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# **JOB DIAGNOSTIC SURVEY: A TEAM PROJECT INFORMATION TECHNOLOGY PERSPECTIVE**

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***Processo de Avaliação: Double Blind Review***

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## **ABSTRACT**

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This work aims to understand the effects of management styles on the work motivation of a team project in the telecommunications information technology context. To understand this complex behavior, we use the Job Diagnostic Survey methodology. In this critical analysis, we identify the main factors for failure in the field of telecommunications. The managers need to implement a methodology and define processes and formal procedures that need to be applied during the development of projects to mitigate the risk of failure and maintain control over it. One of the main findings in this research is associated with challenges and motivation by the Information Technology (IT) professionals.

Keywords: Networks; Job Diagnostic Survey; Information Technology; Motivation; Projects.



## 1 INTRODUCTION

Even with the recent global financial crisis that destabilized the international market and many investors in 2009, the telecommunications market, or simply telecom, has maintained its project planning. Companies in this industry have invested resources to develop innovative products in order to follow the global technology trends, digital convergence and meet the desires of consumers who historically have been constantly evolved.

In this context, the Information Technology (IT) area, has a fundamental organizational strategic importance, which technically enables the services and products required. Over recent years, there has been a steady demand for IT professionals in various places worldwide. These professionals, in general, have a workload justified by different priorities, confidentiality and urgency to launch products.

Moreover, they often need to communicate in a second or third language, interacting with professionals from different cultures, and we can admit differentiated requirements technically and mentally, in personal appearance, these professionals spend days away from their families which requires an emotional ability and are generally deprived of performing a series of personal activities and sometimes subject themselves to work in unsafe places in the political or natural.

According to Shanks (2009), considering all these aspects that surround the professionals involved, the type of management applied to these teams appears as one of the main factors for success or failure of a project once that if properly applied, teams tend to show higher motivation and technical performance, which implies growth potential of quality of service and decrease problems. On the other hand, if not properly implemented, risk factors for the project may be expanded as reduction of personal motivation, service quality.

Therefore, considering the scope presented before, the subject of this work can be characterized as understanding the effects of management styles on the motivation of the work of a team project in the Information Technology context.

The failure of a project on its initial plan can be caused by different reasons and factors, e.g. sudden changes in the original project scope, requirements definition failures, problems with people management, shortage of qualified professionals to perform

specific activities, motivation, global economics, security, and even environmental disasters.

It is justifiable, and even understandable, that the progress of a project can be affected by external aspects that cannot be managed or contained in a timely manner. However, generally, the failure of a project caused by manageable factors that can be conducted by managers with skills is a situation that can bring negative consequences to IT companies.

In their critical analysis of the factors for the failure of projects in the telecommunications field, managers need to implement a methodology and define processes and formal procedures that will be applied during the development of projects to mitigate the risk of failure and maintain control over it. There are various managerial implications that, if not properly treated and not considered the relevance that they have, can contribute to motivation in IT, and hence increase the probability of failure. Such aspects may be, for example, a policy of reward misguided, lack of communication and knowledge of the technical requirements for the project, or even constant changes in resource allocation.

Considering the consequences of deployment and management style of motivation and performance in workgroups, from the perspective of the management process and the IT operation teams, this paper is focused on the recognition and assessment of potential factors associated with the management style in IT projects involved in the motivation level conference teams, changing the level of commitment, performance and identification of the work done.

The rest of this paper is organized as follows. On the next section, a relevant literature review is provided. On section 3 a method that has been implemented is detailed. Finally, section 4 concludes the paper and discusses possible extensions.

## 2 LITERATURE REVIEW

The growing importance of the Information Technology area in the organizational context and strategic enterprises has brought considerable challenges and obstacles regarding the organization and management technology. Information systems have gradually become sources of competitive advantage, and therefore companies often seek and value innovative and motivated professionals. However, as the development of innovations is a task usually assigned to systems analysts and programmers, the quality of the final product depends more on the technique, motivation and tracking these professionals than on processes or methodologies for software development.

As usual in the production lines, the end goals and expected quality are more easily achieved when there is a management process throughout the life cycle of a product development. Thus, project management can be defined as a set of aggregated actions, properly executed, which converge to the achievement of specific goals and objectives of the project. Planning, organizing and managing resources can be identified as managerial procedures relevant to this context.

