Sustainable Competitive Advantage: Toward a Generic Framework

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Abstract
This paper is going to discuss, how companies or organizations can sustain competitive advantage using the best practice of Lean and Six Sigma Techniques through organizational learning and business intelligence in order to develop CRM competencies and manage high performance using efficiency process and quality process. However, in order to sustain a competitive advantage, more than one variable determines a company’s profitability, learning and how business entity works as a system using I/O and feedbacks included by several models within Value Chain and Service Engineering but only if managers are planning to treat customers as a set of transactions based on their purchases. This is one way to show how a sustainable competitive advantage will work.

Keywords: Lean Six Sigma Techniques, Organizational Learning, Business Intelligence, Customer Relationship Management, Dynamic Capabilities, Sustainable Competitive Advantage and Service Engineering.

1. Introduction
Business in today’s world has become very complex which is why it requires a certain set of tools to manage its day to day workings. These tools can help the organization transform its traditional activities with up to date information management systems. This actual business process change came about in the year 1990 when companies employed software technologies embedded in the systems to handle their information flow. This helped with not only their decision making abilities but also improved their planning, performance and level of activities (Harmon, 2007).

Many of the historic business processes have been taken over by the concept of Total Quality Management (TQM). These historic processes are shown in Figure 1. The business management system entirely transformed the operation carried out in the business world and focussed on improving operations throughout the systems to generate high levels of performance. TQM constitutes within itself a wide range of ideas and concepts. It takes into account all kinds of Operational Activities being carried out in businesses and provides standards for their Quality Control. These kinds of controls were bound to improve the performance of the organizations. TQM not only improved performance but also helped evolve the traditional systems into automated processes to make them faster and more efficient. Take for example, departments like Information Technology and the Business Process Redesign, which have widely made use of these management systems to improve the level of activities. Not only small organizations but also the larger companies have moved towards TQM. Furthermore, Lean Six Sigma is part of the TQM concept which focuses on process redesign initiatives (Service Engineer) as well as efficient process management systems. Nevertheless, the IT departments usually require this kind of system for their automation systems and redesigns processes which is why they highly depend on this system.
1.1. Lean

Lean strategy is an aspect that focuses on reducing costs by eliminating waste to carry out efficient activities. When companies move towards a Lean Thinking (LT) process they first distinguish the value added activities from the non-value added activities (Antony, 2010). That is, done by identifying the steps of the non-value added activities and then they try to eliminate waste from the entire system as a whole. These processes consist of tools which help eliminate set up times, lead times, inventories, rework etc. This concept was developed by the Toyota Production System (TPS) as it suited their kind of manufacturing business to a great extent. A four step thought process shown in Figure 2 shows how Lean works in the activities.

- Identify the value steps from the beginning to the end of the lifecycle.
- Eliminate those value steps which are not efficient.
- Then leave behind value steps to be joined together tightly so that the work flow is smooth.
- Let the customers extract value from the rest of the activities after the work flow has been set.

In Figure 2, it is clearly seen how the value was identified and then the waste steps were eliminated to make the process more efficient. LT is initiated by the top management which then trickles down into the rest of organizational levels to carry out its efficient use in the best manner. The concept of LT has become so popular that companies are now using it for not only their production departments.

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<tr>
<th>1980s</th>
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<tr>
<td>Total Quality Management (TQM)</td>
<td>Six Sigma</td>
<td>Lean Six Sigma</td>
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<td>Capability Maturity Models (CMMI, BPM)</td>
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<td>Process Frameworks (SCOR, ITIL, cTPI)</td>
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<td>Business Process Architectures</td>
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<td>Enterprise Architectures (FEAF)</td>
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<td>Structured Software Methodologies</td>
<td>UML, MDA</td>
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<td>Expert Systems</td>
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<td>Packaged Software (ERP, CRM)</td>
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**Figure 1**: Business process management movement (Harmon, 2007)
but also for their service, retail, distribution and other kinds of extensive variety of activities.

