# Exploration of Information Technology Governance Practices in the Public Sector: A Developing Country's Perspective

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**Summary**
The use of information technology (IT) has become indispensable in public sector organizations (PSOs) due to the growing demands for more efficient and cost-effective public service delivery. Consequently, effective IT governance (ITG) practices are required to be identified, applied and continued if PSOs want to enhance the contribution of IT to gain their goals. This paper identifies and analyzes the relevant ITG practices in terms of Critical Success Factors (CSFs) in Pakistani public sector organizations (PakPSOs). This is achieved through systematic literature review complemented with multi-case study in the selected eight PakPSOs. The results indicate that 12 ITG practices are more relevant to PakPSO. The identified set of practices provides a holistic view of ITG by not only wrapping the five focus area of ITG, but also covering the three aspects of IT-business alignment. The results can be used by the public managers to recognize critical areas where focus can be given for success due to limited resources and related competencies.

***Key words:***
*ITG, critical success factors, systematic literature review, public sector organizations in less developed country.*

## 1. Introduction

In recent years, information technology governance (ITG) has attracted much attention in the literature. It is a key enabler and success factor for business performance. A study on ITG performance reveals that top performing organizations produce up to 40 percent more profit than their competitors and organizations with above average ITG produce more than 20 percent profit than organizations with poor ITG adopting the same strategy i.e. customer intimacy [1]. Another study on ITG success describes that many leading organizations apply ITG to quest for increase in efficiency and accountability and comply with regulatory and other forms [2]. This emphasizes the need to investigate and implement ITG in organizations.

ITG is different in different organizational contexts and its implementation in public sector organizations (PSOs) is more problematic as compared to private organizations [3]. Specifically, the PSOs in developing countries are more challenging due to lower level of institutional capacity, higher corruption and informality, occasional engagement of stakeholders which are counterproductive for effective decision-making and accountability [4]. However, the quick development of technologies over the past decade has narrowed down the gap between two sectors [5].

The need for effective ITG has also been realized in Pakistani Public Sector Organizations (PakPSOs) because Pakistan has introduced many adjustments to commercial and regulatory policies that, among other things, have led toward a converged IT sector. This has also been accelerated by "National IT Policy and Action Plan (2000)" and "E-Government Strategy and 5-Year Plan for the Federal Government (2005)". The PakPSOs have observed remarkable improvements in investment, use and demand of IT due to these adjustments. Various IT applications like electronic processing of internal files, e-filing of income tax return and citizen online etc. are functional in various PakPSOs. Other e-government projects are under implementation. However, for envisaged improvement of public service delivery, effective ITG practices are not fully realized within and across various PakPSOs.

The paper has identified and analyzed the relevant ITG practices in PakPSOs in terms of Critical Success Factors (CSFs), previously unidentified in this context. This has led to the following research question of the study: *RQ: Which ITG practices are relevant to PakPSOs and why?* This has achieved by identifying and analyzing ITG CSFs through systematic literature review complemented with multi-case study in the selected eight PakPSOs.

The rest of the paper proceeds as follows. The next section presents the rationale for adopting CSF approach following by methodology. The fourth section operationalizes the ITG practices in PakPSOs. In the fifth section, discussion is made. Conclusion is provided in the last section.

## 2. Rationale for Adopting CSF Approach

The IT context of Public Sector Organizations (PSOs) in less developed countries is generally characterized by low human development, limited IT resources, inadequate

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related knowledge & competencies and cultural constraints [6]. Generic practices and frameworks have many limitations in this environment due to their complex nature, high cost of implementation and lack of required competencies. However, CSFs approach is more suitable in this environment because *"CSFs are limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization"* [7]. These factors are used to direct the focus on key areas central to the organizations' objectives where they invest their resources for success [8]. Such factors are employed in many perspectives including a project level to organizational level [9]. Therefore, based on the context of the study, we have adopted CSFs approach to identify right ITG practices in PakPSO due to the following reasons.

- Lack of previous ITG research, identification of critical areas and relevant data.
- Limited IT resources, inadequate related knowledge & competencies and cultural constraints.

