# Improving Information Performance of Schools in Higher Education through IT Service Management

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*Abstract*- **A rising number of private schools of informatics management and computing in Indonesia are not accompanied by the accreditation grades. The fact shows that none of the 197 schools has obtained accreditation grade A. Moreover, 71.57% of these schools are still accredited with grade C. This condition reveals that there has been no synchronization and interoperability of producing information for the need of processing the academic data. The problem of the research proposal was formulated to (a) produce a new research model regarding influences of IT innovation adoption and IT governance on IT service management in improving information performance of schools; (b) create a hypothetical testing design to cognize influences of every variable in this research. The research aim was to analyze the magnitude of relationships and influences of IT service management based upon supports and deliveries of information services becoming dominant factors improving information performance of schools. The research was designed with an explanatory survey of analyzed units of organizations. Furthermore, the research applied a mixed (quantitative and qualitative) method and concurrent triangulation strategy. Computed quantitative data were obtained from a sample of 55 schools determined through a simple random sampling technique. Strengthening the quantitative analysis, qualitative measurement was conducted through in-depth interviews and FGDs (Focus Group Discussions) with 5 informants in the sample.**

*Keywords*- **IT Innovation Adoption, IT Governance, IT Service Management, Information Performance.**

## I. INTRODUCTION

Referring to the information of the Private School Association of Indonesia, in 2007 there were 2,761 private schools in Indonesia. This number doubled in comparison to the one in the previous 10 years. In 1997, for example, there were only 1,293 private schools with a 53.17% increase. In 2015, however, the number mounted to 3,825 and, therefore, there was a 27.82% increase. In addition, based on the database of schools, there have been 4,101 private schools in the odd semester and in the academic year 2016/2017. The increase is, hence, 6.73%. This information shows that in an academic year, there are 276 private schools established. Private schools in higher education improve immensely significantly. Today, 1,431 schools, 1,018 academies, 472 universities, 145 polytechnics, and 62 institutes with private schools exist.

A sharp rise in the number of private schools reflects good momentum for the improvement of higher education. This fact proves that the public earns trust in private groups. An increasing number of private schools, nonetheless, are not concurrent with high-quality education and information performance in conducting the three main duties of the schools. This condition is reflected based on a large number of private schools, including schools of informatics management and computing not successfully fulfilling and achieving minimal national standards.

Private schools of informatics management and computing should have capabilities to manage reliable IT services. They should further be able to create and implement portfolios of information system integrally to achieve information performance of schools. Supporting and disseminating information for the need of solving the three main duties are also capabilities with great importance. The information availability provides implications in the process of creating decisions of school management to fill out accreditation forms of bachelor's study programs.

Accreditation forms require integrated synchronization and interoperability of data of all academic activity cycles. Every standard has a strong relationship with others and, thus, needs superfine information performance. The problems are that there are inconsistency among academic data, unclear measurement of the number and the qualification of lecturers' competences as well as the number of students, inaccuracy of information concerning an active number of students in a certain study period limit, and lack of lecturers' research compositions related to their expertise. All this information is interconnected. Conformity and compatibility are, therefore, required to fill out the accreditation forms.

To date, none of the 197 schools of informatics management and computing in Indonesia has obtained accreditation grade A. Moreover, 71.57% of these schools are still accredited with grade C. This number reflects that there are still a lot of schools not being able to optimize their information management. Meanwhile, graduates still prioritize accreditation grades as a main criterion. This condition obviously hinders them to seek jobs and have further studies. Also, accreditation grade C and not accredited status can make prospective students change their choices for the other schools (see Figure 1).
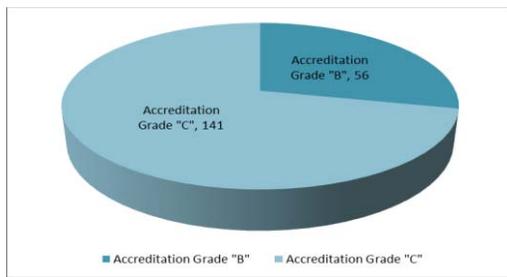
Fig. 1. Composition of Accreditation Grades

To achieve integrated information performance, capabilities to manage IT services are needed to support and present IT services. Information performance immensely relies on the use of IT in providing information services [1]. This condition indicates that availability and alignment of information are essential components that are inseparable from academic activities in universities. Information alignment is a part of school management [2]. IT service management can generally support the effectiveness and efficiency of academic information system process [3]. Academic information performance is a part ascertaining availability and continuity of information to organization units of schools.