An information technology project can be defined as a product initiated and sponsored by the IT department of an organization. Or it may be a component of a wider product initiated and supported by other areas of the organization. The study by Hackman and Oldham (1974) indicates that the motivational aspects at work are related to factors such as professional identification, communication, autonomy and significance of the work performed. Thus, one can assume the existence of a potential correlation between motivation and management style.

Hanisch and Wald (2012) show the contingency theory in project management and emphasize that external factors were incorporated in project management recently. This context is important to project managers because it has a direct impact on their projects, and they can better understand the factors that influence the projects, such as motivational aspects. The author's findings about cooperation and interaction in project teams are relevant.

Howell et al. (2010) discussed some characteristics of project management an approach exploring the discussion about lack of tools, the focus was on contingency theory. And in the case of projects in IT, there are external limitations that impact directly on the

team performance. It is clear that contingency factors have a direct impact on the project performance or results.

Smith et al. (2011) highlighted the implications that stress and optimism have in the projects conducted by IT project managers. The successes of these projects are affected by this variable, so the manager has to supervise them carefully. Since optimism is not realistic, it can act in a negative form in a project. The authors conclude that optimism improves the relationship with the project team and stakeholders, and the team achieves a better level of productivity. The contribution of the authors to create a realistic optimism and control the stress in IT projects can be structured as the following framework:

- Executive support, appropriate project plan, tactics established to control schedules and minimize risks/uncertainty reduce of stress and increase of optimism
- Develop professional relationships
- Motivate the project team
- Develop general management techniques
- Develop abilities to act in difficult hours
- Minimize external factors as soon as possible

Anantatmula and Shrivastav (2012) highlighted the generation Y working with others generations. It is important to measure the impact of different generations in a project team. The authors found that 41% have one or more years of experience. Another interesting finding is the fact that the Y generation, when compared to other generations such as Generation X, Baby Boomers and Veterans, valorizes the same factors, like adaptability, team orientation, multitasking, technical competence and respect for diversity.

Canonico and Söderlund (2010) studied the multi-project organizations (MPOs) and developed a framework to management control in MPOs; it is clear that when there are several projects, these varieties affect the management style. The authors analyzed Simons' framework and its combination to support project activities. Krane et al. (2012) discussed the conflict between the project team and the project owner associated with potential risks. Operational risks were reported as the main focus of conflict; so it is

notable that strategic risks are not prioritized in projects. This issue can create a risk associated with variables in the project strategic plan.

Davis (2011) discussed the emotional intelligence of project managers and its impacts on interpersonal competence. Cavaleri and Reed (2008) highlighted leading dynamically complex projects exploring systems thinking, knowledge processing, and action learning. Shao et al. (2012) related a measurement program based on delivery capability, organizational capability, marketing capability and innovative capability. Aubry et al. (2008) stressed the history of PMOs. Kaulio (2008) drew attention to the incidents that project managers can encounter in multi-projects. The main issues were technical difficulties, group dynamics, as well as client and peer relations.

Rwelamila and Purushottam (2012) reported the challenges in Africa where there is inadequate knowledge of project management and there is no sufficient training. Crawford (2005) highlighted the senior management perceptions of project management competence. Ritson et al. (2012) reported the impact of alignment on successful programs. Buys et al. (2007) pointed out the construct validity of the revised job diagnostic survey.

Recent results of research conducted by the Project Management Institute (PMI) shows that approximately 72% of executives are concerned about having managers in charge of their projects. Of these, 92% believe that this is an effective way to get success in their projects. Based on these numbers, one can say that project managers are important professionals within the strategic context of the organization, responsible for the development and deployment of value-added products to business enterprises.

According to Kappelman et al. (2006), a successful project management is critical to the organization performance and also to the personal and professional growth of all individuals involved, including executives, managers and project team. However, to achieve an adequate project management, the application of knowledge, skills, tools and techniques in each of the planned activities is required, so that they meet the requirements of each project.

