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PRIORITIZING KEY SUCCESS FACTORS TO BE TAKEN IN ACCOUNT TO SELECT QUALITY VENDORS FOR OUTSOURCING SOFTWARE DEVELOPMENT PROJECTS

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ABSTRACT

The objective of this paper is to identify the factors currently taken into account for selection of vendors while outsourcing software development projects, and also to clump up such factors which make up an even more saturated segregation technique. We performed a systematic literature review wherein we took account of various research articles and boiled them down to our own conclusions. Performing a Systematic literature Review has let us put forth such factors in which previous models can be categorized and also helps in scaling the vendors to find one that suits the best for a particular project to be outsourced.

Keywords: Software Development, Data Security, Cost, Testing, Quality, Maintenance.

1. INRTODUCTION

Outsourcing has been a business strategy in existence for around 40 years, which has its perks and negative effects too. A strategy where in a specific part of a project or the whole of it is given to a third party which is specifically better at that particular operation or part of the development process. The idea of this processis very beautifully summarized in a statement made by **Mr. Peter Drucker**, "Do what you do best, outsource the rest." who was an American Management Consultant and his work contributed to practical foundations of modern day business corporations. This process of outsourcing has, in a chain of events, created other complexities which led to defining a procedure of selecting an appropriate vendor for the work to be outsourced. This paper is concerned with the criteria and procedure of vendor selecting for outsourcing a software development project on various grounds. This paper proposes such factors on which we think a vendor should be evaluated and selected, as of all the outsourcers would want the project to be completed in time, the optimized codes or algorithms, with the minimum possible costs, to go through the most rigorous of testing techniques (so as to avoid failure while working with it in real time) and other which will be listed out and graded in the later part.

Also this technique came into existence when the organizations grew, reached the far off shores across the seas, and also the markets where the need of a low cost work was very much increasing and also with the best possible accuracy and optimization. As the need of a low cost, more efficient, made in much less time and a quite accessible product came in, the idea of outsourcing hit the IT industry because of reasons that are obvious. The reasons being low cost man power available overseas with more optimized work and accuracy at the particular task, such as some firms do specialize in testing an IT product, some are good at making the best out of need and many more.

We looked through previous works done in the field of IT outsourcing which relate to the testing of a software, method followed in the development, the approach to identifying the problem, ethics of the vendor company and also found a technique known as Offshore Software Development Outsourcing (OSDO), where the name itself tells about the technique, this is the practice of hiring an organization rather external org. to whom the project or a part of it is to be outsourced.

Now here in this paper talks about the procedure to be followed to assess the pool of vendors in the market to find the one that suits the requirement of a certain project. In order to do so we've listed down factors that could play an important role in the assessing the vendor. The factors are '

- What steps are followed in software development process?
- How efficient is the vendor?
- What certifications does the vendor has?

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- How good are the testing techniques followed?
- What level of data security doses the vendor provide?
- How has been the vendor's performance in the market for the previous years?
- How good are the vendor's finances?
- How ethical is the working culture at the org.?
- What is the global reach?

These areas are the ones which we feel should be taken in account also these would be the questions that come in an outsourcers mind while analyzing a vendor to give away a software development project, here these factors cover all the areas of assessment where an outsourcer needs to know the vendor.

Up ahead there are brief takeaways, from our research, about these criteria we think should be considered. A literature review was also performed, which led to conclusions that will be studied in deep with this research, also gathered statistics for what amount of work we gathered up and what relevant things have been done it the past, and for now we try to bridge the gap between previous works done and what could be the newer scenarios, because ethers been a lot of changes in the previous working protocols and now, which increases the complexity of the system and pushes us to implement newer strategies bring out newer criteria to assess onto. For that we've here brought out some factors in a broader view which could help the new day offshore software development outsourcing in deciding a vendor, which would take in account all the factors right from the acquiring of the project to the testing of a particular IT product. Also the vendor is scaled on its financial performances which would in turn help out in the commercial aspect of software development outsourcing.

2. PAST OVERVIEW

Dickson (1966) conclude that in most of the research the major factors for selection of suppliers are capacity, Total price, quality of product, delivery time.

Single objective was considered as a problem in the early criteria for supplier selection, these problems may consist of reduction in product cost, reduction in delivery time, ensure quality product. Timmerman (1986) used weighted linear models for single objective.

