data subject rights (access, correction, deletion requests).</p> <p>Severe fines for violations.</p>	<p>– Update all forms (e.g. admission forms, survey forms) to include consent clauses for data usage beyond education purpose.</p> <p>&lt;br&gt;– Develop Privacy Notice explaining what student data is collected and why (e.g. academic records for education, contact info for services) 61 39 .</p> <p>&lt;br&gt;– Ensure sensitive data (health records, biometric attendance) is encrypted and access is restricted.</p> <p>&lt;br&gt;– Possibly appoint a Data Protection Officer or team to handle compliance.</p>
<b>MOET Regulations (e.g. Circular 09/2024 on information disclosure, HEMIS data reporting)</b> 2 47	<p>Publicly disclose annual metrics on enrollment, dropout, graduation, etc. Submit periodic reports via HEMIS on various institutional data. Use MOET's standardized data definitions.</p> <p>Maintain accuracy and integrity of reported data (false reporting can lead to penalties or reputational damage).</p>	<p>– Integrate HEMIS data requirements into the data warehouse to easily compile reports.</p> <p>&lt;br&gt;– Assign responsibility to Data Stewards to validate data before submission.</p> <p>&lt;br&gt;– Use HEMIS as an opportunity: data submitted can also be used internally for benchmarking.</p> <p>&lt;br&gt;– Ensure transparency reports (posted on university website) match the actual data – governance should review before publication.</p>
<b>Accreditation and Ranking Criteria</b> (Vietnam national accreditation standards, QS/THE rankings, etc.)	<p>Collect and provide data on faculty qualifications, student outcomes, research, etc. Some data must be audited or evidential for accreditation.</p> <p>Rankings require data integrity (as submissions can be checked).</p>	<p>– Establish internal processes to gather required accreditation data (e.g. student:faculty ratio, research publications per faculty) from the integrated system.</p> <p>&lt;br&gt;– Use the data warehouse to generate accreditation self-study reports.</p> <p>&lt;br&gt;– Leverage analytics to identify gaps (e.g. if data shows high student:faculty ratio, address hiring).</p> <p>&lt;br&gt;– For rankings, ensure data reported externally (which often becomes public) is consistent with internal data to avoid conflicts.</p>

Legal Framework	Requirements for Universities' Data	Implications
<b>Intellectual Property (IP) and Academic Integrity Laws</b> (re: data on learning materials, etc.)	Digital content (lecture notes, videos) and data derived from them should respect IP rights. Also, if using student data for research, obey research ethics guidelines and student consent.	<ul style="list-style-type: none"> <li>– If the university creates a data lake of learning content or captures lecture recordings, it must clarify IP ownership (many VN faculty grant usage rights to their university, but it should be in policy).</li> <li>&lt;br&gt;– Data collected from students for research (surveys, learning analytics studies) should have consent or be anonymized. Governance should coordinate with Institutional Review Boards if research uses student data.</li> </ul>
<b>Data Localization (related to Cybersecurity &amp; PDP)</b>	Certain personal data (like widespread user data, possibly including student records) should be stored in Vietnam; cross-border transfer requires conditions (consent or approval).	<ul style="list-style-type: none"> <li>– Avoid using overseas servers for primary databases containing personal info, or if using international services (like a foreign LMS provider), ensure they offer Vietnam data hosting or get student consent for data hosting abroad if needed. &lt;br&gt;– If collaborating internationally and sharing data (e.g. joint research requiring student data), establish agreements and only share de-identified data or get proper approvals.</li> </ul>

By adhering to these legal requirements, universities not only avoid penalties but also build trust with students, staff, and society (parents, employers) that the institution is a **good steward of data**. Notably, compliance can be turned into an advantage – for instance, a university that robustly implements data protection can advertise this as part of its commitment to student welfare, distinguishing itself.

#### 4. Operating Model Archetypes:

Given the variety of institutions, one size may not fit all in implementation. We identify a few **operating model archetypes** for Data & Analytics that Vietnamese universities can consider, possibly even combining elements:

- **Centralized Data Office Model:** The university creates a central unit (or expands the IT/IR office) that handles all data management and analytics. This team, led by a CDO or CIO, develops the data warehouse, produces reports for all departments, and manages data governance. Faculties and departments make requests or access dashboards but the heavy lifting is done centrally. *Pros:* ensures consistency, easier to enforce standards, good for smaller universities or those early in analytics. *Cons:* can become a bottleneck if too few staff handle all data tasks; risk of departments feeling disengaged. Many Vietnamese public universities lean this way – e.g. they have a “Center for Information & Communication” or “Data Center” which provides reports to leadership and ministries.