Processes that involve project management can be classified into five categories or procedure groups: Startup, Planning, Executing, Monitoring and Controlling, and finally Closing. Other activities are included in this process, e.g., identification of requirements, communication with project sponsors (stakeholders), management of scope, budget, schedule, quality, features and rich project (PMBOK, 2008). Without the influence or the adoption of a methodology for the project management on the





management style used in a project, it tends to fail by not having a well-established organizational planning, taking into consideration all the activities and processes expected to be undertaken.

Additionally, Kappelman et al. (2006) conducted a survey with 138 experienced managers in large IT projects / Telecom who were tasked to list the main problems of their projects and rank them on a scale of 1 to 7 points (known as 7-point scale) for the level of importance in relation to the strategic goals and objectives of the projects.

They identified all risks or that the real problems were divided into three groups: Social Risks, Risks of Project Management and Technical Risk. In a more simplified context, these three groups can be understood as People, Processes and Products, respectively. The conclusion of this research was that 32% of the problems are considered critical and they all boil down to two main groups: People and Processes. The evidence presented reveals that the relationship among people and management practices is a potential factor in determining the success or failure of an IT or Telecom project. As a consequence, the project managers have been seeking to develop or enhance the project management methodologies that have a greater focus towards the management of people.

### **P-CMM: People Capability Maturity Model**

Through a globalized economic environment, companies have become increasingly exposed to fierce competitions. To remain competitive, organizations have sought to engage and motivate their employees towards their results, encouraging creativity and ability to function within an organizational context actively. The P-CMM is a tool that allows the gradual implementation of a set of management practices and workforce development. The main aim is that this force is an independent center intelligence focused on organizational goals and strategies.

The P-CMM is a methodology for managing people with a focus on projects that seek to achieve some goals with the development of individual capacity, building workshops and organizational culture, motivation and performance management, and finally the workforce development.



The P-CMM consists of five maturity levels. The relationship among the maturity levels and the process areas defines the practices to achieve organizational maturity in relation to people management and, therefore, to project.

### **Study of motivational aspects of environmental professional**

Managers are continually challenged to motivate their teams to work towards the success and achievement of organizational goals. However, they also need to encourage people to pursue their personal and professional goals (SHANKS, 2007). Nonetheless, because human behavior is complex to the point of having different individuals motivational factors and goals, managers must have the necessary ability and insight to understand that their subordinates have different needs that can be motivated in distinct ways.

According to Beecham et al. (2007), the motivation is cited as a major personal problem in the IT area, and is considered an important factor for the failure of projects. Motivation is a subtle factor, difficult to quantify, and is usually behind other factors that seem to be less important but easier to quantify. Every organization knows that motivation is important, but only a few take steps in this regard. Many management practices exchange large growth opportunities for personal and professional motivation for small gains of methodology or budget, increasing the risk of failure of IT projects.

IT specialists have a professional profile whose differential motivational factors are not related to performance, sometimes similar to other professionals. This particular profile, according to Capretz (2003), is considerably motivated by factors related to the nature of work and activities. Therefore, among the various existing motivational models, the procedural models considers motivation as the result of a series of related factors – is the best fit for IT professionals. For them, in a comprehensive manner, motivation generated in the professional environment is a consequence of the existence of meaning and identification with the work.

According to Shank (2007), motivation is the act or process that encourages a person to perform an action. Thus, even though managers exert significant influence on professionals, they are not capable to motivate them to act by themselves. Managers should provide types of incentives that influence IT professionals in various forms and



ways, e.g., facilitate the learning of new technologies, rearrange activities, improve working conditions, perceive work, give autonomy and sense of responsibility, among others.

The factors leading IT professionals to consider the possibility to change jobs are assorted. However, this decision is usually encouraged by organizational situations related to work environment, management of practices or rewarding policies.

According to Humphrey (1997), technical professionals seek activities that require different skills, expertise, that make them valuable tools to the business, and that also have a positive impact on the lives of others, whether belonging to the internal or external organizational environment. Thus, the work takes on a significant value motivated by the challenges that must be overcome. The fascination and commitment to the results extend to the time the problem is finished, and so happy with the experience and knowledge gained, these professionals seek other challenges that foster greater professional growth.

However, that work has meaning full for IT professionals is expected that the organization pursues a policy of recognition and reward that is also consistent with those adopted in other organizations for the same type of activity. This makes professionals feel valued, empowered and motivated to perform their activities.

