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TOWARDS DEVELOPING A RISK CHARTER FOR SOFTWARE DEVELOPMENT PROJECTS

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ABSTRACT

The challenge of software development lies in its attempt to satisfy the users' requirements; control and cost management; product's schedule and product's quality. To ensure that these criteria are met, product success and product management success need to be emphasized. Product success deals with goal and purpose while the project management success deals with the project input and output. Project success may be achieved by having an integrated project management process where an important aspect of the process is risk management. The risk management process must be integrated into the plan to enable a project manager to effectively manage the software development. In the software risk management process, risk identification is one of the most important components that needs to be tackled before developing any meaningful risk management strategies. Therefore, in this paper, risks related to software development are identified and discussed.

Keywords: ***Product success; Project management success; Project success; Risk charter; Risk identification and Risk management***

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INTRODUCTION

Given the rapid pace of technological innovation, Information Technology (IT) projects, especially software development, has become increasingly complex, high cost and high risk. The lack of successful software management has contributed to the realization that software development is an uncontrolled activity, which is not being managed in an effective manner.

In a survey conducted by Standish Group, USA (Abrahami, 1999) the results show that only 9 percent of IT projects were delivered on time or within budget, 90 percent fail upon delivery and 15 percent had actual time spent on miscellaneous work. Subsequent rework on software constitutes up to 10 percent of overall work effort and 20 percent is spent on compliance to testing. However, of the 150 corporate IS managers surveyed by the Center for Project Management, San Ramon, California, the results show that only 25 percent of projects satisfy all three criteria; timely completion, within budget and meeting client's satisfaction. About 50 percent of finished projects are over budget by 60 to 190 percent and contain less than 70 percent of originally promised functionality. Projects that are cancelled due to scope increase recorded as high as 25 percent; less than 15 percent of IS project managers have created a change in management plan to deal with scope changes and only 11 percent of them actually know the critical paths of their projects.

The layout of this paper is as follows. The first part explains in brief the software management. This is followed by discussions on the criteria for achieving project's success, risk management, risk identification and it ends with a remark on the need to develop a risk charter.

PROJECT SUCCESS

De Witt (1988) stated that, measuring success is a complex exercise, since a project can be a success for one party and a disaster for another. Likewise, a project may be perceived as a success one day and a failure the next day. Therefore, to think that one can objectively measure the success of a project is an illusion. In trying to define and understand whether the software development projects are successful or not, criteria for measuring project success must be set out at the beginning of the project. This is to ensure that different team members do not have contradictory perception pertaining to the failure or success of the project (Baccarini, 1999). Baccarini further reaffirmed that the project success is also due to application of consistent and universal process where projects are initiated, approved, managed and implemented. When projects are not managed in a properly disciplined environment, typical results are confusion of roles, inadequate communications, inefficient use of scarce resources and potentially conflicting objectives and schedules. Therefore, efforts need to be taken to strengthen management practices to ensure project success. In measuring the project success, two most important components need to be considered. They

are *product success* and *project management success* (Baccarini, 1999). Figure 1 shows the linkages between these two components.