## 3. Method of the Study

Systematic literature review is a process of searching, evaluating, and interpreting relevant papers/studies related to specific research question(s), area of interest, and topic of interest [10]. It has been considered as a leading method for collecting and analyzing existing research work and extending it to a context where less is known about a particular phenomenon. Various researchers suggested various stages for conducting systematic literature review. For example, Kitchenham [10] proposed three main stages: 1) review planning; 2) execution of the review; 3) and reporting the results. Khan et al. [11] suggested five stages: 1) formulating the questions for a review; 2) identifying the related work; 3) assessing the quality of papers/studies; 4) summarizing the evidence; 5) and interpreting the findings. However, we have adopted five stages of Khan et al. [11] in this study to conduct systematic literature review due to its comprehensiveness and well-recognition in the literature. The detail of the actions taken is as follows:

### 3.1 Framing the Question for a Review

At this stage, the research question and related search terms are clearly defined before the commencement of actual literature review. Therefore, the following research question has formulated for this purpose: Which ITG practices are relevant to PakPSOs and why? We selected following key words & terms to search related papers/studies: ITG CSFs, ITG performance & success factors, IT-business alignment success factors, ITG implementation minimum baselines and factors affecting ITG success etc.

### 3.2 Identifying the Related Work

At this stage, the resources for the relevant literature are carefully identified. For this, we used Google scholar, Research Gate network and Scopus database. These resources wrap all the prominent journals in this field such as MIS journals, AIS journals and senior scholar basket of journals etc. Moreover, the researcher searched papers from eminent conferences in the area of ITG such as "International Conferences on System Sciences", "Hawaii International Conference on System Sciences", Mediterranean, Pacific Asia, Australian and European conferences etc. Furthermore, we used repositories of ITG Institute (ITGI)) which conducts ITG research globally. A total of 55 papers/studies were identified and reviewed at this stage.

### 3.3 Assessing the Quality of Papers/Studies

At this stage, the discovered papers/studies are filtered out based on some quality measures. We applied the following quality measures to the discovered papers/studies: 1) the paper/study is clearly related to the research question; 2) The paper/study has a clear methodology; 3) the paper/study comes from some trusted resource and/or journal; 4) the publication year of the paper/study should be 1995 or above because the phenomenon of ITG emerged in the literature in the late 1990s. The papers/studies that not met the aforesaid quality criteria were rejected. In this way, a total of 18 papers/studies out of 55 were accepted at this stage. The list of accepted papers/studies is shown in Table 1.

### 3.4 Summarizing the Evidence

At this stage, the discovered evidences related to research question(s) are accumulated and summarized. Based on this explanation, 18 articles were scrutinized thoroughly in order to find out their relatedness with the research question of the study. For this, we first selected papers/studies from the PSOs. However, due to shortage of this kind of research in PSOs, we also included papers/studies from the private sector. We selected papers/studies in which ITG CSFs have positive impact on IT outcomes in terms of ITG performance, IT-business alignment, IT effectiveness, IT performance or strategic IT projects' success. Fortunately, all 18 papers well fitted to this criterion. As a result, a total of 23 CSFs were identified and logically harmonized according to the context of PSOs in less developed countries as shown in Table 2.