When the organization does not provide favorable conditions for the professionals to deem their work significantly, either for cultural reasons or management decisions, it increases the likelihood of turnover of professionals involved. IT professionals tend to identify with their work when managing organizational values and give importance to the permanence and continuity of activities they perform. When this does not occur, it is likely that professionals will not develop a sense of loyalty to the organization. It is important for the development of the work identity with the fact that the IT professional notice that is effective and essential part to the addition of a job with organizational strategic significance.

Another relevant factor for professionals to identify themselves with their work relates to the management workload. It is common for IT individuals to experience situations of pressure and workloads higher than in other sectors, especially when they are involved in large projects. However, an excessive workload put these professionals through stressful situations and physical exhaustion. This commonly leads to loss of quality of work, creating unnecessary situations and rework in the future. As IT

individuals tend to associate the results with their self-esteem, this may cause a lack of motivation and productivity.

According to Langfred and Moye (2004), autonomy provides motivation, information and structure of processes. Professionals who have autonomy to carry out their activities within the limits established by the organizational management tend to be more committed and dedicated to their activities. These professionals develop a sense of responsibility for the product developed by them, and become more aware of their activities. That means that they are motivated to evolve, maintain and improve their products when they have an aggregated material in relation to organizational strategic objectives.

Another effect that produces autonomy is the ability of communication and information that the professional is replaced with their managers since him responsible for the first product developed. It is often necessary to advocate the professional status of their products in management meetings, making them relevant to the strategic context of the organization.

Autonomy also causes structural processes since managers need to have control over the activities of their subordinates in a clear, objective and comprehensive way. Meanwhile, the structuring procedures generates a work environment more favorable and acceptable to all.

Therefore, professionals who do not have any autonomy in their jobs tend to be less committed, less dedicated and perform their tasks poorly. Plus, the channel of communication between managers and those professionals is restricted. This does not create a professional environment that motivates and stimulates the turnover of individuals.

There should be pointed out that the process of giving and receiving feedback is essential for the development of an IT team. Without feedback, the IT professional can perform actions or seek unproductive goals that have been already achieved. The lack of communication and working relationship with IT managers causes discouragement, compromises productivity and the involvement of professionals.

Professionals who have ideas or suggestions that are often ignored by their managers, who find it difficult to opine on matters that involve the entire project team or have difficulties to exchange knowledge with other professionals including their managers tend to strongly consider the possibility of changing their job, thus increasing the level of turnover and demotivation.

## **JCM & JDS: motivational model features of the work and its analysis tool**

The motivational model based on the characteristics of the work, known in the literature by the acronym JCM (Job Characteristics Model), was developed by behavioral scientists Hackman and Oldham between the years 1974 and 1976, based on other motivational models developed by renowned scientists like Herzberg, Turner and Lawrence, and Blood and Hulin. The JCM, considered an evolution of the previous model, developed the theory that the work can be designed to have characteristics that create conditions for the development of a higher level of motivation, satisfaction, quality and performance in relation to work.

The job characteristics theory describes the relationship between job characteristics and the response of the professionals to them. This theory specifies the working conditions in which individuals are subjected to, and where they are expected to thrive and have a good professional performance. For this purpose, the JCM studies five basic characteristics related to work that lead individuals to develop three states of fundamental psychological benefits to achieve personal and professional achievements (FATUROCHMAN, 1997).

This model indicates that the basic characteristics of the work they do with individuals to develop specific psychological states, which influence positively to the achievement of personal and professional achievements. According to Hackman and Oldham (1976), psychological states are crucial to the model of motivational job characteristics as individuals have a high level of motivation and satisfaction on receiving information on ongoing basis results of activities carried out with commitment and who have personal and professional significance.

The three psychological states are defined below:

(I) Tasted Meaning of Work: The degree to which the individual experiences the job as something significant, value-added and whose results are important for the organization or for the lives of others.

(II) Experienced Responsibility for Work Achievements: The degree to which the individual feels committed and responsible for the results of the work.



(III) Knowledge of Results of Work Activities: The degree to which the individual knows and understands in a continuous manner how effective his performance was in a particular activity.