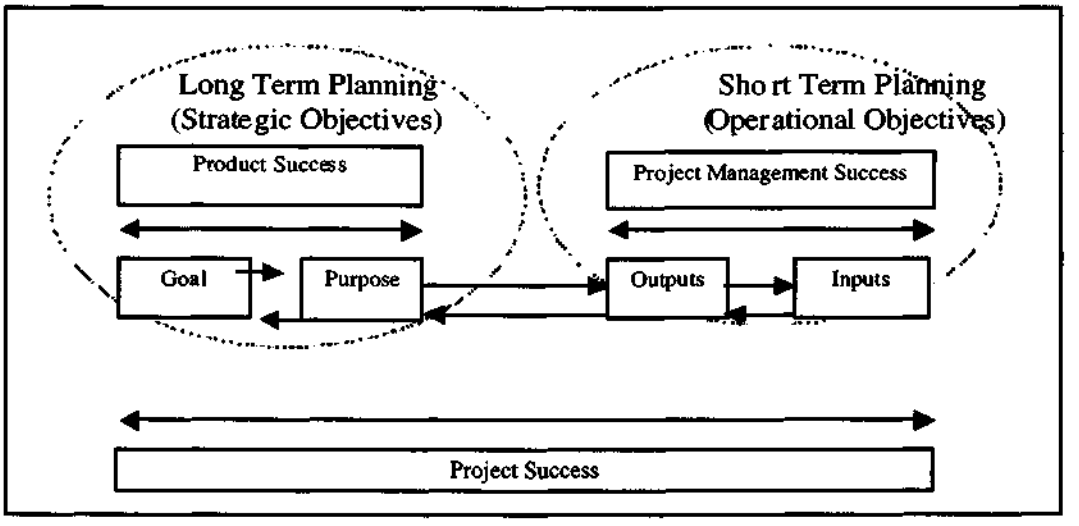

Figure 1: Components of Project Success and Their Linkages

Figure 1 above shows that the components of product success comprises of project goal and project purpose. Project goal refers to the overall strategic orientation to which the project will contribute to and should be consistent with the strategic plans of the organization. Project purpose, on the other hand, provides the means towards achieving the project goal and the means to determine the required project outputs. Therefore, both the project goal and project purpose can be viewed as strategic objectives that require long term planning procedure.

It may be noted that an important aspect of managing the projects in order to achieve quality processes and standards is by having a formal, disciplined processor. This requirement, hence, entail the need to assess the effectiveness of the procedures throughout the lifecycle of the project. Therefore, efficient project management practices are required from day one of the project life cycle. Figure 1, further shows that the project management success in effect depends on the project outputs and inputs, which comprise the immediate, specific and tangible results or deliverables produced by project activities. The detailed relationships between product success and the product management success are summarized in Figure 2 (Baccarani, 1999).

Figure 2 above, shows the dependency of the product success on the three major components. They are, users satisfactions, satisfaction of the stakeholders' needs and the meeting of strategic objectives. The project inputs that define project management success

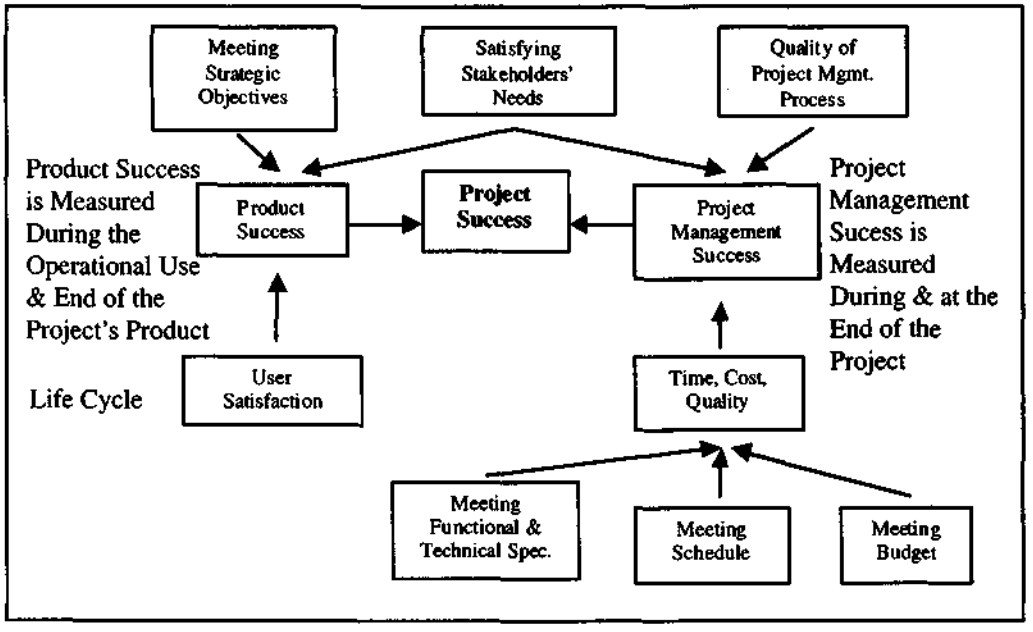

Figure 2: The Cause and Effect Diagram in Defining Project Success

also comprise of five components. They are meeting the budget constraints, meeting the schedule, meeting the functional and technical specifications, the quality of project management process and the satisfaction of stakeholders' needs. The first three components can be defined as cost, time and quality constraints.