Later studies show that multiple factors should be taken in account in order to get a better outcome, so in the 1980's various mathematical models were designed to solve multiple objective problems. AlsoDegraeve (2000) concluded that because mathematical models approach the problem in objective manner as it optimize an explicitly stated objective function, therefore mathematical model are better than rating models, these models are also used to optimize the supplier selection in order to achieve higher concentration of objective function which are based on the problem faced by buyers and suppliers.

Talluri and Narasimhan (2003), Guneri et al. (2009) proposed linear programming as a mean to solve this multiple objective problem. Other than this Integer and non- linear programming were also proposed. Kannan (2013) in review of weber and Ellram (1993) proposed multi-objective programming, this type of approach is used in JIT scenario. The main advantage of Multi-objective programming is that it can handle varying numbers of suppliers.

Weber (1996) in his work has shown the efficiency of Data Envelopment Analysis (DEA) especially in case of multiple conflicting criteria. DEA is an optimizing method. It measures technical efficiency by building a score of relative efficiency as a ratio of single virtual output to a single virtual input. When there are multiple input and multiple output which make the comparison difficult, in this case DAE can play an important role.
Ellram (1995) concluded that Total Cost of Ownership (TCO) is very important for organization in order to achieve better understanding and manage their cost of product, TCO also includes costs other than purchase cost and in Addition to the cost of product Total Cost of Ownership (TCO) may consist of Cost of order placement, Cost of research, Cost of transportation, Cost of quality check, and Cost of inventory, Cost of disposal and many variety of such cost.

In Analytical hierarchy process (AHP) primary objects which affect supplier selection criteria are grouped under three categories: performance assessment, business structure capability assessment, quality system assessment (Bard, 1992). AHP provides a framework to cope with multiple criteria situation involving intuitive, rational,

qualitative and quantitative aspects (Bhutta et al., 2002). Most of the supplier selection problem involves intangible factors in that cases AHP is used as the decision supporting model.

Analytical network process (ANP) is special case of AHP, which is independent of the attributes of criteria and selection problems are defines as network. T.Sari (2016) concluded that ANP gives more accurate results. The multi-attribute utility techniques including AHP and ANP dominate other techniques because of their effectiveness in rating and task choices (Chai et al., 2013). Other than this method Multi Attribute Utility Theory (MAUT) was introduce to handle multiple conficting criteria existing in international supplier selection (Stewart and Mohamed, 2002; Zionts, 1992).

3. BODY

Getting to the core factors, which will be discussed in this part in a brief manner. A pool of factors has been out thee which can be considered while selecting a vendor but here is a segregation of all such factors.

While an outsourcer is looking for a vendor, for a particular project, there are certain factors which would outweigh the others, such an example is discussed ahead.

For instance a firm which may be on the last stages of a project and the testing part is to be done, but unfortunately so there could be certain circumstances under which this testing could not be performed at their own end and henceforth this organization goes all out t0o look for a vendor who specializes in software testing. Here in this case the software testing capability may outweigh the specific vendor's software development procedures, because of the outsourcer just wanting to get the product tested.

Herein with keeping these criteria is mind we propose a method which would help out outsourcers in the selection of vendors by scaling them on a score scale.
STEP I: grade each of the nine factor listed here on a scale of 1-10 (10 being the best and 1 the lowest). Assign a variable to this score $\mathbf{P_s}$ **-** standing for priority factor scale.
STEP II: as these get them in descending order, so as to know what factors top the priority list.
STEP III: collect a pool of vendors, of which the possibility of getting a suitable vendor is most.
STEP IV: Grade each vendors on all of the factors listed, giving away a score from 1-10 for each (10 being the best and 1 the lowest). Assign a variable to this score $\mathbf{F_s}$ - standing for assigned value of a particular factor for a particular vendor.
STEP V: Now put the values in the devised formula.

$\mathbf{(P_s/10)*F_s= W_{sf}}$

$\mathbf{W_{sf}}$– weight score of specific factor

3.1 Software Development

In the "old way" of looking at software development is described:
"Conceptually, the requirements document gets tossed over the wall into the designer's cubicle, and the designer must come forth with a satisfactory design." [4]

Building software consists of various stages of development:

- Formulating requirements
- Planning
- Designing
- Coding
- Testing
- Setup
- Maintenance

In order to select the vendor according to the requirement it is necessary to know and understand the model of software development implemented by his firm.