According to Hackman and Oldham (1976), there are five basic features of work: variety of technical skills, identity and work, work meaning, autonomy, and feedback. The first three characteristics influence the individual to reach the psychological meaning of work:

(I) Variety of Technical Skills: The degree to which the job requires an individual to a variety of different skills and talents to perform activities. When this occurs, invariably that activity is considered significant by requiring intellectual and motor skills of the individual, causing him to devote efforts to complete the activity.

(II) With the Identity Work: The degree to which the job requires the individual to terminate an activity that has a value in a complete way, from the beginning to the end. Thus, the practitioner is significant considering the work once and sees that it comprises the use of fully a developed product. Individuals who carry only a small part of a product without knowing its purpose or scope tend not to consider the work as significant because of the lack of visibility of the utility that the product provides.

(III) Meaning of Work: The degree to which the job has a substantial impact on the lives or work of others, either within the organization or in its external environment.

The following basic feature of the work influence the individual to reach the psychological state conducive to the responsibility in performing the work:

(I) Autonomy: The degree to which the job provides substantial freedom, independence and discretion to the individual to decide and determine the approach and procedures to successfully carry out a particular activity. In these circumstances, the individual feels fully committed and responsible for the success or failure that may occur.

The ultimate basic feature that influences the individual to reach the psychological state of knowledge with respect to the results of work activities is:

(I) Feedback: The degree to which carrying out the activities required by the job results in getting clear information about the effectiveness of individual performance.

The JCM allows calculating the motivational potential (Motivating Potential Score – MPS), which reflects the level of internal motivation of a group of individuals. This



potential depends exclusively on the motivational level of experimentation psychological states achieved based on job characteristics (FATUROCHMAN, 1997). The motivational potential of a job will be high when it shows a high level of satisfaction in at least one of the basic characteristics that influence the psychological state of the meaning of work, a high level of satisfaction with the self-employed, and also a degree of positive satisfaction about communication and feedback aspects. The calculation of potential motivational level involves three psychological states, and therefore five basic characteristics of work. Then, through this calculation, it is possible to identify the factors that impact positively and negatively the motivation of a group. Since the basic characteristics of work conditions are created through management practices, then, based on the motivational level of one's staff, IT managers can identify the strengths and weaknesses of their management. The tool used to calculate the level of motivation of each item searched by the JCM methodology is known as Job Diagnostic Survey (JDS).

### **3 METHODOLOGY**

According to Hackman and Oldham (1974), this research tool, known as JDS, provides measures for each theoretical concept evaluated by the methodology of motivational work characteristics. It assesses basic characteristics such as variety of technical skills, identity with work, meaning of work, autonomy and feedback. Additionally, two other secondary characteristics can be evaluate by JDS: feedback of others and working together with others. These latter characteristics are useful to understand how people react to situations of work since they are also encouraged by style or managerial practices.

The evaluation of the characteristics allows the calculation of the potential motivational indicate that the level of satisfaction of individuals surveyed in relation to style or mode of management. This evaluation is performed in a controlled manner to consider the differences in responses. For this, the JDS is divided into five sections where job characteristics are evaluated in sections 1 and 2; critical psychological states and affective reactions to work are measured in sections 3 and 5; section 4 is used to

evaluate satisfactions that are also specific factors that contribute to personal motivation.

Each item searched is usually evaluated in two distinct sections through written questions both positive and negative (in reverse). This procedure is required for an item whose evaluation is performed based on more than one response. Thus, the item is measured more precisely, increasing the reliability of the survey. In each section, respondents should mark the answer that best fits their realities for each item studied. Generally, each response has a specific weight that ranges from 1 to 7 including written questions in reverse order. The final scale of a searched item is obtained as the arithmetic means of all responses related, as explained by Hackman and Oldham (1974). The JDS can also calculate the potential motivation for a group of individuals also possible to calculate other indexes, such as the degree of will of power for professional growth (Growth need Strength) and the use of other formats of research. However, this work is restricted to the calculation of the MPS and its relation to management practices. Using this tool to study other approaches requires directed study and complementary to the given order.

Considering the methodological approach and the orientation of research as to its classification approach, the guidelines in this study show the interest of seeking to understand and become familiar with this phenomenon, i.e., understanding the influence of management of the internal motivation of the IT professionals involved in telecommunications projects, in order to identify the critical factors of management, allowing, thus, the reengineering and redesign of the management processes applied.