Baccarini (1999) further added that a project could be a success despite poor project management performance and vice versa. This confirms the earlier opinion that project failure is not only due to poor project management but also as a result of the failure to fully define and understand the purpose and scope of the project, the organizational goals and objectives (LaPlante, 1995; Lawrence & Johnson, 1997). Even with the use of a wide variety of systems development methods and tools, software projects still have to deal with time and cost overruns and unmet user's requirements. To avoid these problems, it is frequently recommended that risks associated with software project be properly managed. This means that for an effective project management, risk management should be established as an important and integral part of the project management process.

Figure 3 illustrates the relationship between project management success, product success and risk management process which constitute an integrated component in a project management process that focuses all efforts towards the strategic plan of the organization. This requires reinforcing a mastery of both the project management tools and techniques.

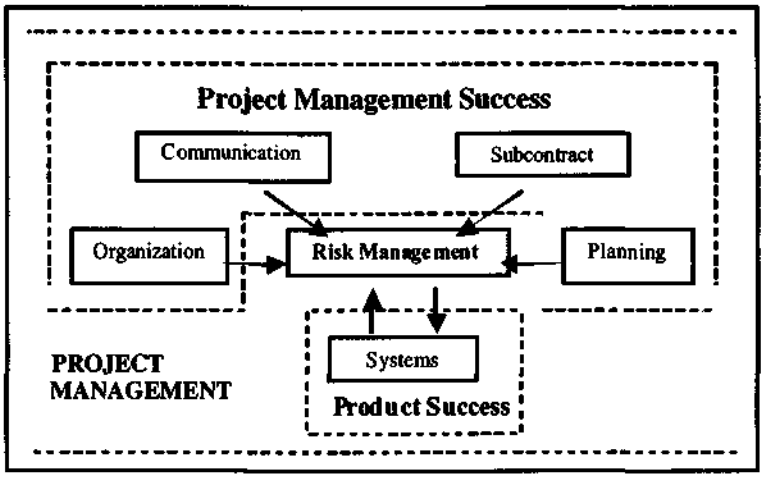

Figure 3: Project Management and its Essential Components

RISK MANAGEMENT

A risk can be described as any variable in a project, which we may or may not have direct control over, that could take on a value within its normal distribution of possible values that either endangers or eliminates the possibility of a project success (Lister, 1997). The key concept of risk management is that it can help software managers assess problem situations and hence formulate proactive solutions (Boehm and DeMarco, 1997). Therefore, the proper application of risk management would enables one to anticipate and to reduce variabilities before they become problems.

It can be said that good project management goes hand in hand with good application of risk management. Such situation provides a disciplined environment for proactive decision making to predict continuously what can go wrong, to determine what risks are important to deal with and hence to implement strategies to deal with these risks (SEI, 1999). Therefore, when risk is proactively managed, fewer surprises occur, and in nearly every organization or business, fewer surprises equate to less worry and more profit (Harrold, 1999).

Down et. al (1994) identified three key elements (Figure 4) in the risk management process. They are:

- Creating the Optimum Risk Environment (CORE),
- Managing the Optimum Risk Environment (MORE) and
- Learning from the Optimum Risk Environment (LORE)

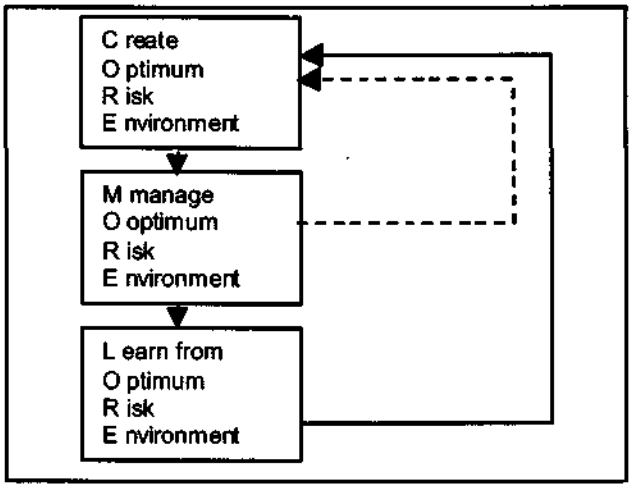

Figure 4: The Risk Management Loop

According to Project Management Institute Standards Committee (1996) project risk management is a subset of project management with four component processes:

- **Risk Identification**: involves determining which risks are likely to affect a project and documenting the characteristics of each.
- **Risk Quantification**: involves evaluating risks and risk interactions to assess the range of possible project outcomes.
- **Risk Response Development**: involves taking steps to enhance opportunities and developing responses to threats. The output of the risk response development process is a risk management plan.
- **Risk Response Control**: involves responding to risks over the course of the project. Outputs of this process include corrective actions in response to risks and updates to the risk management plan.

The U.K. Association for Project management on the other hand distinguishes nine components or phases involved in the project risk management (Simon et. al, 1997):

- **Define**: obtain a clear, shared understanding of the project.
- **Focus**: obtain a clear, shared understanding of the risk management process.
- **Identify**: obtain a clear, common understanding of threats and opportunities.
- **Structure**: test simplifying assumptions and provide more complex structure if necessary.
- **Ownership**: clarify allocations of ownership and management responsibility

- **Estimate**: understand which risks and responses are important
- **Evaluate**: diagnose important difficulties and examine implications of different responses.
- **Plan**: produce a project base plan and associated risk management plans.
- **Manage**: monitor and control progress and develop plans on a rolling basis.

Where risks are concerned, a person can either ignore them or take appropriate actions to eliminate or minimize the effects of those risks. With the application of effective risk management, people may recognize and deal with potential problems, even before they occur. This would enable them to produce the finest product, within budget and scheduled constraints (Williams et al., 1997). Lister (1997) listed the following steps that need to be taken to ensure success in software development projects:

- Risk identification
- Determination of the odds of each risk manifesting as a problem,
- Estimation of your cost when risks occur, (i.e. money, time, and effort spent),
- Determining the priority of risks to manage,
- Taking action on risks and
- Planning contingency for immediate action.

In line with the layout of this paper, the following section discusses risk identification in more detail.

RISK IDENTIFICATION

Identifying risks is the process of developing an understanding the potential unsatisfactory outcomes associated with a particular project (Schwalbe, 2000). When developing the risk charter an essential step that needs to be taken is to understand the potential sources of risks. In this paper, a review of risk charter is made based on earlier research, namely by Ropponen and Lyytinen (2000), Chatterjee and Ramesh (1999), Keil et. al (1998), Moynihan (1997), Gemmer (1997), Barki et al (1993), SEI (1993), Boehm (1991) and McFarlan (1981).

A risk charter acts as a checklist in the efforts to identify risk factors for software projects. However in order to develop a meaningful risk checklist, it is necessary, firstly, to classify the risks into five components parts;

- Systems Risk,
- Planning Risk,
- Organization Risk,
- Subcontract Risk, and
- Communication Risk.

Systems Risk

In systems risk, the uncertainties in technological advancement may change the environment causing continuous stream of changes in the requirement of features during the course of development of the project (Chatterjee and Ramesh, 1999). Integrating and interfacing the new systems with the existing and other related systems is very important. This is because of the potential impact the new system may have on other systems in the organisation. The consequence is unnecessary risk. It needs to be emphasized that complex projects, usually involving more than one functional unit, more often contain higher levels of risks.

All variables dealing with the systems functionality must correctly be loaded either from the user or from the technical point of views (the latter procedure must satisfy the user interface, core functions and correct property) (Ropponen and Lyytinen, 2000). Adding unnecessary features to software because of professional interests or pride or user's demand can be an added risk. (Boehm, 1991).