Table 1: The Accepted CSFs Related Papers/Studies

| Title | No. of CSFs | Author(s)/Year |
|---|---|---|
| Enablers and Inhibitors of Business-IT Alignment | 6 | Luftman et al. [12] |
| Critical Success Factors in the Alignment of IS Plans with Business Plans | 18 | Teo and Ang [13] |
| Designing Information Technology Governance Processes: Diagnosing Contemporary Practices and Competing Theories | 4 | Ribbers et al. [14] |
| Board Briefing on ITG | 11 | ITGI [15] |
| Key Success Factors for Implementing ITG: Let's Not Wait for Regulators to Tell Us What to Do | 5 | Guldentops [16] |
| Don't Just Lead, Govern: How Top-Performing Firms Govern IT | 8 | Weill [17] |
| ITG in Practice: Insight from Leading CIOs | 6 | PwC and ITGI [18] |
| Implementing Centralized IT Service Management: Drawing Lessons from the Public Sector | 10 | Tan et al. [19] |
| Enhancing ITG Practices: A Model and Case Study of an Organization's Efforts | 4 | Bowen et al. [20] |
| An Exploratory Study into the Design of an IT Governance Minimum Baseline through Delphi Research | 10 | De Haes & Van Grembergen [21] |
| Establishing Good ITG in the Public Sector | 5 | Hoch and Payan [22] |
| Justifications, strategies, and critical success factors in successful ITIL implementations in U.S. and Australian companies: An exploratory study | 9 | Pollard and Cater-Steel [23] |
| Critical Success Factors for Effective ITG in the Public Sector Organizations in a Developing Country: The Case of Tanzania | 11 | Nfuka and Rusu [24] |
| Critical Success Factors in IT Alignment in Public Sector Petroleum Industry of India | 9 | Aggarwal [25] |
| Critical Success Factors for ITIL Best Practices Usage | 12 | Nenickova [26] |
| Critical Success Factors for Business – IT Alignment: A Review of Current Research | 10 | Kurti et al. [27] |
| The Critical Success Factors for Effective ICT Governance in Malaysian Public Sector: A Delphi Study | 27 | Razak and Zakaria [28] |
| Critical success factors (CSFs) or information technology governance (ITG) | 15 | Alreemy et al. [29] |

Table 2: Harmonization of CSFs from the Accepted Papers/Studies

| | Alreemy et al. [29] | Razak and Zakaria [28] | Kurti et al. [27] | Nenickova [26] | Aggarwal [25] | Nfuka and Rusu [24] | Pollard and Cater-Steel [23] | Hoch and Payan [22] | De Haes and Van Grembergen [21] | Bowen et al. [20] | Tan et al. [19] | PwC and ITGI [18] | Weill [17] | Guldentops [16] | ITGI [15] | Ribbers et al. [14] | Teo and Ang [13] | Luftman et al. [12] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Top management support | x | x | x | x | | x | x | | | | x | x | | | | | x | x |
| Alignment between IT and business strategy | x | | x | x | | x | | | | | x | | | x | x | | x | |
| IT demonstrates leadership | | x | x | x | x | x | | x | x | | | | | | | | x | x |
| Adequate stakeholders involvement | x | x | | | | x | x | | | | x | | | | | x | x | |
| Effective communication between IT and business | x | | x | | x | | x | | x | x | | | | | | x | x | x |
| Regulatory environment and compliance requirements | x | x | | | | x | | | | | | | | | | | | |
| Existing governance and transparency | x | | | | | | | | | | x | x | x | x | | | | |
| Organizational culture | x | | | | | | x | | | | | | | | | | | |
| Financial support | x | | | | x | | | | | | | | | | | | | |
| Adequate IT skills and staff | x | x | x | | x | x | | | | | | | x | | x | | x | |
| Performance measurement and aligned incentives | x | | x | | x | x | | x | | | x | x | x | | x | x | x | |
| Change management and exception handling | x | x | | | | | | | | | x | x | x | | x | | x | |
| Well prioritized IT Projects | x | x | | | | | | | | | x | | | | | | | x |
| Clear IT strategy, principles & policies | x | | | | | x | | | | x | | x | x | x | x | x | x | |
| Clear roles and responsibilities | x | | | x | | | | | | | | | | | | | x | |
| ITG awareness and understanding | | | | x | | x | | | | | x | | x | | | | x | |
| IT structures to ensure accountability and flexibility to the IT organizational needs | x | | | | | x | | x | x | x | x | x | x | x | x | | x | |
| Risk identification and mitigation process | | x | | | | | | | | | | | | | x | | x | |
| Standardized and managed IT infrastructure & applications to optimize costs and information flow | | x | | | | x | | | x | | x | | x | | x | | x | |
| IT skills and knowledge of business executives/personnel | | | x | | | | x | | | | | | | | x | | x | x |
| Business skills and knowledge of IT executives/personnel | | | x | | | | | | | | | | | | x | | x | x |
| Mutual trust and respect between business and IT executives/personnel | | | x | | | | | | | | | | | | x | | x | |
| Shared understanding between business and IT executives/personnel | | | x | | | | | | | x | | | x | | | | x | |