**Figure 2: How Lean works (Lean Enterprise Institute, 2009)**

### 1.2. Six Sigma

In the year 1982, Bill Smith an engineer at Motorola came up with the statistical concept of Six Sigma. This approach helps in the improvement of business processes output which are invaluable to the customer. It helps deliver solutions and final results effectively. Furthermore, Six Sigma identifies and eliminates defects in a process which are considered either harmful or deliver low quality. Moreover, they help speed up processes and products along with reducing the process average variations.

According to researchers Six Sigma is a tool which helps measure time-based performance to achieve maximum productivity in both operations and project levels. (Elhaik and Alaomar, 2006). In the above statement time based performance refers to the lead time, cycle time and delivery speed of the product and in today’s dynamic business environment if these aspects are not efficient then the organization suffers great loss. It has also been stated that the I/O of the system should be clearly defined to eliminate any kinds of waste in the entire production. This will help achieve new levels of excellence in performance. (Elhaik and Alaomar, 2006).

### 1.3. Lean Six Sigma

When comparing the two quality improvement techniques in Table1, it was noticed that both focus on process flow, Professor T.N. Goh said, as cited by Antony (2010). Both will also be able to eventually bring about competitiveness and quality in the business processes, Professor Sung Park said, as cited by Antony (2010). However, several differences are also present which show that the LT method is based on the process steps of production and any kind of activity. On the other hand though, Six Sigma only caters to those steps in the value chain which are poor in performance. Lean techniques are based on qualitative methods whereas Six Sigma focuses on being within the steps so it can clearly state the non-value added ones (Antony, 2010).

As stated by researchers the two statistical concepts need to be used together to create high levels of performance that generate maximum impact (Drickhamer, 2002). He believes that by just implementing Six Sigma, the performance cannot reach its maximum potential as LT eventually brings about the concept of Six Sigma. The application of six sigma and LT is vastly seen in production organizations. However, service organizations still have not been able to efficiently make use of the tools even though it could bring down their cost to a great extent (Fraser, 2010).

### Table 1

<table>
<thead>
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<th>Lean</th>
<th>Six Sigma</th>
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<tr>
<td>Improve speed to market</td>
<td>Translate strategy into action</td>
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<td>Avoid backlog build-up</td>
<td>Avoid downsizing measures</td>
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### 1.4. Process Modelling

Nowadays most processes are considered to be flexible enough to let the workers manipulate them in any way they like. If these workers do not work with efficiency they could create many loopholes (El-Haik and Al-Aomar, 2006). Take for example an ATM. The work of this machine is to receive input from the customer about their personal
information and then generate transactions by rebalancing accounts and dispensing funds. Figure 3 shows that the same work done by the Input Process Output (IPO) can be done by the computer (El-Haik and Al-Aomar, 2006). As shown in Figure 4 the same activity can be carried out by the IPO and this concept can also be extended to SIPOC (supplier input process output customer) which refers to the supply of the input and the receipt of the output as shown in Figure 4.

![Figure 3: IPO diagram (El-Haik and Al-Aomar, 2006)](image1)

![Figure 4: SIPOC (El-Haik and Al-Aomar, 2006)](image2)
To achieve an operating system when delivering to a customer which is embedded with quality, it is necessary to keep three things in mind as shown in Figure 5.

- The attributes of the product or service is according to customers’ needs and wants.
- The value delivery process is speedy and highly efficient.
- A fully integrated and well developed life cycle of a service or product should be created.

### 1.4.1. Customer Relationship Management (CRM)

Customers are considered the heart of any business. It has become very important for organizations to understand the needs and wants of its customers and to deliver products accordingly. However, the entire strategy of the organization needs to revolve around satisfying these customers (Rodgers and Howlett, 2000).