Information performance refers to the model of information system success [4] and the framework of IT governance based on the dimension of information needs [5]. Both of these perspectives are bases of information performance dimensions of schools consisting of effectiveness, efficiency, secrecy, alignment, availability, appropriateness, and reliability. Improving information performance of schools requires readiness of managing IT services through dimensions of supports and deliveries of services [6]. IT service management is an important factor for schools in supporting academic activities [7]. It has 2 antecedents such as IT innovation adoption and IT governance.

IT innovation adoption requires the users to adopt new ways of implementation. It gives positive effects in conducting service innovation further influencing organization performance [8]. Meanwhile, IT governance has important roles in integrating all forms of IT services, ensuring IT availability, and supporting organization goals. IT governance is related to structures, process organizations, and mechanisms. All of these elements convince IT operations and support goal achievements [9].

Previous studies indicate that IT service management essentially informs news on academic activities to schools [10]. In improving IT service quality, schools have 3 important areas such as academics, administration, and additional functions [11]. IT service innovation becomes significant and creates profit- and non-profit-challenges [12]. In this context, there has been no research on IT service management in connection with an effort to fulfill synchronization and interoperability allowing information consistency of filling out accreditation forms. Previous research also did not specifically emphasize supports and deliveries of IT services used to reach information performance of schools. In addition, it only conceptually emphasized the performance of schools. The novelty of this research, therefore, empirically discussed information performance of schools through IT service management influenced by two antecedents, i.e. IT innovation adoption and IT governance.

The problem of research proposal was formulated to (a) produce a new research model regarding influences of IT innovation adoption and IT governance on IT service management in improving information performance of schools; (b) create a hypothetical testing design to cognize influences of every variable in this research. The research aim was to analyze the magnitude of relationships and influences of IT service management based upon supports and deliveries of information services becoming dominant factors improving information performance of schools.

## II.  LITERATURE REVIEW

### A.  IT Service Management

IT service management is the management of all processes aiming to ascertain IT service quality based on approved service levels. IT service management comprises initiation, designs, organizations, controls, procurement, supports, and IT service improvement adjusted to organization needs [13]. IT service management can give strategic values in forms of service deliveries and support effectiveness and efficiency. IT service providers should prioritize IT service quality based on consumers' expectations. This quality is, thus, the agreement between IT service providers and consumers [14].

IT service management has two important elements such as supports and deliveries of services. The former refers to ways to gain access of information service availability quickly and completely, while the latter presents services to fulfill managerial needs of the stakeholders in decision making [15]. Referring to ITIL (Information Technology Infrastructure Library), service supports consist of incident management, problem management, change management, exemption management, and configuration management. Service deliveries, on the other hand, include management service levels, finance management, IT continuance management, capacity management, and availability management [16].

IT service management of schools covers services in providing information to the management to make decisions; providing data and information to every operational unit for business transaction activities; providing messages among entities through electronic communication media; providing information to internal and external consumers; expediting administrative, functional, and strategic activities; and ensuring good controls on business processes [17].

Availability and smoothness of information are primary needs supporting academic administration processes of schools [18]. The use and functions of IT should be able to quickly, accurately, and relevantly provide service supports and service deliveries in relation to academic administration activities, infrastructures, departments, libraries, and finance. The purpose is to ascertain superfine decision making of school management [19].

## B. IT Innovation Adoption

Innovation is process that is not only limited to the activity of generating new ideas. It further leads to competitiveness [20]. IT innovation adoption is a decision made to wholly use innovation as the best way to use IT. The innovation adoption should, hence, be primarily concerned [21]. As it is a part of organization strategies, enough information is needed. Furthermore, adopters can search information from any relevant sources based on organization needs [22]. Because IT innovation adoption brings a number of uncertainties, knowledge and information on innovation are needed to make prevention. Innovation compatibility of organizations is a success key to the innovation per se [23].

In adoption, diffusion happens. Diffusion is communication process through strategies planned with goals to adopt. The purpose of conducting diffusion of technology and innovation is to make changes [24]. Innovation adoption is in relation to decision making influenced by time dimension and the capability to raise awareness, and desires to try and implement things [25]. IT innovation adoption refers to the model of technology acceptance including the perception of benefits and ease of use [26] completed with two main innovation categories such as process and products [27].