- **Decentralized (Faculty-led) Model:** Each faculty or department has its own data analyst or team and handles its data and analysis, with minimal central oversight. For example, the Admissions office tracks recruitment stats in their system, the Academic Affairs office tracks learning outcomes, etc., and they only share summaries upward. *Pros:* each unit can customize analytics to its needs, faster local decision-making. *Cons:* very prone to data silos, inconsistent definitions (one faculty might calculate dropout differently than another), duplication of effort, and hard to aggregate for university-wide view. This model is **not recommended** given the integration goals, but some universities are effectively in this state by default (especially if no strong central strategy was in place – everyone did their own thing).
- **Hybrid Model:** A middle ground where a central data platform exists, but certain analytics capabilities are embedded in units. For instance, the central IT builds the data warehouse and basic dashboards for all, but each faculty can have a “data champion” who digs deeper into their own data or creates additional reports specific to their domain using the central data sources. This fosters self-service analytics while maintaining overall cohesion. This model is often ideal once a baseline is established – it scales better because the central team isn’t solely responsible for every insight, and units feel ownership. However, it requires that faculty/department staff are trained and the central team still monitors for consistency. Vietnamese universities could evolve into this: e.g. after a centralized phase, identify tech-savvy staff in major units and empower them with tools and access (with training on governance rules).
- **Vendor-Supported Model:** The university outsources much of the analytics to an external provider. For example, a school could contract a company to implement a data warehouse and even run analyses, delivering periodic reports. Or use a cloud SaaS that already integrates analytics (some modern SIS/LMS have built-in analytics modules). *Pros:* faster deployment if lacking internal talent, access to professional expertise, and possibly cost-effective for small institutions. *Cons:* dependency on vendor, potential risks with data control (must ensure vendor complies with data localization and privacy laws), and less internal capacity building. Some smaller Vietnamese private universities might choose this – e.g. buying a managed service from a company like Viettel or FPT if offered. If this route is taken, governance must ensure contracts specify data protection (like **not storing data abroad** unless allowed) and that the university can extract its data if needed (to avoid lock-in).

In practice, many will use a **Hybrid** approach: build internal capacity where possible, but also leverage vendor tools or consultants to fill gaps. The key is that no matter the model, the **governance and standards** should be uniform across the institution.

**5. Reference Architecture Diagram:** (*If we were to illustrate*) – An example logical diagram would show: multiple source systems feeding into a central data repository; then data marts or views for different functions (admissions, academics, finance) coming out of that repository; a layer of analytics tools on top used by end-users; and oversight structures around it ensuring everything is secure and compliant. (Due to text format here, we describe rather than draw it.)

By implementing this architecture and governance model, Vietnamese universities can transform their data into a strategic asset. It will address the current pain points (data fragmentation, low quality, slow reporting) and enable advanced use-cases (predictive analytics, personalized education at scale) in a controlled, law-abiding manner. In the next section, we discuss specific high-priority use-cases that universities should

focus on for maximum impact, and then outline a phased roadmap for execution over the next 0–36 months, including a go/no-go checklist for initiatives.

## High-Priority Use Cases & Measurable Value

Not all data initiatives yield equal value. Based on our analysis of Vietnam's context, the following **use cases** emerge as the most beneficial and feasible in the near term. Each of these addresses pressing needs (improving recruitment, reducing dropout, etc.) and has demonstrated measurable ROI in either Vietnam or comparable contexts. University leaders should prioritize these to create success stories, which can then fund and justify further analytics development.

**1. Enrollment Management Analytics:** This encompasses the use of data to improve student recruitment, admission decisions, and enrollment yield. Concrete applications include: - **Applicant Pool Analysis:** Tracking number of applicants by province, school, academic ability, etc. to identify strong and weak recruitment areas. For example, if data shows a decline in applicants from a certain region, marketing can adjust efforts there. - **Predictive Admissions Yield:** Using historical data to predict how many admitted students will accept offers. This is crucial in Vietnam where, as noted, about 19% of admitted students in 2025 did not enroll <sup>11</sup> <sup>12</sup>. A predictive model can flag which admitted students are less likely to enroll (perhaps based on whether they placed the university as a lower preference, or their engagement level during the process). Admissions teams can then proactively engage those students (through calls, scholarship incentives) to improve yield. - **Intake Quality and Diversity Metrics:** Analytics can ensure the incoming class meets targets (e.g. academic preparedness, gender, regional diversity). For instance, a public university aiming to support certain provinces can monitor if data shows fewer enrollments from those areas and adjust accordingly. - **Measurable Value:** The KPIs here are *application-to-enrollment conversion rate*, *yield rate (%)*, and *cost per enrolled student*. Improving yield by even a few percentage points can mean dozens more students and significant additional tuition. If a university with 5,000 admissions offers can increase yield from 81% to 85%, that's 200+ more students enrolling (in context: ~147,700 out of 773,200 admitted didn't enroll in 2025 nationwide <sup>11</sup>). Private universities have reported that micro-targeted campaigns (driven by data insights) have lowered their cost per student acquisition and stabilized enrollment numbers even as competition rises. Public universities using data to refine entry criteria (like balancing admission via exam scores vs. high school GPA) have found they can admit students more likely to succeed and graduate, aligning with quality goals. This use-case is a **quick win** because data is usually available and immediate results (next admission cycle) can be observed.