It is due to this thinking today that the concept of Customer Relationship Management (CRM) has risen. Since the time CRM has been implemented, it has only been used in the sale department which deals with the customers. However, this concept should be distributed throughout the organization rather than limiting it to one department. Other departments include supply chain and finance which provides better performance and then in turn boosts information flow and communication. For this purpose companies can also create CRM which can receive information about customers’ data, then verify this information and remove information that is not valuable and then finally use the value to improve performance. This ongoing process will satisfy the customer and help organizations deliver services through concrete and relevant information systems (Rodgers and Howlett, 2000).

In addition, Information Technology has made the most use of the concept of CRM. The suppliers of software programs create such products which are directly related to the needs and wants of its customers. These specialists are able to create a niche in the market since customers are satisfied and their needs are provided for. On the other hand, many companies focus on cutting costs...
through streamlining their processes but now it has become their priority to spend on the needs and wants of their customers and cut costs that are unnecessary. This automatically brings efficiency in the organization (Rodgers and Howlett, 2000).

1.4.2. Service Engineer

There has been confusion for a long time about how services and processes of organization should be made more efficient. “Services are often engineered in process, changing with each unit of production. Identifying service has been stated as service are products that are processes” (Sampson, 2010). The ability to simplify the service world in unified theory is important for its use. Unified service theory (UST) is founded on the I/O model of process as in Figure 3 and 6. There are a large number of elements to consider in studying the I/O model in order to identify suitable ways for transforming these process inputs into outputs. In other words, if the processes are managed well, the transformation using the I/O model will also be effective (Sampson, 2010).

UST can be defined as a universal process which aims to deliver satisfaction, value and utility of the product to its customers. (Evenson and Dubberly, 2010) When talking about production processes, UST includes activities which are directly involved with the customer like personal information, data and the interaction between them. However, in the service industry it is referred to as performance delivery and how new innovations can be brought about to deliver them in a better and creative way. For example, a firm uses a hybrid solution to satisfy its customers. It aims is to involve both aspects of product and service development to gain the loyalty of the customer. This kind of overall customer loyalty goes a long way for the organization and adds value not only to its name but also its finances. Now the customer would be willing to pay for the company’s extra ordinary personalized service.

Figure 6 shows that the UST consists of a distinct characteristic service which is very different from an organization which does not cater to this kind of service. This has been highlighted by an arrow and shows the suppliers as the inputs and the customers as the outputs. This application can be used in many departments of IT Services, Health Care and Education Policies (Sampson, 2010).

2. Business Intelligence

Business intelligence (BI) is a valuable methodology which helps to make thorough observations about the data and information systems of an organization. It is a tool that analyses both the internal as well as external data that is stored for decision making purposes. It helps reduce the companies’ costs and increase its revenue and performance. To create a competitive advantage in the market, firms need to understand that efficient use of relevant information is required. Businesses may all be different but their core activity is to analyse the trends in the previous data to make future decisions. This is possible with the help of these business intelligence software’s. (Olsen and Cooney, 2011) Programs like ORACLE, SAP, SAS and IBM all understand the importance of software and are fully integrated with these information systems.

BI constitutes within itself a wide range of applications that support business activities. These include data integration, information/analysis methods and customer programs which are combined to create valuable performance and competitive businesses. BI works best in organizations which are complex in nature. They competitively handle the activities of these organizations need and carry out customer satisfaction and can be altered at any point in time. Efficient customer service programs are essential for any kind of business and these BI systems are able to provide immense assistance in this field. BI is able to succeed with flying colours if the IT activities and business operations strategies are all aligned together in an efficient manner.

Even though BI provides the above mentioned benefits, there are 5 strategic barriers that have been identified by researchers Williams (2011). These barriers can create several issues for the professionals. Therefore, BI not only provides benefits and has strength but also comes with some weaknesses and challenges for users (Williams, 2011).
2.1. Capabilities Levels and Value of analytics

Continuous process improvement at every phase is needed to be embedded in the system. Figure 1 shows a CMMI model which is used by organizations that are in the initial stage of information and skill gathering. This model has been divided into six levels for the purpose of clarity and efficient application for the process of continuous improvement. (Zhu, 2010) The maturity of these six levels in a business software process capability can also be measured by referring to Table 2.