## C. Information Technology Governance

Boards of directors and executive management of organizations are responsible for IT governance becoming an integrated unit of managing the organizations. They should also ensure that IT can be used to maintain and expand strategies and goals of organizations [28]. IT governance is the limit of components building the system through the implementation of a series of procedures and mechanisms in organization activities. IT governance does not only lead to specific decisions, but it also determines the makers and the contributors [29].

Structures involve essential forms of roles and responsibilities, the steering committee of IT, the strategic committee of IT at the level of the board of directors, the steering committee of IT projects, CEO at the position of the executive committee, and CIO reporting to CEO and COO [29]. IT governance involves identification and formulation of IT business decisions, priorities, justification, authorization of IT investment decisions, monitoring, and evaluation of IT performance. All of these activities also need elements of portfolio management, strategic information system planning, controls and reports of IT budgets, project governance, IT service levels, and IT maturity [29]. Next, relationship mechanisms are important in implementing IT governance. Relationship mechanisms cover elements of active participation and cooperation among the main stakeholders, IT leadership of partnership rewards and incentives, as well as the training and the turnaround of businesses/IT [30].

With structures of controlled relationships, IT governance becomes an important part supporting the organization success through value addition and risk balance [31]. This fact shows that IT is a very important resource when implementing good and accurate IT governance [32] to achieve organization goals

and productivity performance. IT governance contributes to right solutions of changes and IT complexities [33]. Managing IT properly enables innovative business transformation through efficient reduction of transaction costs, interaction, and addition of incentives [34].

## D. Information Performance of Schools

A number of definitions of performance exist and remain debated. In association with schools, performance is defined as a success indicator in achieving missions and goals of schools. Information performance of schools really depends on the application of IT governance in providing information services based on all stakeholders' needs. Information service system is needed to generally support the effectiveness and efficiency of all academic business processes of schools [35].

IT services are fundamental for all processes consisting of learning, research, and community services. All activities including processing system as well as storage and archiving of documents become automatic, transaction can be made with no limit to time, and everything becomes more effective and efficient [36]. This condition eases the management and the distribution of information as well as the evaluation [37]. Improving information service quality is prerequisite to more dynamic and more competitive schools. IT needs of management information system of easy and quick academic information services become main activities of schools [38].

## III. PROPOSED RESEARCH METHOD AND HYPOTHESIS

The research was designed with an explanatory survey of analyzed units of private schools of informatics management and computing in Indonesia organizing bachelor's study programs of information system, computer science, and computer system. The research was descriptive and verifiable and applied interviews and questionnaires to be answered by heads and vice heads of study programs.

The research applied a mixed (quantitative and qualitative) method and concurrent triangulation strategy. Only a phase was taken when collecting the data and conducting computation and analysis. Obtained data were compared afterwards to see which could be combined and differentiated [39].

The population consisted of 121 private schools of informatics management and computing in Indonesia with 197 study programs obtaining accreditation grades from the National Accreditation Board of Schools. The sample covering 55 schools was measured by using a Slovin's formula [40]. The schools were further determined through a simple random sampling technique since based on the perspective of IT service management, all schools were principally homogeneous. The data were collected using a "one snapshot"–cross sectional timescale.

The research began with the definition of background to cognize problems and goals. Relevant literature reviewed was further developed into a model with hypotheses. In addition, the method was developed with the determination of analyzed units performing as research objects.

Primary data were collected through interviews and questionnaires. A number of selected respondents were

concerned. Obtained research data of IT innovation adoption included perceived benefits, perceived ease of use, innovation of processes and products; IT governance included structures, processes, and relationship mechanisms; IT service management included supports and deliveries of services; and information performance of schools included effectiveness, efficiency, secrecy, alignment, availability, appropriateness, and reliability.

Meanwhile, the secondary data were obtained through publications provided on PDPT (Database of Schools) and BAN-PT (the National Accreditation Board of Schools). The secondary data comprised a number of private schools of informatics management and computing in Indonesia with accredited bachelor's study programs. Next, analysis and interpretation of the collected data were made. The analysis itself was statistical, descriptive, and inferential and was applied by using SEM (Structural Equation Modeling) method and PLS (Partial Least Square) approach. To obtain the research results, analysis and measurement were qualitatively made through in-depth interviews and FGDs. Conclusion and suggestions were finally given.

The framework aimed to make this research systematically to the point through a good method based on the problem formulation and the stated goals. The concept framework should be comprehensively designed through the orientations of facts of today's problems, the relationships among variables, previous research, and testing of analysis methods.