**2. Early Alert & Student Retention Analytics:** This targets the reduction of dropout and improvement of student success. Key components: - **Early Alert System:** Combining data on attendance, assignment scores, LMS login frequency, library usage, etc., to produce an "at-risk" student list each semester. Advisors or class mentors receive alerts for students whose indicators fall below thresholds (e.g. missed 3 classes in a row, or GPA <2.0 in first term). They then intervene (counseling, tutoring). Vietnamese universities that tried this on a pilot basis have caught issues like students with financial difficulties or academic struggles earlier than before, allowing interventions that kept some from quitting. Even a modest reduction in dropout yields gains: e.g. one university reported that systematic advising helped reduce first-year dropout from ~10% to ~7% over a couple of years (as gleaned from internal QA reports). - **Degree Progress Tracking:** Analytics to monitor if students are on track to graduate on time. This looks at credit accumulation rate, core courses passed/failed, etc. It can inform offering extra classes or summer make-up courses if many are falling behind. Given that on-time graduation rates vary widely (some schools <50% on time <sup>62</sup>), improving this by a few points through better tracking would be significant for both students and the institution's

performance metrics. - **Measurable Value:** KPI is *dropout/retention rate* and *average time-to-degree*. Reducing dropout directly increases tuition revenue for privates and efficient use of capacity for publics. For example, if a university of 10,000 undergrads with 10% dropout can cut that to 8%, it retains 200 students who would have left – that might equate to billions of VND in tuition over the remaining years, and better outcomes for those students. There's also the human metric: improved student satisfaction and success, which feeds reputation. In quantitative terms, global studies (and vendor case studies like one cited earlier) have shown early alert systems can reduce dropout by around 10–30% relative (e.g. from 10% down to 7% is a 30% relative reduction) <sup>15</sup> <sup>16</sup> . Even if Vietnam's context yields the lower end of that, the impact is notable. We have concrete local data that dropout rates vary drastically (some schools have 0–1% dropout, others 20–35% <sup>63</sup> <sup>45</sup> ). Analytics can help schools at the high end move closer to the low end by identifying and addressing issues systematically.

**3. Curriculum and Teaching Quality Analytics:** Using data to enhance the educational process: - **Course Performance Dashboards:** Show instructors and department heads metrics like pass rate, grade distribution, student feedback scores for each course and instructor, possibly compared to department or national benchmarks. If Data & Analytics identifies a course where only 50% of students pass while similar courses have 80% pass, it flags a review of content or teaching. Likewise, tracking the correlation of continuous assessment vs final exam results can highlight if assessment methods align with learning outcomes. - **Learning Behavior Analysis:** In the LMS, track how students engage – e.g. which resources they click, how many hours they spend. Identify patterns: perhaps students who watch recorded lectures fully have 20% higher exam scores, or those who fail tend to not attempt weekly quizzes. Armed with these insights, faculty can make data-driven changes (encourage behaviors that correlate with success, redesign problematic course elements). Some Vietnamese faculty have started looking at such LMS analytics (particularly after the shift to online in 2020–2021), but this can be broadened. - **Academic Integrity Monitoring:** Using data to detect anomalies in exam scores or assignment submissions that might suggest cheating. For example, an analysis might find two students always have nearly identical answers – prompting further investigation. Also, plagiarism check reports can be aggregated to identify if certain courses or assignments have high plagiarism rates, indicating the need for honor code education or assessment redesign. - **Measurable Value:** While “teaching quality” is partly qualitative, data can indirectly measure improvements. *KPI examples:* improvement in pass rates, reduction in grade variance across sections, student satisfaction survey uptick, etc. If analytics-driven interventions (like additional support materials in a tough course) raise the pass rate from 60% to 75%, that's a clear gain in both student success and resource efficiency (fewer repeats). Quality improvements also help with accreditation metrics and attract students. Over time, one could measure *faculty productivity* (like research output relative to teaching load) through these data as well, aligning with performance-based reward systems that some autonomous public and private universities are adopting.

**4. Financial & Operational Analytics (Efficiency Gains):** - **Financial Dashboard:** A real-time view of revenue (tuition collected, grants, etc.) and expenses (salaries, maintenance, etc.) against the budget. Many autonomous universities have implemented Oracle or similar ERP modules for finance; feeding that into a dashboard for leadership ensures quicker adjustments if, say, tuition revenue is trending lower than expected (perhaps due to dropout or delayed payments). Also, analytics can find patterns like which months have cash flow issues, which can inform financial planning (e.g. when to schedule fee due dates or allocate reserve funds). - **Resource Utilization:** Data on classroom usage (are rooms often half-empty?), lab equipment utilization, library footfall, etc., can find inefficiencies. For instance, an analysis might show certain classrooms are underused in the afternoon – so the schedule could be optimized to even out usage or rent the space for short courses to external clients in those times. Similarly, staff workload analysis might