The contribution of adopting a methodological aspect to this study is the ability to understand the phenomena related to the effects of management style, and the identification of critical factors related to the internal motivation of IT professionals. For this reality to be examined with scientific rigor, it will require the application of the characteristics found in the discussion of the research. That is attention is needed to prepare the planning, control and choice in search of objects and methods.



## ***Testing***

Therefore, this present study identifies itself as a qualitative research aimed to have an understanding of real situations involving the management practices of IT teams, and intents to create an evaluation model that allows management review in order to enhance the management methods applied in projects, i.e., based on the knowledge gained through the application of an exploratory research.

## ***Sources***

Data sources represent the sources collected that will be used to generate essential information for the development of the research and its findings. Thus, this work involves literature searches regarding the survey of literature that has been published on the subject and also field research that aims to deepen the knowledge of the subject that has been studied. These methods clarify the concepts, help to trace the final design of the research study and similar researches by checking their methods and results. The field research, particularly, uses the method for collecting data through questionnaires, interviews, among others.

## ***Population and sample***

This paper considers as the population of this research IT professionals who participate in international projects in the telecommunications industry. However, as a valid and representative sample of this population, only professionals working in Latin America, with the development and implementation of a given billing system used by many companies in the sector in four of the five continents, participated in this research.

Particularly in this case, the sample consists of professionals with skills, roles and positions with different techniques. The need for this segmentation occurs after conducting research questions defined for this job.



### ***Procedure for data collection***

The process of data collection adopted in this research was conducted by a questionnaire that was developed based on the theoretical methodology Job Diagnostic Survey (JDS) created by Hackman and Oldham (1974). This questionnaire, with the permission of the respective managers, was ran among professionals who are part of the sample selected for this research.

This process was carried out through digital files that were sent out electronically to the participants, as well as interviewing them in order to obtain data in a faster way or additional information that would be relevant to the development of this work.

According to Hackman and Oldham (1974), this questionnaire, composed of questions that are correlated to managerial aspects, allows the calculation of the potential level of the motivational team that was researched.

### ***Limitations***

Although the number of professionals working in international telecommunications projects is significant, the access to them is sometimes restricted, either because of distance, availability or even the because of the policy implemented in the projects. For that reason, most of the professionals who participated in this research work in projects in Latin and Central America. This can result in an outcome subject to American characteristics of project management and also in cultural aspects.

## **4 CONCLUDING REMARKS**

According to Hackman and Oldham (1976), there are five basic features of work: variety of technical skills, identity with work meaning of work, autonomy, and feedback.

The first three characteristics influence the individual to reach the psychological meaning of work. Variety of technical skills: the degree to which the job requires an individual to a variety of different skills and talents to carry out the activities. When this occurs, invariably that activity is considered significant by requiring motor and intellectual abilities of the individuals, causing them to devote efforts to complete the activity. In the IT perspective, this represents a critic dimension.

Identity with work: the degree to which the job requires that individuals finalize an activity that has a value in a complete way, from the beginning to the end. Thus, the professionals shall consider the significant work since they understand and see the use of a fully developed product. Individuals who perform only a small part of the development of a product without knowing its purpose or scope tend not consider work as significant, because of the lack of visibility of the utility of that product.

Meaning of work: the degree to which the work has a substantial impact on the lives or work of other people, either within the internal or external environment of an organization.

The following work of the basic characteristic influences the individual to reach the psychological state that is most suitable to the responsibility for carrying out the work.

Autonomy: the degree to which the job provides substantial freedom, independence and discretion to the individual to decide and determine the approach and procedures to successfully perform a particular activity. In such circumstances, the individual feels fully committed and responsible for the success or failure that may occur.

The last basic feature described influences the individual to reach the psychological state regarding the knowledge of the results of the work activities.

Feedback: the degree to which the performance of activities required for the work result in getting clear information about the effectiveness of individual performance. The motivational potential for work will be high when feedback is given a high level of satisfaction in at least one of the basic characteristics that influence the psychological state of the meaning of work; and also a good degree of satisfaction with the communication aspects and feedback. In this survey, it was identified that networks of complex and challenging projects are critical to motivate IT professionals.

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