In this research framework, there are four basic concepts that (a) IT service management has direct influences on school performance; (b) IT service management has two antecedents having direct influences on its capabilities such as IT innovation adoption and IT governance; (c) IT innovation adoption can also influence IT service management directly and indirectly through IT governance; (d) IT innovation adoption has direct and indirect influences on school performance through IT service management.

This research focused on findings of influences happening between variables of IT innovation adoption and IT governance towards IT service management for improving information performance of schools. IT service management was an intervening variable. This proposed research model had novelty through its focus on the four important variables such as IT innovation adoption, IT governance, IT service management, and information performance of schools (see Figure 2).
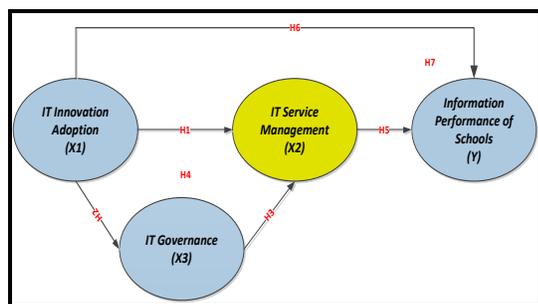

Fig. 2. Proposed Research Model

Review of various literature and previous research shows that there has not been specific research on IT service management improving information performance of schools consisting of capabilities to synchronize and interoperate the academic data to fill out the accreditation forms. Existing research is more on overall school performance and has not related influences of IT innovation adoption and IT governance.

Some previous study results indicate important contributions that IT innovation adoption brings for ensuring reliable IT service management. Capabilities of IT innovation to adjust ways of work influence the smoothness of IT service management [41]. Having IT service management also depends on readiness and application of organizational ownership of IT governance. IT service governance creates accountability, service management, structure governance, success factors, main performance indicators, and matrices of service management. In addition, it shows the commitment of the management and strengthens the service culture [42]. Improving IT governance in organizations requires people participating in applying IT innovation adoption. Stakeholders are also needed since they can change users' negative perception [43].

Referring to the previous framework, here is the formulation of hypothesis testing. Hypothesis testing is a very important part in the research. Analysis of collected data does not generate proven and not proven hypotheses. It can support or not support the hypotheses.

To prove that the hypothesis testing results are significant or not significant, statistical hypotheses are needed. A null hypothesis indicating no differences among data of the population and the sample is tested [39][40]. There are several steps that should be considered to test hypotheses. At first, a null hypothesis and an alternative hypothesis are formulated. Second, degrees of confidence are chosen. Third, statistical testing instruments are chosen. Fourth, hypotheses are accepted or rejected. Hypotheses tested in this research were as follows:

a. H1: IT innovation adoption can make contributions of use and has direct influences on IT service management of private schools of informatics management and computing in Indonesia.

b. H2: IT innovation adoption can make contributions of use and has direct influences on IT governance of private schools of informatics management and computing in Indonesia.

c. H3: IT governance can make contributions of use and has direct influences on IT service management of private schools of informatics management and computing in Indonesia.

d. H4: IT innovation adoption can make contributions of use and has direct influences on IT service management through IT governance of private schools of informatics management and computing in Indonesia.

e. H5: IT service management can make contributions of use and has direct influences on information

performance of private schools of informatics management and computing in Indonesia.

    f. H6: IT innovation adoption can make contributions of use and has direct influences on information performance of private schools of informatics management and computing in Indonesia.

    g. H7: IT innovation adoption can make contributions of use and has direct influences on information performance through IT service management of private schools of informatics management and computing in Indonesia.

## IV. Conclusion and Perspectives

This research proposal generated novelty in the form of a new model on IT service management to improve information performance of schools through influences of IT innovation adoption and IT governance. The research novelty was on influences of the two antecedent variables. Information performance of specific schools with accredited study programs was emphasized.

Perspectives of these research results had important contributions for private schools of informatics management and computing in Indonesia. Initially, synchronization and interoperability of each academic data unit of schools can be actualized. Regarding the significance of reaching consistent levels of information to fill out accreditation forms, interrelationships of information should be prioritized. This condition becomes the representation of the improvement of information performance of schools. This research proposal emphasized the magnitude of relationships and influences of IT service management based upon supports and deliveries of information services becoming dominant factors improving information performance of schools. Additionally, expected information performance can be a basic reference to improve IT service management and accreditation grades of schools.

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