"Software development methodologies follow two major philosophies: heavyweight and lightweight."[1]. Heavyweight methodology is easy to implement and is suitable where the requirement for project is unlikely to change. These types of methodology have greater appeal to the owner as they results in proper documentation.

Lightweight methodology is suitable where the requirements are not clear and have greater tendency toward change. Lightweight methodology have higher tendency to accept the changes therefore they are more flexible. Lightweight methodology also forces the higher involvement of project owner which result in higher requirement satisfaction.

Heavyweight methodology

Waterfall**:**

This model breaks the project into basic elementary tasks, which are to be carried out in the proper sequence. In waterfall model next step is initiated only if the previous step is completed. This results in solid documentation after each step. Waterfall methodology has higher risk of error as the error in initial stage may be carried throughout the chain therefore it is only suitable for small scale software development. Waterfall includes requirements definition, architecture design, detailed design, implementation, component verification, integration verification and requirements validation.

Incremental:

Incremental model is modified version of waterfall model. "By breaking the project into a series of small subprojects [increments]" []. In incremental model main focus is given on construction of subpart of final project. Selection of this subpart can be done randomly, either the difficult subpart can be constructed at first or the easier one can be constructed at first. Different subpart can be taken in consideration for construction at same time "this approach can decrease the calendar time needed for the development, that is the Time To Market (TTM)"[2]. Incremental model focus more on design instead of documentation. This model is suitable for medium and large.

Spiral:

Spiral model is known as Boehm's model. In spiral model project is broken into series of cycle and each of this cycle is initiated by evaluation of risk. Process is shifted to next cycle only if all the risk and errors involved are eliminated with the help of testing. This model is applied to project having higher risk, so that when risk are higher the project can be terminated and this will reduce the cost involved in it. Project is subjected to repeated cyclic phase until it is ready of real time setup. Spiral model is suitable for medium and large scale project. Feedback is taken after the first iteration of project.

Rational Unified Process:

RUP model divide project into cycle and each cycle work on new variant of the project. "The RUP provides each team member with the guidelines, templates and tool mentors necessary for the entire team to take full advantage of the best practices."[3]. RUP prioritize risk handling and involve feedback at initiation of each cycle. In order to implement RUP highly qualified professional are needed. RUP is suitable for all small, medium, large scale projects.

Lightweight methodology

Rapid Application Development:

Rapid application development model helps to achieve higher rate of software development with high quality as compared to other methodology. "The model is considered to be incremental development model and that have emphasis on short development cycle"[3]. Advantages Instead of focusing on planning Rapid application development emphasis on development. RAD has higher involvement of feedback after completion of each module which makes it suitable for all small, medium, large scale projects.

Scrum:

Scrum methodology believes in team coordination and overcoming issues by operating project in team. Scrum is the best methodology which enforces face to face communication which leads to knowledge sharing among different department which in return provides more effective problem solving. Team formed can be classified into two groups self-organizing and cross-functional. Each such team consists of designer, programmers, evaluators, managing authority. Scrum is suitable for all small, medium, large scale projects.

Prototype model:

This type of model actively involves the project owner as continuous feedback is taken after completion of each prototype. This methodology consist or development of prototype of the same software with basic requirements and then they are refined to acquire the specific requirement. This model involves over exhausting process and

more costly as all the demo prototypes are meant to be discarded. Prototype model is suitable for small and medium projects.

3.2 Data Security

Business Process Outsourcing is common these days, as this helps firms to focus on their core business. BPO comes in many different flavors all of which provide an upside on the cost savings front first.

But the benefits provided with the outsourcing like reduced cost, increased efficiency etc. comes a need to provide outsourcers with access to some of the most sensitive data of the organization. So, along with the benefits of BPO comes an increased risk to data.

Over the years there has been a rapid increase in data theft is seen that causes a massive losses to the organization which comes in form of compliance issues, brand risk or customer concern. If you cannot protect your data, you put your business at a risk. Thus data risks are an inherent problem for the companies that outsource.

Successful outsourcing wants successful risk management. It also requires new view of data security which ensure the company's important data to be secured totally.

A certain amount of risk is a natural part of business. But when it comes to data, many companies have been forced to accept more risk than they might otherwise be comfortable with because the bottom line benefits of outsourcing outweighed the risks. That tide is now turning and it is turning for a number of reasons.

