

### **Proposal**

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## **Digital Performance Data Management in Higher Education. Theoretical Modelling of Smarter Universities and Institutional Reality**

### **Introduction**

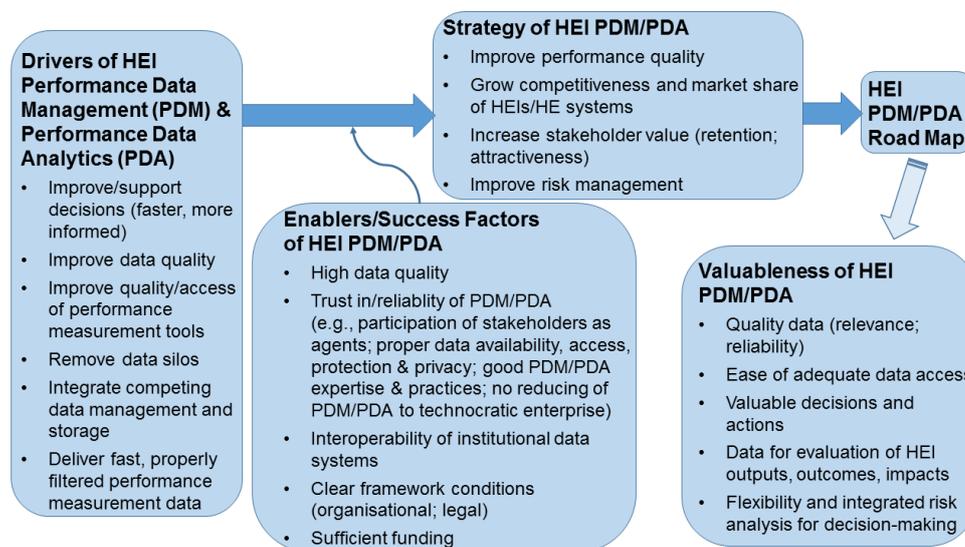
According to the 2014 Horizon Report, one of the six key trends in driving changes in higher education (HE) within three to five years is the “Rise of Data-Driven Learning and Assessment” (Johnson et al. 2014, pp. 12ff.). In view of the enormous data growth in many sectors including HE (Liebowitz 2017, p. 7), it is obvious that HE “cannot afford to not use data” (Slade & Prinsloo 2013, p. 12). In consequence, HEIs in the near future cannot avoid to (further) develop comprehensive abilities of performance data management (PDM) and performance data analytics (PDA) in all performance areas. Such an endeavour, which was announced for almost a decade, bears its promises as well as challenges.

This study investigates into some of these prospects as well as threats, and fathoms out the opportunities of PDA in higher education institutions (HEIs). It examines whether HEIs succeed in making sense of the growing amounts of data available, and whether they apply PDA to improve their quality enhancement and decision-making. This includes to check whether PDM/PDA actually can support organizational governance and identity (i.e., self-understanding) of HEIs.

### **Conceptual Model**

The study aims at testing and enhancing a conceptual framework for HEI PDM/PDA as shown in Figure 1. According to the underlying working definition, PDM/PDA is the “collection, analysis, use, and appropriate dissemination of HEI-generated, actionable data with the purpose[s] of creating appropriate cognitive, administrative, and effective support” (Slade & Prinsloo 2013, p. 3) for various HEI achievers; enhancing performances’ quality; and improving HEI governance (comprising accountability, competition and autonomy).

**Figure 1:** Conceptual Framework for HEI Performance Data Management (PDM), completely modified after (Liebowitz 2017, p. 9)



The framework in Figure 1 shows that there are PDM/PDA drivers which influence the PDM/PDA strategies of HEIs. There are also enablers and success factors for an effective PDM. They include, but are not limited to, the following methodological, epistemological and ethical challenges:

- Participation of stakeholders as agents
 

PDM/PDA-involved stakeholders (such as students, teachers and researchers) should not be reduced to mere sources of data; but be engaged as collaborators. The involved stakeholder should be seen “as a co-interpreter of his own data – and perhaps even as a participant in the identification and gathering of data” (Kruse & Pongsajapan 2012, pp. 4-5).
- Proper data availability, access, protection and privacy
 