Planning Risk

Requirements definition has a profound effect on a project's scope where the criteria used are based on the size and complexity of the project. Inadequate project specification is the most frequently mentioned barrier to project success. Poor mastering of performance requirements, may, typically put personnel involved under major stress in the late stages of a project development and thereby increases personnel risks (Ropponen and Lyytinen, 2000). Due to the uncertainties in the price and the failure to consider resource usage required for the implementation of a project often results in the failure to schedule the resource accurately or may not even be done at all. Scheduling timing risks is related to the difficulties in scheduling the project correctly such as problems in timetable, actual cost as against the estimated costs and changes in timetable (Ropponen and Lyytinen, 2000). Industries that have no standard application and low certainty in the functionality is by far more difficult to schedule as compared to industries that have standard application such as retail and hotels industries.

The lack of standards, limited use and experience in software risk management can contribute to the increase in the risk factor. This again may lead to poor planning, ineffective scheduling, controlling and replanning of the project management. This calls for the need to recognize the uniqueness of the project, the application size, complexity and the organizations environment before setting up the project (Barki et al., 1993).

Subcontract

The larger the size of the project, the more subcontracting will be needed and thus leading to increased risks. This requires ample experience and training in project management

and risk management methods, without which shortfalls may occur. Shortfalls in externally finished components will produce poor quality systems and shortfalls in externally performed tasks will produce a poor quality or unpredictable accomplishment of tasks that are performed outside the organization (Boehm, 1991).

In a contract, a manager carries the risk of the project going wrong. Therefore a contract should be drawn up, specifying the price, delivery date and deliverables. Warranties, user's responsibilities and escape clauses should also be included in the contract.

Communication

Lack of communication among various groups of developers and between risk managers and project developers is one of the risk factors. Failure to provide timely and accurate information will lead to bad decision-making. Since, no one person has all the necessary knowledge, decision about a particular situation is usually made with a good deal of uncertainty. Lack of communications can also lead to misunderstanding of requirements, which is viewed as a critical risk factor because the requirements drive the entire projects (Keil et al, 1998). Because risk communication must provide perspective as well as information, we should monitor how people perceive risk and how they act on the perception (Gemmer, 1997).

Organization

Politics can play a role not only in project selection but also in the aspirations behind projects. However because of in influencing power, priorities are usually set without regard to strategic plan. Keil et. al (1998) considered commitment, involvement and competency of the top management as necessary prerequisites for a project to be successful. On the other hand, lack of communications from management and user are looked upon as a risk that may overshadows all others. Keil et. al, also viewed failure to gain user commitment as a critical factor. This is because it helps to ensure that users are actively involved in the requirement determination process and to creates a sense of ownership, thereby minimizing the risk that the system will be rejected.

Inefficient work atmosphere, employee dissatisfaction in their assigned roles and responsibilities and resistance to accept innovations can be considered as additional factor in the risk identification. A key concern for a project owner is to ensure that all project participants are motivated to work towards the owner's objectives for project performance. They also need to be convinced that risk management activities will help them meet their own objectives (Ward, 1999).

Risk Charter

Earlier we have discussed the problem of identifying risks in the risk management process. These include the differences in which different persons look at risks. One way of overcoming this problem is that during risk identification, all potential risks, assumptions and uncertainties existing need to be written down, reviewed and consolidated. This may be done by having a risk charter, which provides a safe course in risk identification. It acts as a checklist to enable a project manager to identify, analyse and prioritise the risks. In the risk charter, the possibility of missing some of the possible risks is very low because most of the possible risks have been listed in the charter. Hence, surprises of any kind will be avoided. Once the risks have been identified and examined, they will be categorized either based on their severity or impact on the project or business, their probabilities of occurrence according to their importance. Following the application of these procedures, an impact scenario will be developed and any consequential impacts would then be forecasted. All these should be embedded in the overall project plan which need full support of managers at all levels of managerial activities in order to achieve the desired results.

The relationship between the components and factors influencing the risk are summarized in the risk charter in the form of a fishbone diagram (Figure 5).

CONCLUSION

In order to survive and be successful in a highly competitive environment as witnessed today, there is a need for sustained innovation and process improvement. Organizations that are best at innovations and process improvements win. The resulting outcome is the development of new projects. In particular, in the development of software projects, the two separate components of project success must be understood and differentiated in the project plan. This explains why project management is no longer a special-need management and it is rapidly becoming a standard procedure in the software development projects. With effective risk management process embedded in project management, potential problems can be recognized and continuously dealt with before they can occur. Hence, by developing the risk charter, the work of risk identification will be made easier. In conclusion the ultimate aim of all these efforts is to produce the finest product satisfying both the budget and schedule constraints.