<table>
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<td>Capability Levels (Zhu, 2010)</td>
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<td>Level 5</td>
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Several researches have proved that organizational performance can also be improved with the help of Process Oriented Dynamic Capabilities (PDCs). These systems are considered as the firm’s ability to make positive changes throughout the organization. These PDCs help a firm realize its potential and then change its processes in areas like integration, cost reduction and BI to achieve the maximum levels. PDCs are also used for superior levels of performance. This is achieved by using internal - external information for better performance and decision making and at the same time configuration and reconfiguration, deployment and redeployment of the resources used in business. All these activities need to be sorted out to cater for the vision and mission of a firm (Kim et al., 2011).

Information Technology and the use of IT appliances have become the backbone of business organizations. To meet developing challenges organizations employ advanced IT infrastructure which increases the firm performance. These two aspects have a very strong connection which is researched on several levels. (Devaraj and Kohli, 2003; Tanriverdi, 2005) Studies are trying to understand the core value of these IT systems along with their efficient capabilities and the potential to transform an organization as a whole. Every level of management is required to participate and understand these systems and integrate systems and solve issues in an efficient process and thorough comportment (Kim et al., 2011).

Day to day challenges are increasing and it is evident that organizations who transform themselves are able to resolve these issues easily. Results have shown that 44% of respondents were twice as likely to consider that the challenges of the firm were difficult to resolve instead of 21% of respondents who thought it was easy. Organizational issues were considered difficult by less than one third of the respondents of transformed organization that is 30% compared to three of five respondents or 60% from the apparitional organizations (Kiron and Shockley, 2011).
There has been an increasing trend in business not only aiming to create value but also gain a competitive advantage in the market. In the year 2011, a survey conducted by MIT Sloan Management Review showed that more than 4500 respondents that are 58% claimed that their organizations were able to gain competitive advantage up by 37% from last year (Kiron and Shockley, 2011). This is shown in Figure 7. But it is also noticed that these companies used extensive amounts of software and data programs for their financing and several other distribution related activities. The companies who lag behind in adopting these kinds of software are seen to be failing day by day.

The question arises whether the limited resources of an organization should be put into investing in these data analytics and if they will be able to provide the required value? It is obvious that these will benefit the organization to a great extent; however, it is necessary that the company only uses the kinds of software that it actually requires and does not spend extensively on something it doesn’t need. The man power assigned to these should also be efficient otherwise the entire investment will be useless and no value will be created. It is necessary that the right people are employed that understand the complexity of the situation and adapt the correct use of these software systems (Kiron and Shockley, 2011).

If people are asked how efficient they are they will say 99%. But when the amount is 110 billion dollar and the 1% is 1.1 billion then 99% is not good enough, it is the 99.9% that is considered to be as good which is 100 million. However, this will also not be good enough and the data and analysis will require a further level of accuracy (Kiron and Shockley, 2011).

BI is used to generate value by enabling a corporation to increase its revenues, trim down its costs, or together leading to advanced income. Nonetheless, every firm has diverse strengths and challenges when it comes to achieving BI success and Williams (2011) has acknowledged five strategic barriers that can cause economic professionals and the companies they dole out to struggle with capturing the verifiable benefits of business intelligence.

Therefore, organizations today have transformed themselves from the traditional to the analytical kind to create a brighter future with satisfied customers. They have incorporated effectively and efficiently within themselves the strong concepts of Information Management and its Analytical Requirements.

3. Competitive Advantage

A competitive advantage (CA) of a firm is basically the edge that it has over its competitors. It can be in the form of increased number of sales margins or ability to retain its customers. Firms today are faced with many difficulties and challenges which need to be encountered in an efficient manner to make sure their competitive edge remains strong in the market. Managers need to clearly understand what their competitive advantage is in the market and then explore this to a great extent to create a distinctive image (Harmon, 2007).