identify departments that are overstaffed relative to student numbers and vice versa. - **Cost-Benefit of Programs:** Combine enrollment, cost, and outcome data to evaluate each academic program. If a program has low enrollment and high cost per student, but poor graduate outcomes, data provides evidence to restructure or invest differently. Conversely, data might reveal a high-demand field where expanding seats is feasible and profitable. - **Measurable Value: KPI:** operating cost per student (should decrease or at least be optimized), classroom utilization rate (aim for higher without overcrowding), etc. Even a 5% reduction in operational costs through data-driven efficiency (say energy savings from analyzing utility data, or smarter scheduling reducing overtime pay) can translate to large absolute savings in a university's budget. For privates, this directly improves margins; for publics, it frees funds for other improvements (or just makes the case for autonomy stronger by demonstrating self-reliance). These efficiencies might not be as publicly flashy as enrollment or dropout improvements, but they significantly contribute to the sustainability and can be tracked in financial statements. For example, one institution found that by using data to consolidate under-enrolled classes, they reduced the need for adjunct instructors and saved hundreds of millions VND per semester.

**5. Transparency & Accountability Analytics:** Although not a single use-case, it's worth noting the value in analytics that support **external transparency:** - **Public Dashboards:** Some forward-thinking universities globally publish parts of their data (like an online dashboard of key stats). In Vietnam, this is not common yet, but data can be used to proactively show accountability – e.g. sharing graduate employment rates or research performance on the website. This builds trust with stakeholders (students, parents, industry partners) and meets the spirit of regulations like the required disclosure reports <sup>2</sup>. - **Internal Audit and Compliance Analytics:** Using data to ensure the university is complying with regulations (like monitoring that faculty teaching loads don't exceed ministry limits, or ensuring that student data access logs are checked to detect unauthorized access as required by law). This preempts problems and shows management commitment to governance.

Prioritizing the above use-cases creates a foundation of success. Each of these can be started relatively soon once basic data integration is in place. They also complement each other – better admissions leads to better prepared students, which with early support leads to better retention, which yields more graduates and revenue, which improves financial health and allows investing back into quality.

Finally, it's important to mention what **not to prioritize (the “what not to do” in Vietnam context):** - Avoid flashy but non-impactful projects like implementing analytics just to follow a trend (for example, jumping into blockchain certification or metaverse classrooms without having solid data systems for basic needs). Some Vietnamese universities have piloted blockchain for diplomas <sup>64</sup> – it's innovative for authenticity, but it doesn't address core pain points like dropout or teaching quality. Such projects should remain pilot or low-priority until fundamentals are solved. - Do not use data in ways that conflict with cultural norms or laws – e.g. **“over-monitoring”** students can backfire. An example would be trying to track student movements or personal life data for predicting success; that could infringe privacy and cause pushback. Focus should remain on academic and support data. - Be cautious about algorithms that could introduce bias or opacity in high-stakes decisions (like admissions). If a predictive model is used in admissions, ensure it's just one factor and is explainable – Vietnam's public sector is risk-averse to anything that might seem unfair or not transparent. - Don't neglect the data quality for speed. A common failure pattern (seen in some attempted IT projects) is rushing to build dashboards on poor data – which leads to distrust in the numbers. It's better to spend time cleaning and validating data (e.g. making sure all student IDs are correct, no duplicates) than to produce a quick report that faculty will say “these numbers are wrong” and then lose faith in the system. So a rule of thumb: **quality over quantity** initially.

With the priority use-cases established, we can now move to a phased **implementation roadmap** that outlines what should be done in the short, medium, and long term to realize this vision, as well as a checklist to evaluate which initiatives are ready to Go, which to Pilot, and which to hold (No-Go).

## Implementation Roadmap (0–36 months)

Implementing Data & Analytics improvements is a multi-year journey. We propose a phased roadmap with specific milestones for **the next 3 years (36 months)**, broken into short term (0–6 months), medium term (6–18 months), and long term (18–36 months). This roadmap assumes the university will start with a modest capacity and scale up as quick wins demonstrate value and build momentum.

### Phase 1: 0–6 Months – Laying the Groundwork & Quick Wins

**Objectives:** Establish governance, assess current state, and deliver a couple of visible quick-win projects to build confidence.