Increased risk to data, in the form of mass data violation has heaped pressure on organizations that store and use sensitive data. Fallout from data violation does not stop at brand busting. Fines and legal issues resulting from data violation have become more complicated and much more costly.

Fortunately, where once there was a insufficiency of methods in detecting malicious activity with data, now there are dozens of new techniques available to solve such problems. These new techniques are helping to tip the risk vs benefits scale to the point where organizations with outsourcing projects underway are taking a second look at their BPO data risk suppression techniques.

When it comes to outsourcing, this problem is magnified by the fact that the users accessing the data are not inside of organization and may be on the other side of the globe. This is where a new view of data security comes into play. Traditional data security is a methodology based on controlling access to data. The idea is to maintain a tight control over who has access to data.

Access control still is an important component of an effective data security program, but it does not address outsourcing data security issues, or any insider threat to data – because it cannot detect malicious activity by authorized users at core data servers. The users who pose the greatest threat to data are those who have the credentials to access the depths of the data center where all of the critical data assets are stored. This could be an employee, an outsourced partner or a data thief.

The new intelligent data monitoring technologies watch what is happening to data in real-time and analyze what the activity means in relation to a pre-defined set of potential risks and past behavior of the users in question. The beauty of the 'innocent until proven guilty' approach is that it enables a relatively free flow of data for business outsourcing activities but provides a window into those activities that gives you control over data assets when necessary. Thus, by giving up the illusion of control, you gain real control over what is happening to your data.

BPO providers are increasingly putting checks in place to prevent misuse of sensitive client data, but effective data security and compliance requirements still call for the enterprise to know what's going on with outsourced data. This means closely monitoring the use of data by outsourcers.

The first step in securing outsourced, or any critical data for that matter, is data discovery. Knowing where specific data assets reside and who is accessing them will provide the basis for an effective monitoring program.

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Once a benchmark for data location and access has been established, policies for monitoring, alerting and reporting can be created.

The second step is compliance. Even though these regulations look complicated, the auditing requirements are very straightforward. Actions such as alerting and pre-scheduled reporting can be written into policies to automate the monitoring process even further. Creating policies for data theft is also fairly straightforward. There are definite signatures for theft—such as: highly sensitive data accessed, data accessed at odd times, unusually large downloads or, more importantly, certain combinations of these--that can easily be captured in policies.

Determining the right solution for your organization depends on several factors including how many data servers you need to monitor, how much traffic flies over your network and what type of output you require from the system — types of reports, workflow features, alerts, etc. So, there is a way to have your outsourcing cost savings and data security, too. But it requires a slightly new way of looking at data security — that is, from the data core out and as a problem of insiders that need to be monitored.

3.3 Total Cost of Ownership

The concept for total cost of ownership was seen in action in late 1980s as a basic evaluation criterion for investment in personal computers. TCO can be defined as “the sum of all the expenses and costs associated to the acquisition, ownership, use and subsequent disposal of a good or service”.[50][1].Today, TCO analysis is supporting the purchasing decision and procedure for wide range of assets, majorly including the products with large maintenance cost and operation cost across ownership life.

In counting ownership life there are major three more classified lives present in it Depreciable life, economic life and service life. Period of an asset for which depreciation expenses are charged by its owner is termed as depreciation life. Time period of an asset when it returns more value to owners than its cost to own, operate and maintain is called as economic life While duration of an asset for which it is actually in service is called as service life.

It has been seen that companies are getting privileges by implementing it since TCO improves decision making, decreases communication gap between different departments of purchasing process, also provides the performance of choices for investment. Apart from these privileges companies adopting TCO are resisted by barriers of culture, lack of individual training and lack of resources for implementation.

TCO analysis reveals uncover hidden cost, alerts for the upcoming problems, saving cost, avoidable costs. The analysis provided by the TCO gives the mentioned points in useful manner, which seems to be helpful and efficient for industries .These analysis broader prospective helps the industries in different manner .These analysis are the result of the inputs which have to be done in TCO. The scarcity of resources for calculation seems to be the most difficult part in TCO analysis. Apart from that there are numerous advantages for industries to enjoy, which help them in getting profit.