### 3.5 Interpreting the Findings

At this stage, the results from the previous stages are analyzed and conclusions are made. For this, 23 CSFs obtained in stage 4 were further operationalized by multi-case study in the selected eight PakPSOs. The selection of the organizations is based on existence of the IT function, their mature IT processes, experienced IT and business management personnel and services they provide to the public. The purposive sampling technique was used to choose most relevant organizations and participants to get meaningful data. Qualitative responses of 18 senior managers in eight PakPSOs were sought through semi-structured interviews. At minimum, two participants (one IT expert and other business expert) from every organization participated in the interview process. The respondents were mainly heads, directors and deputy directors of IT and business. This provided triangulation i.e. use of data from multiple sources to increase confidence in the results. A total of 10 IT management and 8 business management personnel participated in the interview process. The unit of analysis was the organization. The distribution of the respondents in each studied organization is shown in Table 3.

**Table 3**: Distribution of the Respondents in the Eight Studied PakPSOs

| | Org. A | Org. B | Org. C | Org. D | Org. E | Org. F | Org. G | Org. H | Total |
|---|---|---|---|---|---|---|---|---|---|
| IT Management | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 10 |
| Business Management | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 |
| Total | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 18 |

The participants were requested to tick the most pertinent CSFs from the given list of CSFs and/or add other CSFs which they feel critical in their business settings. The interview process continued till the reoccurring of the themes. In order to verify the responses, archival records were also checked. The interviews were tape-recorded and conducted into the national language which later converted into English language. To extract themes from the interviewed data, content analysis technique was applied. In order to perform content analysis, the qualitative software NVIVO-10 was used.

## 4. Results

The results of the summarized qualitative response of the interviewees after content analysis are shown in Figure 1. Here is a brief description of interviewees' response.

One of the heads of business said that the practice "performance measurement and aligned incentives" is not suitable because there is no concept of providing incentives like promotions and increments in salaries on performance basis in PakPSOs as per Constitution of the country rather it is on seniority basis. So, incentive is a broad and confusing word. The practice should be "performance measures and benchmarks". However, he confirmed that this practice is very much important for success of IT in his organization. Three more respondents also confirmed the presence of this practice in their respective organizations which were also verified by their archival records.

| Contextualized practice | No. of studied PakPSOs in which the practice is implemented |
|---|---|
| IT leadership | 5 (B, C, D, H, F) |
| IT/business communication and partnership | 6 (A, B, C, F, G, H) |
| Engagement of key stake holders | 7 (A, B, C, D, F, G, H) |
| Performance measures and benchmarks | 4 (B, C, D, F) |
| IT governance awareness and training | 2 (B, H) |
| Senior management involvement and support | 4 (A, C, E, G) |
| Defined, aligned and cascaded IT and business strategies | 5 (A, B, D, E, H) |
| Standardized and managed IT infrastructure & applications | 4 (B, C, D, E) |
| Competitive IT professionals | 6 (A, B, D, E, F, H) |
| Policies and guidelines for optimal acquisition and use of IT | 8 (A, B, C, D, E, F, G, H) |
| Risk identification and mitigation mechanism | 3 (B, E, G) |
| IT structures for responsiveness and accountability | 5 (A, C, D, E, F) |

**Figure1:** The Summarized Qualitative Response of the Interviewees

One of the heads of IT said not only "top management support" is critical but their active involvement in IT-related matters is also important for success. He suggested that this practice should be "senior management involvement and support". He agreed that without this practice, their IT initiatives could not be materialized. This was also confirmed by three more respondents.

One of the respondents replied the interviewer that the practice "alignment between IT and business strategy" should be replaced by "defined, aligned and cascaded IT and business strategies" because some of the PakPSOs even not have IT strategy. If they have, then they do not communicate it down to the organization. However, he said that this practice is active in his organization which was also confirmed by the archival records of the organization. Four more respondents confirmed that this practice is exercised in their respective organizations.

One of the directors IT suggested that the practice "standardized and managed IT infrastructure & applications to optimize costs and information flow" should be restricted up to "standardized and managed IT infrastructure & applications" because the purpose of this practice is obvious which is to optimize costs and information flow. Therefore, there is no need to explain it further. He also confirmed that his organization is striving for this practice. Three more respondents revealed that their organizations are also very keen in focusing on this practice.