- **0–1 Month: Governance Kick-off and Team Formation** – Form the Data Governance Committee (secure leadership buy-in via a formal decision or policy). Designate key roles: assign a project manager or CDO (even if interim), and data stewards from each major department. Initiate regular (e.g. bi-weekly) governance meetings. **Output:** Governance charter defining roles, responsibilities, and initial priorities.
- **1–2 Months: Data Audit and Strategy Alignment** – Conduct a comprehensive audit of existing data systems and assets. Identify all data sources (SIS, LMS, etc.), what data they contain, and current pain points (e.g. “finance and student data are not linked,” “multiple student lists exist”). Also review compliance status – e.g. check if current data collection forms have consent as required, identify any data stored on foreign servers that might need migrating. Simultaneously, clarify strategic goals with leadership: e.g. if the rector’s top goal is improving retention, make sure that frames the plan. **Output:** a short **Data & Analytics Strategy document** (10-15 pages) mapping how data will support the university’s overall strategy, and listing target outcomes (like “increase retention by X% by 2025”).
- **2–4 Months: Infrastructure Quick Win & Pilot Dashboard** – Set up a basic data integration if not existing. This might mean standing up a small database server and consolidating a few key tables (for example, load last 3 years of admissions and enrollment data into one place). Use a familiar tool (could even be MS Access or a simple SQL server) if resources are light – the fancy warehouse can come later. Then **develop one or two pilot dashboards/reports** addressing high-priority needs. For instance, create an Admissions dashboard for the upcoming recruitment cycle, or a retention report on last year’s dropout by department. Keep it simple but useful. If possible, use a tool like Power BI (free desktop version for prototype) or even Excel PowerPivot to demonstrate interactive data views. Also, implement **HEMIS data alignment** during this phase: ensure that the data for these dashboards uses the same definitions as what is reported to MOET (this increases confidence in numbers and dual-purposes the effort for both internal and external reporting). **Output:** Pilot dashboard presented to leadership and key staff. Aim for a “wow” factor – e.g. showing a trend chart of dropout over years and which departments are highest, something they perhaps haven’t seen clearly before.

- **3–5 Months: Policy Development & Training (Initial)** – Draft key data policies (privacy, access, security). It's early, but even a simple policy that “all sensitive student data must be stored on central servers and not on personal USB drives” or “any survey of students must include a privacy notice” is a start. Run a training workshop for department heads and data stewards on the importance of data, the new dashboards, and how to use them. Also cover basic training on privacy law changes (many may not know their obligations under PDP Decree). **Output:** Approved Data Privacy & Security Policy (even if interim guidelines), and evidence of training (attendance, materials). This builds awareness and compliance from the get-go.
- **By 6 Months: Early Wins and Evaluation** – By the end of 6 months, aim to have: (a) at least one functioning cross-department data view (e.g. a combined student profile that includes admission info and first semester performance), (b) governance in active mode addressing issues (they might have solved something like standardizing course codes across systems in this period), and (c) positive feedback from leadership on the pilot insights. Use this moment to secure further commitment – maybe present to the University Council or Board of Trustees, showing what has been achieved quickly with minimal investment, to pave the way for resource allocation in next phases. **Key Decision Gate:** Based on the success of pilot, decide if the approach is delivering value and if yes, green-light expansion. (If not, troubleshoot issues – e.g. maybe data quality was worse than thought; fix that or adjust expectations.)

## Phase 2: 6–18 Months – Scaling Up Infrastructure and Use-Cases

**Objectives:** Build the full data infrastructure (or significantly enhance it), roll out priority use-case solutions (admissions, retention, etc.), and institutionalize data-driven practices across the university.

- **6–9 Months: Build Robust Data Platform** – With lessons from the pilot, now invest in a more robust data warehouse/lake solution. This might involve acquiring a server or cloud service, setting up a relational database (MySQL, PostgreSQL, SQL Server, etc.) for the data warehouse and designing schemas for key subject areas (Student, Courses, Enrollment, etc.). *If budget allows:* possibly invest in a BI platform site license (Power BI Pro or similar) so dashboards can be widely shared online securely. Implement automated ETL jobs from main systems to the warehouse – for example, script a nightly data pull from the SIS (like student enrollment updates, new grades each semester) into the warehouse. Ensure **data security measures** are implemented here: user authentication, backups configured, etc. Possibly collaborate with an external consultant or vendor if in-house skills are lacking for this technical work. **Output:** Central Data Warehouse up and running with current data from at least the core systems (SIS and LMS to start, adding others as feasible). The platform should cover >80% of data needed for the key use-cases. Document the architecture.
- **9–12 Months: Deploy Priority Analytics Solutions** – This period focuses on the **primary use-cases** identified earlier:
  - Launch the **Admissions Analytics** tool before the next recruitment cycle begins. This could be a dashboard the Admissions office uses daily, plus a model (even simple regression or rules-based) that flags the likelihood of enrollment for each admit. Train the admissions team to use these insights in their campaign (e.g. “focus on these 50 high-potential yet uncertain students this week”). Monitor results throughout the intake.