According to Porter (2008) there are many kinds of CA that exist in the economy today and this could be the products they produce, their distribution systems or their customer service programs. Figure 8 clearly illustrate Porters (2008) model of CA within Value Chain. It shows how all the operational activities are focussed on the production activities and the IT. Accountings as well as support activities are all part of the same Value Chain. This clearly shows that the organization requires incorporating within itself all sets of activities from the point of production to delivery and after delivery services. This will help
determine the cost of the activities and the margins they will gain (Harmon, 2007).

The value a customer is provided with depends on his perception along with his willingness to purchase the product. Therefore the two kinds of core activities that have been extracted from the value chain Figure 8 are:

- Specify the activities which contribute to cost leadership and differentiation.
- Find the main source of competitive advantage.

Apart from the Value Chain, Porter (2008) also introduced the Five Forces Model which is shown in Figure 9. The five forces are:

- New Entrants: Scare off new entrants by keeping a strong competitive advantage and keeping the fixed costs of the business high.
- Threat of Substitutes: Offer better products so that substitutes do not take over the market share.
- Supplier Power: Keep the needs and requirements on a standard level so that the supplier does not have power over you and you can switch anytime.
- Rivalry: Beat rivalry by keeping prices competitive and the product is widely distinguishable amongst others.
- Buyer Power: If services provided by the companies are satisfying the customers then it would be hard for them to switch over.

![Figure 8: Michael Porter's generic value chain (Harmon, 2007)](image)

![Figure 9: The Five Forces that shape Industry Competition (Porter, 2008)](image)
To compete and achieve the right competitive advantage is when the appropriate opportunity is present in the market. If these are attractive enough, the firms can compete and struggle because eventually it will provide high levels of payoff. If the right opportunity presents itself and the firm applies its relevant and realistic sources to achieve the competitive advantage it deserves, then in the future it can deliver high levels of performance (Bingham et al., 2011).

4. Organisational Learning

Organizational learning (OL) is considered a strategic asset for any organization to survive successfully for a long period of time (Hult et al., 2002). It has also been noticed that by learning about topics of new invention growth (Baker and Sinkula, 1999), the tactical supply process (Hult et al., 2002), customer orientation (Hult et al., 2001), market orientation (Santos et al., 2005), and the market program changes is bound to generate performance excellence (Sinkula et al., 1997). However, the accurate scope of measurement of organizational learning has still not been identified (Bell et al., 2002).

Research carried out shows that organization learning was more beneficial for the use of traditional values of the firm. This was clearly noted by Baker and Sinkula (1999) and Santos (2005) that values do foster learning but they need to be such to welcome new adaptations. Several other authors, for example, Bapuji and Crossan (2004) both believe that the firm can continuously innovate its processes and products if it is able to incorporate this kind of learning which leads to sustaining a strong competitive advantage (Kandemir and Hult, 2005).

When there is continuous information and knowledge coming into an organization through the internal and external sources the organization needs to enrich it and make the most of it (Sa´nchez et al., 2009). If the organization uses this knowledge for its advantage and decision making it will be able to create for itself a strong position in the market place. It is a well-known fact that learning enhances business activities. (Prieto and Revilla, 2006).

Another most important aspect that needs to be discussed is the value that is created for a customer in an organization (Beverland and Lockshin, 2003). On the other hand, for organizations it has become a definite purpose to first understand the needs and wants of its customers and then produces according to these needs and wants. Otherwise the customer will be dissatisfied and the product will fail. If the elements are understood in an efficient manner (Golfetto and Gibbert, 2006) it is on the cards that the organization will maximise its potential and create value in the overall market (Kang et al., 2007).