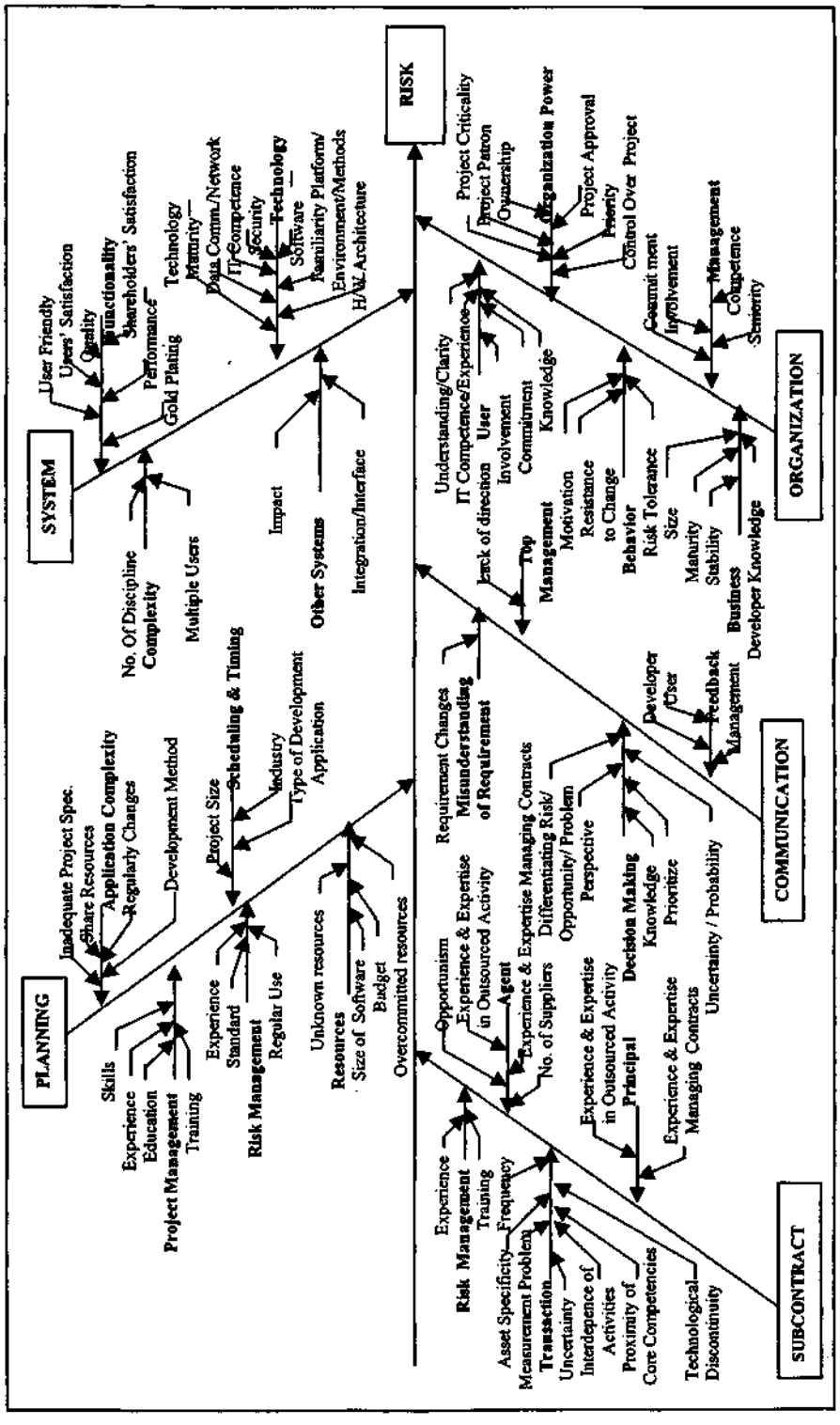

Figure 5: Risk Charter

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