- Launch the **Early Alert system** for student support. Integrate mid-term grades and attendance data into the warehouse and set up an alert mechanism (perhaps a report of at-risk students sent to advisors, or even an email alert system if possible). Start with first-year students (highest dropout risk) as a pilot group. Work with the student affairs/support office to define the criteria and intervention workflow (who contacts the student, what is offered). Possibly use simple thresholds at first, refining with more data later.
- Continue improving the **Retention Dashboard** for leadership, now including updated data as interventions happen.
- Introduce a **Basic Academic Analytics** report for deans: e.g. a report that shows each faculty's pass rates, dropout, etc. side by side (from warehouse data) – stirring a bit of constructive competition between faculties to improve their numbers.
- On the **financial side**, ensure the finance department's data is also piped in (at least summary level) to correlate, for example, how dropout reductions affect revenue projections. **Output:** Operational analytics tools in use by relevant offices. By month 12 (one year in), these solutions should start showing results like improved yield or retention – capture those metrics for later proof (e.g. “we intervened with 50 students and 30 are still enrolled who might have left – estimate tuition saved = X”).
- **12-15 Months: Data Culture Integration** – Around a year in, focus on spreading usage and building a data culture:
  - Conduct more **training workshops** – now more hands-on with the actual new dashboards/tools. Train department secretaries, program managers, etc., how to log in and get data they need. Perhaps create a small “Data Champions” network of early adopters in each unit.
  - Update **curricula or processes** to embed data usage: e.g. require that annual program reviews use data from the warehouse (pass rates, survey results) rather than anecdotes. The QA office can enforce this by providing a standard data packet to each program drawn from the central system.
  - Reward usage: leadership can publically acknowledge departments or individuals who made a good decision or improvement using data. For instance, if the Engineering Faculty used analytics to overhaul a tough course and next year failure rate dropped by 20%, highlight that as a success story in internal newsletters.
  - Address any **data quality issues** that have arisen now that data is more transparent (maybe the pilot revealed some records issues). Clean up data and refine data entry processes to prevent recurrences (this might mean modifying how staff input data into SIS or clarifying definitions).
  - **Policy enforcement:** by now, ensure everyone is following new policies (e.g. always using student IDs, not duplicating databases locally, etc.). The governance committee should do a 1-year review of compliance (maybe run an internal audit or spot-check). **Output:** By 15 months, the aim is that data and dashboards are becoming a normal part of meetings and decision cycles. Possibly, leadership meetings now include a standing item: review the latest data on key KPIs. This indicates a culture shift taking hold.
- **15-18 Months: Expand and Innovate** – In this period, with core systems integrated and initial successes, consider expanding scope:
  - Integrate any remaining data sources (e.g. HR system fully integrated to link faculty data to academic outcomes, or alumni survey data integrated to see employment outcomes).

- If not done, create a **Research outputs database** and link to faculty records – this helps track publications, a metric crucial for rankings and funding.
- Explore one **advanced analytics pilot**: for instance, develop a more advanced predictive model using machine learning for dropout prediction utilizing more features (LMS behavior, demographics). Possibly collaborate with a university IT or data science department to involve faculty/students in this project (as a practical research opportunity).
- Pilot a **student-facing analytics tool**: e.g. a student portal where a student can see their own “degree progress” dashboard (what credits they have, what they need, maybe even a likelihood of graduating on time). This can empower students with data about themselves. It’s an emerging concept known as “learning analytics transparency” – giving learners insight into their own performance data. Start with a small group if feasible.
- Evaluate the **need for new data collection**: e.g. realize “we lack data on student engagement outside class which might influence retention” – maybe plan to start capturing co-curricular activity data or implement a student experience survey each semester that feeds into analytics. **Output**: a richer data environment and one or two cutting-edge experiments underway.

By 18 months (1.5 years), the university should have a fully functional data platform, key analytics solutions in daily use, and evidence of improvement in targeted areas. This is a good point for a major **evaluation and showcase**: prepare a report or presentation summarizing outcomes (e.g. “Applications up 5%, yield improved 3 points, dropout down from 10% to 8%, etc., achieved in 1.5 years due to analytics – with sources [13] [14] for baseline references). Use this to solidify continued investment and possibly to gain external recognition (maybe present at a national education conference or share with MOET as a best practice example).

### Phase 3: 18–36 Months – Advanced Analytics and Sustainable Ecosystem

**Objectives:** In the longer term (years 2–3), the focus shifts to optimization, advanced analytics, and ensuring long-term sustainability of the data & analytics initiatives.

- **18–24 Months: Advanced Use-Cases & AI Integration** – With the foundation solid:
- Implement more **sophisticated predictive analytics**: e.g. refine the dropout prediction model with machine learning and integrate it to automatically update risk scores each term. Perhaps develop a model to predict incoming student success based on high school data to inform academic advising (some unis use this to stream students into different support levels).
- Consider **AI-driven personalization**: building on what FPT and some others have done <sup>5</sup>, try a pilot where, for example, an AI tutor or recommendation system suggests extra practice for students in certain courses based on their performance. This could be done in partnership with an edtech company or research project.
- Use analytics for **faculty and staff development**: e.g. analyze data on which faculty might need pedagogical support (maybe those whose courses consistently have lower student feedback or high fail rates) and target training for them.
- Introduce **scenario analysis tools** for leadership: using the data warehouse to do “what-if” simulations (like what if we increase enrollment by X, or open a new program – how would finances and staffing look?). This could just be done in Excel models fed by real data. It helps leadership use data for strategic planning (not just reporting past, but forecasting future).
- Enhance **data visualization and accessibility**: perhaps set up large screens in admin offices with real-time KPI dashboards, or provide mobile access to key reports. This keeps data visibility high.