Each customer has his own needs and wants and it is necessary for firms to cater to their separate personalized needs (Sa´nchez et al., 2009). Once this value has been created it can then be sustained by using the above mentioned Six Sigma aspects of accuracy, precision and effectiveness in business processes (Giardina, 2006). To carry out this activity successfully a lot of finance is required along with manpower and resources (Alsagheer, 2011). It is therefore necessary for the firm to take stock of the overall benefits and decide if people are actually willing to bring about a change and it is worth it to spend on this change (Shrivastava, 1995).

5. Conclusions

For effective process at first and repeat measurements for efficiency and to compare results with competitors it is vital to sustain CA within the role of CRM and to enable ISP and the use of BI to build a hybrid solution. For example, measuring effectiveness of a process or service with CRM process with efficiency has different types and terminology as shown in Figure10 as performance framework (Tenner and DeToro, 1997).

The relationship between both efficiency and effectiveness is the performance measurement framework in which the framework measures the process itself and not by examining the output or by asking the customer.
<table>
<thead>
<tr>
<th>Terminology</th>
<th>Explanation</th>
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<tr>
<td>1. Process or Efficiency</td>
<td>Resource consumed in the process relative to minimum possible levels.</td>
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<td>2. Output or Effectiveness</td>
<td>Ability of a process to deliver products or service according to specifications.</td>
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<tr>
<td>3. Outcome or Product/Service</td>
<td>Ability of outputs to satisfy the needs of customers.</td>
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<td>effectiveness and Customer Satisfaction.</td>
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**Figure 10**: Performance measurement framework (Tenner and DeToro, 1997)

**Figure 11**: Performance as a function of Sigma (Tenner and DeToro, 1997)
Furthermore, this tool eliminates waste of money, people and time. “Efficiency is subordinate to effectiveness (Tenner and DeToro, 1997). Figure11, illustrate this and their ability to sustain, as companies go from one level to another of CMMI which is important. It shows improvement of performance and functionality which leads to sustainability within Sigma functionality.

The higher level of Sigma operates in measuring process in organization or company within CMMI, the lower the variability and results would appear and variation is reduced. However, variation will always be there but in smaller variations (Tenner and DeToro, 1997).

The range of these measures in service will spotlight on speed, cost quality, efficiency and effectiveness. All these can be made strong at Six Sigma level (El-Haik and Al-Aomar, 2006).

The following Figures12, 13, 14 and 15 show how this process is capable and can be sustained.

**Figure 12:** Highly capable process (El-Haik, Al-Aomar, 2006).

**Figure 13:** Six Sigma capable process short terms shift (El-Haik and Al-Aomar, 2006).

**Figure 14:** Six Sigma capable process long terms shift (El-Haik and Al-omar, 2006)

**Figure 15:** DMAIC process (El-Haik, Al-Aomar, 2006).

Therefore, defining the opportunity and customer requirements is vital to lead to the second step, which is ensuring sufficient set of measures such as, process stability and initial capability and the need to analyse the data to determine the critical inputs and former factors is immediately after that and its required in hybrid CRM for the purpose of improving the process based on new knowledge in BI. That is, the last step for sustainability driven by controlling the process and implementing sufficient controls to sustain the gain. That is, the role of Six Sigma and how it does change over time. Nevertheless, it is a process based line of attack and high level of IPO, process mapping,
value stream mapping and value analysis as well as process management system to learn the vital of accepting the measurements system. In addition, once those are understood, companies and organizations can evaluate the capability of the process to meet customer requirements and demonstrate those into transactions based on customer purchases by carrying out hybrid process of Sigma, its outputs are profitability within DMAIC tactic and management of shifting their capable processes in the long term, for example, the process of loyalty program in CRM. That will strengthen and enhance the analysis of CRM to satisfy customers and build long term relationship and loyalty not only to our products and service but also for the company itself. As one satisfied customer will communicate and recommend them to four other potential customers, whereas, an unsatisfied one will narrate the bad experience to at least twelve others, harming the reputation of the company. That is why as Peter Senge said “The ability to learn faster than your competitors may be the only sustainable competitive advantage”.

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