Majority of the respondents declared that the practice "adequate IT skills and staff" is a need of the hour in their respective organizations. One of the respondents added that retaining of IT skills and staff is an inherent problem in

government sector due to good salaries in private sector. Another respondent suggested that practice should be "competitive IT professionals" to provide the more clear meaning to the term. Therefore, the practice was replaced by "competitive IT professionals".

Many respondents showed their concerns on the name of the practice "clear IT strategy, principles & policies". They agreed that the name of the practice should be "policies and guidelines for optimal acquisition and use of IT". However, all respondents confirmed the presence of this practice in their respective organizations which was also evident from their archival records. All PakPSOs follow Public Procurement Regulatory Authority (PPRA) guidelines for this purpose.

One of the respondents argued that the practice "risk identification and mitigation process" should be updated by "risk identification and mitigation mechanism" because this practice is hardly implemented in PakPSOs in the form of proper process. However, he confirmed the presence of this mechanism in his organization which was also verified from archival records of his organization. Two more respondents confirmed this practice in their respective organization to some extent.

The practice "IT structures to ensure accountability and flexibility to the IT organizational needs" was updated by "IT structures for responsiveness and accountability" on the suggestion of one of the respondents. Five respondents were satisfied by the existing IT structures in their respective organizations but three were unsatisfied. However, all the respondents agreed that this practice is crucial for implementing effective ITG. No respondent confirmed the presence of "well prioritized IT projects", "business skills and knowledge of IT executives/personnel" and "regulatory environment and compliance requirements" in their respective organization or declared them crucial for implementing ITG in their operating environment. It is worthy to mention that no new practice has been emerged in PakPSOs because the specific practices in some of the PakPSOs also fall under the aforesaid studied practices. However, PakPSOs use these practices with different names.

## 5. Discussion

The identified practices have arranged in such a way that on one hand they wrap the five focus areas of ITG [30] and on the other hand they cover the three IT-business alignment aspects [31]. In this way, the practices demonstrate an all-inclusive view of ITG. The arrangement of the practices is shown in Figure 2. The identified practices are discussed along the three IT-business alignment aspects i.e. human, social and intellectual aspects.

| IT governance focus areas | IT-business alignment aspects | | |
|---|---|---|---|
| | Human aspect | Social aspect | Intellectual aspect |
| Strategic alignment | IT leadership | IT/business communication and partnership | Defined, aligned and cascaded IT and business strategies |
| | Senior management involvement and support | Engagement of key stakeholders | IT structures for responsiveness & accountability |
| Value delivery & risk management | | | Policies and guidelines for optimal acquisition and use of IT |
| Resource management | IT governance awareness and training | | Standardized and managed IT infrastructure and applications |
| | Competitive IT professionals | | |
| Performance measurement | | | Performance measures and benchmarks |

**Figure 2:** Classification of the identified practices

### 6.1 Practices Related to Human Aspect

The human aspect is concerned with the characteristics of individuals such as knowledge, skills, leadership and attitude [31]. The practices related to this aspect are as under.

*IT Leadership*- This practice is crucial to lead and manage IT and transformation program. Among other things, IT leadership looks into the potential & contribution of IT and demonstrates viable IT value proposition. The results confirmed that the practice is crucial and exercised in five PakPSOs. This is also supported by a previous study [21] where this practice is among the top 10 minimum baselines for implementing effective ITG.

*Senior Management Involvement and Support*- It emphasizes on the involvement of senior and/or executive level authorities into IT-specific decision-making to gain desired outcomes. The practice declared essential and exercised in four studied PakPSOs. The use of this practice is also supported by many previous studies [24, 32, 33].

*IT Governance Awareness and Training*- It encompasses ITG related campaigns for both business and IT people [21]. In the context of lower IT knowledge and culture, Nfuka and Rusu [24] refer this practice as mindset change and competency improvement. This practice mentioned its importance in the studied environment. However, this practice is exercised in only two studied PakPSOs which indicates the urgent need for provision of ITG awareness and training in this environment.

*Competitive IT Professionals*- This practice refers to the human resources' knowledge, skills, competencies and acquaintance with organizational goals and public expectations. It is an engine of innovation, optimization and

performance [34]. The results indicated that this practice is exercised in six PakPSOs.