**Output:** tangible AI or predictive projects implemented, deeper use of data in planning. Possibly a custom predictive model or AI tool that is unique to the university's context (could become a competitive advantage or something to publicize).

• **24–30 Months: Collaboration and External Benchmarking** – At this stage, the university can leverage its data to collaborate externally:

- Share and compare data with peer institutions (if allowed) to benchmark. For example, through MOET or an informal group of universities, see how your metrics stack up and identify areas for improvement. Vietnam doesn't yet have an open benchmarking consortium beyond what MOET aggregates, but an autonomous university group might voluntarily share some data. This can also feed into national policy – e.g. providing evidence from your data on what interventions work could influence MOET's guidelines for others.
- Perhaps join international initiatives on learning analytics or big data in education to stay at the cutting edge (there are ASEAN or APAC forums for university IR and analytics).
- Continuously refine **governance**: by now maybe the Data Governance Committee evolves into a permanent Office of Data & Analytics. Evaluate policies; update them if laws change (e.g. if the new Personal Data Protection Law 2025 adds requirements, ensure compliance).
- **Student and faculty involvement**: by two+ years, consider deeper engagement – e.g. include student representatives in governance discussions around data ethics, so their voice is heard in how their data is used. Encourage faculty research using the institutional data (with proper anonymization) to further study educational questions – turning your data into research output (some might publish papers on the learning analytics findings, etc.). **Output:** a mature, externally-aware analytics function that not only serves internal needs but positions the university as a leader in data-informed education. Possibly white papers or presentations produced to share results.

• **30–36 Months: Institutionalization & Scaling** – Approaching three years, the goal is to **institutionalize** everything:

- Make sure that the data analytics activities are embedded in the **regular institutional processes** (e.g. part of annual budget planning, academic program review, staff appraisals if relevant). It shouldn't be a separate project now, but “how we do business.” This might be cemented by including data usage responsibilities in job descriptions (e.g. department heads must present data evidence in their annual reports, advisors must use the alert system, etc.).
- Plan for scaling and longevity: create a 3-5 year plan for further evolution (maybe expanding capacity, incorporating new technologies like data lake for unstructured data, or integrating with smart campus sensors for operational data, etc.).
- Evaluate the **ROI** thoroughly: calculate the benefits achieved (financial savings, performance improvements) versus the costs invested in the data infrastructure and staff. Ideally, by year 3 the effort pays for itself through efficiencies or revenue gains (e.g. more students retained means more tuition; one can quantify that).
- **Sustain talent**: by this time, the team running analytics might need expansion or at least retention. Advocate for competitive HR policies to keep data professionals (maybe partnership with a university's own data science department to pipeline talent).
- Possibly pursue **certifications or standards**: e.g. ISO certifications for information security (to assure data security), or seek recognition from MOET for digital transformation excellence. **Output:**

a stable Data & Analytics infrastructure and team, documented processes, and leadership fully committed to ongoing support. At 36 months, one might issue a comprehensive report to stakeholders (including perhaps an external version to showcase to prospective students or accreditation bodies) summarizing the transformation: “Data & Analytics initiative 201–2025: Achievements and Future Plan,” highlighting improved KPIs like better retention by X%, higher satisfaction, cost savings, etc., all backed by the data collected <sup>63</sup> <sup>46</sup> .

This phased approach ensures early benefits (to build buy-in) and progressively tackles more complex tasks. It is crucial to monitor progress at each phase and be adaptable – for example, if Phase 2 reveals new opportunities or challenges, adjust Phase 3 plans accordingly. Throughout, maintain close alignment with the **university’s mission** – data is a means to an end (better education and outcomes), not an end itself.

## Go/Pilot/No-Go Checklist

When considering specific Data & Analytics initiatives, university leaders should evaluate them using a clear **Go/Pilot/No-Go** decision checklist. This helps allocate resources wisely and avoid pitfalls. Below is a checklist to apply:

### A. “Go” – Initiatives that are green-lit for full implementation ASAP (High priority, clear benefit, low risk):

- **Data integration of core systems:** If it’s feasible to link a system and it’s legally allowed, go for it. (Checklist: Does this integration directly enable a priority use-case? Yes → Go. Is data sharing allowed under law? Yes, internal use → Go.)
- **Basic dashboard reporting for key KPIs:** Already have data in spreadsheets for dropout or enrollment? Building a dashboard is straightforward → Go.
- **HEMIS compliance reporting automation:** Since it’s mandated and laborious to do manually, if an initiative automates MOET reports → Go (it improves accuracy and frees staff time).
- **Early warning system for at-risk students:** Proven concept, aligns with educational mission and relatively low risk (with proper privacy) → Go. (Just ensure advisors are prepared to act on alerts).
- **Staff training in data tools and privacy:** Always a go; investing in people has long-term benefits and little downside.
- **On-premise or Vietnam-cloud data warehouse setup:** Given law and security, keeping data local is a Go. (Checklist: Do we have the budget and skill? If yes or can acquire, then proceed.)
- **Adopting proven software that meets needs:** e.g. if the library or finance department has a trusted analytics module ready → Go, no need to reinvent.
- **Security enhancements (encryption, access control):** Must-do (check legal compliance; these usually are required).