HEIs must be transparent about the conditions of use of data; who will have access; and how individuals’ identity can be protected.
- PDM/PDA competences and no reduction to a technocratic enterprise
 

Knowledge and practice of PDM/PDA must take into account that performance success in any HEI area is a complex and multi-dimensional phenomenon because it results from non-linear, multi-dimensional interdependent and dynamic interactions. This implies that data are usually incomplete and error-prone, and analyses are vulnerable to biases and misinterpretation. This is particularly true for ‘specific expert organisations’ with their various missions in multiple achievement areas. In consequence, interventions and interactions in HEIs are limited in their precision, explanatory power and controllability because of our ‘bounded rationality’ (i.e., restricted tractability of decision problems; cognitive limitations of minds; limited decision time available). Thus, PDM/PDA cannot be solely based on quantitative concepts of causal efficacy.
- Clear framework conditions, in particular with respect to organizational and legal issues

Finally, the basic valuable outcomes and impacts of HEI PDM/PDA are expected to be (1) the provision of relevant and reliable data; (2) adequate data access; (3) valuable

decisions and actions; (4) the provision of data for evaluation of HEI performances; (5) flexible and integrated risk management for decision-making (see Figure 1).

### **Empirical Exploration**

The empirical part of the study examines whether a sample of German HEIs, namely up to 29 universities and universities of applied sciences in the state of Baden-Württemberg, follow the line of thought as represented by the conceptual framework in Figure 1. It is analysed how Big Data and performance analytics are currently developed in HEIs. Possible gaps between the theoretical modelling of data-smarter universities and institutional realities shall be identified.

The methodology consists of document analyses and structured survey interviews with selected stakeholder groups (e.g., HEI leaders; quality and data managers; academic staff; students).

Accordingly, surveys are oriented at the following questions (but are not restricted to them): Do HEIs apply educational data mining and learning analytics? Do they have a sustainable strategy for this with clear leadership responsibilities? Do they apply PDA in quality enhancement and decision-making in various sub-systems? How are involved stakeholders engaged in PDM/PDA (collecting, interpreting, using data)? How do HEIs regulate the accessibility and use of data and individuals' identity protection? Are there hard limits to PDM/PDA because of organisational and legal restrictions? Do HEIs have methodological and ethical training programs for PDA users? Does PDM actually support organizational governance, strategy and identity building of HEIs? Do PDM/PDA have transformative effects for the sample HEIs? What happened to the German Rectors' Conference (HRK) PDM recommendations as of 2012?

### **Preliminary Conclusions**

The findings of the study so far suggest that the investigated HEIs usually have in place important building blocks required for grasping the opportunities of digital PDM/PDA, such as, e.g., facilities and utilities logistics; student admission, retention and progression; assessments' administration.

However, it is also true that, while data in HEIs are growing "most of it is scattered across desktops, departments and come in various formats, making it difficult to retrieve or consolidate" (Daniel 2015, p. 917). Also, the sample HEIs' current systems of performance data collection seem complicated and incoherent (e.g., dispensable duplications of data definition; data collection; data delivery). Also, basic PDM/PDA areas are largely missing: student engagement and performance; budget and workload planning; performance benchmarking; research interests, performance and output. Altogether, so far it cannot be confirmed that the sample HEIs have comprehensive PDM/PDA in place which would be definitely more than virtual logistic course management and various island solutions.

From the sample study including a SWOT analysis of PDM/PDA, it is also concluded that the main failure factors faced by the HEIs are unclear organisational structures and responsibilities; sub-optimal interoperability of institutional data; complex regulations of data access, data protection and privacy; as well as deficient IT competences.

In view of the still rudimentary development of PDM and the corresponding gaps of experience with PDM/PDA, it is still an open question whether comprehensive PDM would be effective (as expected) and efficient. It is also unanswered so far, whether it would be possible and helpful to develop a sector-wide strategy for PDM which

would “support and enable sharing and collaboration between institutions” (HEC 2016, p. 7)?

**Keywords:** Big Data; decision-making; governance; higher education institutions; performance data analytics; performance data management; strategy

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