### 6.2 Practices Related to Social Aspect

The social aspect is concerned with the relational, informal and cultural aspects [31]. The practices related to this aspect are as under.

*IT/business Communication and Partnership*- It demonstrates the need to involve business people into IT activities and IT people into business processes. The results indicated that the practice is vital in the studied environment and is exercised in six PakPSOs. This practice is also declared imperative in a previous study [12].

*Engagement of Key Stakeholders*- It focuses on engaging key stakeholders having clear goals, roles, and shared understanding on agreed upon agenda and principles of success. The results revealed that the practice is exercised in seven studied PakPSOs. The need of this practice is even enlarged in PSOs due to the presence of numerous stakeholders with competing needs [35].

### 6.3 Practices Related to Intellectual Aspect

The intellectual aspect is concerned with the end products and deliverables resulting from the work of individual and group of people [31]. The practices related to this aspect are as under.

*Defined, Aligned and Cascaded IT and Business Strategies*- This practice deals with the properly defined, aligned and communicated IT and business straggles. The results showed that the practice is crucial and exercised in five PakPSOs. It is also supported by a previous study [6] which revealed that defined, aligned and well-communicated IT and business strategies down into the organization have positive effect on ITG implementation success.

*IT Structures for Responsiveness and Accountability*- It ensures the existence of accountable persons with clear roles & responsibilities regarding IT decision-making [36]. The results of qualitative response also showed that the practice is crucial and exercised in five PakPSOs.

*Risk Identification and Mitigation Mechanism*- It pertains to analyze and assess IT risks. The results showed that the practice is crucial and exercised in only three PakPSOs. It means PakPSOs are weak in identifying and mitigating risks which is also supported by another study [37].

*Policies and Guidelines for Optimal Acquisition and Use of IT*- It refers to instituting and enforcing best practices across the enterprise to achieve required outcomes [17]. The results indicated that this practice is exercised in all of the studied PakPSOs. The practice is also essential to create business value of IT.

*Standardized and Managed IT Infrastructure & Applications*- It deals with ensuring a standardized and consistent IT set-up and applications [34]. The results showed that the practice is crucial and exercised in four PakPSOs.

*Performance Measures and Benchmarks*- This practice deals with the performance of strategy, processes and resources. The results showed that the practice is imperative and exercised in four PakPSOs. This practice is considered as an integral part of effective ITG [17].

## 6. Conclusion

This study has identified and analyzed ITG practices in terms of CSFs relevant to PakPSOs. This has achieved by systematic literature review complemented with multi-case study in the selected eight PakPSOs. After the data analysis, it has found that the studied PakPSOs mainly exercise 12 practices in their operating environment. Specific practices with different names in some of the studied PakPSOs also fall under these broad categories. The finalized set of practices has then arranged into five focus areas of ITG i.e. “strategic alignment”, “value delivery”, “risk management”, “resource management”, and “performance measurement” [30] and three aspects of IT-business alignment i.e. “human”, “social”, and “intellectual” aspects [31] to demonstrate an all-inclusive view of ITG. The results indicate that majority of the practices fall under strategic alignment focus area of ITG and intellectual aspect of IT-business alignment. This shows that that the said area and aspect are more crucial for PSOs of a less developed country.

This study sheds light on contextualized practices for implementing effective ITG in PakPSOs and similar environment. The identified practices are slightly different to the previous ones in the relevant literature. This shows that ITG is a contextual phenomenon.

The study contributes to the practice and prevalent body of knowledge. Public managers in PakPSOs and other identical circumstances can use the results to recognize crucial areas where attention can be focused for success due to limited resources and insufficient knowledge & competencies. Ultimately, they can invest their resources and time to improve the key areas which are central to the organizational success. Theoretically, the study has broadened the scope of ITG practices in terms of CSFs in the PSOs of less developed countries.

The study has also some limitations which are important to mention at this stage. The major limitation is that the study is restricted to only one country and eight organizations. Future researchers can extend it to more countries and more organizations to enhance the replicability and generalizability of the results. Moreover, they can test and analyze the effect of these practices on IT outcomes i.e. desirable behavior in their environment.

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