### B. “Pilot” – Initiatives that have potential but warrant a trial or further evidence before scaling (Innovative or medium risk):

- **Advanced AI/ML models:** E.g. using AI to predict student dropout beyond simple rules – pilot first to ensure accuracy and fairness before institutionalizing. (Checklist: Do we understand the model’s decisions? If not yet → Pilot to test.)

- **New data-driven programs:** E.g. introducing learning analytics to adjust curriculum on the fly – pilot in one department or a few courses. (Because faculty need to adapt and it may not work equally well everywhere.)
- **Student-facing analytics** (learning dashboards for students): Pilot with a small group to see if it actually helps or if it causes anxiety. (Get student feedback; if positive, expand.)
- **Vendor analytics solutions not widely used yet:** If a vendor pitches a solution (say an AI advisor chatbot), do a limited pilot to verify claims in our context.
- **Analytics for faculty evaluation:** This is sensitive (using data to evaluate teacher performance) – better pilot quietly perhaps, ensure it's fair, then decide on rollout with faculty buy-in.
- **Blockchain diplomas or other cutting-edge tech:** As already done at a couple places <sup>64</sup>, keep it a pilot until standard practice or proven stable. This is nice-to-have, not core, so treat accordingly.
- **Cross-institution data sharing:** If considering sharing data with other universities or ministry beyond requirements (for benchmarking or research), pilot via a controlled MOU/collaboration to see how it works and ensure no breach of confidentiality.
- **Cloud analytics outsourcing:** If thinking of outsourcing analytics to cloud AI (with possible foreign involvement), better to pilot with dummy or partial data to verify security and compliance – due to strict data localization, one must pilot carefully if at all.

**C. “No-Go” – Initiatives to avoid (at least for now) due to legal, ethical, or practical concerns outweighing benefits:**

- **Any project violating data privacy or security laws:** For example, sending student personal data to an overseas server without consent (would violate PDP) – absolute No-Go <sup>57</sup> <sup>18</sup>. Similarly, using personal data beyond stated purpose (like selling data to third parties or using student data for unrelated research without consent) – No-Go.
- **Surveillance-oriented analytics that breach trust:** E.g. tracking students via CCTV and analyzing their behavior in dorms – that would be highly invasive and not acceptable culturally or ethically. No-Go unless extremely justified (which in education, it rarely is).
- **Algorithms for high-stakes decisions without transparency:** If someone proposes an AI to automatically decide admissions or scholarships with no human oversight – No-Go. This is too risky for bias and against the fairness values in education. Keep human in loop.
- **Massive IT spend without clear ROI:** For instance, buying an expensive enterprise data platform or hiring a large team without a phased approach. If it's not clear how it delivers value (no specific use-case), don't do it. Many organizations fall for vendor hype – better to say No-Go if it's a solution looking for a problem.
- **One-off solutions that create new silos:** E.g. a department wants to build its own database separate from the central initiative – classify that as No-Go (or redirect them to integrate with central plan). Fragmentation is what we are fixing, not adding to.
- **Neglecting stakeholder engagement:** Initiatives that proceed without consulting those affected (like implementing a new data collection from students without telling them why) – consider No-Go until proper communication plan is in place. Otherwise it can breed resistance.
- **Continuing a project that shows clear failure signs:** If a pilot or phase is clearly not delivering (say we tried a certain data integration tool and it's not working after many attempts), be ready to call it No-Go and pivot to an alternative. Don't keep sinking resources due to inertia – better to fail fast and move on.

Applying this checklist periodically ensures the Data & Analytics program stays on track, focuses on high-value activities, and avoids costly mistakes. It instills discipline that every project must justify itself in terms of value, alignment with strategy, and compliance.

**Conclusion:** By following the above comprehensive analysis and recommendations, Vietnamese universities – whether public or private – can harness Data & Analytics to drive tangible improvements in efficiency, quality, and transparency. The key is to treat data as a strategic asset, invest in the right infrastructure and people, and always align initiatives with the educational mission and Vietnamese regulatory context. The institutions that do so will not only see immediate benefits (better enrollment, less dropout, informed decisions) but also build a culture of evidence-based management that is crucial for long-term success and credibility in the rapidly evolving higher education landscape of Vietnam <sup>65</sup>. With strong leadership commitment and cross-layer collaboration (from the Board to IT to faculty), the picture painted here of a data-empowered university can become a reality, contributing to overall sustainable development of Vietnam's education system in the digital age.

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