Tco is able to uncover both type of costs associated with an asset that is obvious costs and hidden costs. Obvious cost are the cost which are familiar to everyone while hidden cost are those which can be easily overlook and omit by everyone. The obvious cost can be production cost, purchase cost while hidden cost can be upgrade cost, enhancement cost, setup cost, deployment cost, disposal cost, financing cost, security cost, insurance cost, infrastructure cost, environmental impact cost[54].TCO analysis helps to uncover all the possible hidden cost, which causes problems and losses to the industries. By these analysis, industries can have in detail study of such costs and can take the necessary steps towards them.

The problems which seems not important presently but can cause great loss in future can be easily identified by it. It alerts about all the minute problems which can be converted into loss. By using TCO analysis industries can plan, measure and control these cost problems. There are certain cost associated with an asset which can be avoided for cost reduction in large purchases, which however helps the consumer in reduced cost. The saving cost can be study by these analyses since the avoidable cost can be identified and reduced so the remaining saving cost can be study and different means can be adopted to increase it also it act as one of the factor while doing purchasing.

Tco analysis supports many decisions in various industries, especially in IT industry. It act as a backbone factor in the processes of planning and budgeting, analyzing capital purchases, vendor selection. TCO provides a complete study of all the possible cost related to a product, so that there can be a comparative study for all the choices available for a consumer. So that the consumer gets an ease for selection of choice, making decisions according to his budget in systematic manner. In IT industries there are many capital purchases, which can be better analyze by TCO rather than any other technique. All possible cost related to it are uncovered by it, and in these manner it helps the industry to have complete look for all the capital purchases analytically.

Now a days outsourcing is widely used by many industries and companies since it increases profit, quality, customer satisfaction and many other reasons as earlier discussed .In outsourcing vendor Selection is the most important part, and it can be better done by TCO. It provides cost comparison of all the available vendors in a broader way. All the associated cost can be easily identified and compared by consumer. There are some cost which can be easily overlook by everyone while selection of vendors , but with help of TCO all the hidden obvious cost are uncovered for the consumer. By TCO vendor selection procedure for industries is also turned to easy.

TCO is used to analyze the information technology product to see the financial impact on these product. Technology deployment can include operation expense as part of TCO .These expenses can be infrastructure cost, training cost, insurance, security, replacement, testing, recovery, backup, electricity, safety, audit, future upgrade, failure expenses, decommissioning.

Apart from software and information technology industries TCO can also be used in other industries like automobile, transportation, manufacturing industries. By having a comparative study between different models a customer can select vehicle of his choice, it is the most basic example for application of TCO in automobile industries. Cost related to vehicle can be compared for ease of consumer selection according to his budget, different cost can be maintenance, fuel cost, repair, downtime, fees, and taxes, insurance.

3.4 Certification

Certification:-

Certification is an important factor which evaluate vendors on the basis of how much he is able to do work. Certification is a useful tool to add reliability, by revealing that product meets the expectations of the customer. Each certification has its own importance and it demonstrates that they possess the experience and skills required to implement, manage and design outsourcing initiatives that have a high probability of achieving an organization's intended outcomes. It also helps the organization to promote itself.

Certifications which is widely used in IT industries that helps the vendor to select the outsourcer are:

1. CMM or CMMI certification:

CMM stands for Capability Maturity Model is a development model in which guidance for improving processes that meet the business goals of an organization. It is not like other models and standards that impose some limitations on the organization's principles.

In today's world each organization want to improve itself so that it can compete in whole world.

This certification increases the brand value of the organization so that the organization perform in the real world at a great value.

It also provide the platform to the organization to grow globally. It also increase the efficiency of the organization by certifying the organization and its each member up to level five. It also certify that organization have a chance to perform globally and provide world class facilities.

2. ISO 9000 certification:

In Business Process Outsourcing quality is the major concern with less cost and great efficiency. ISO 9000 certification is the family that relates with the quality management systems. It includes seven quality management principles.

ISO 9001 is the most important and much needed certification in this family which majorly deals with quality management systems. It ensures the vendors that the organizations is having the appropriate and effective quality management techniques.

It also remove the errors by identifying and implementing the errors in the organization.

3. 6SIGMA certification:

A good outsourcer is always needed to have good business processes that helps it in performing work in best possible way. 6SIGMA certification provides a set of tools that enhances the processes within the organization. It identifies the errors in a business process and eradicate them.

This certification eliminating the errors within the organization and improve its business processes and also help the members of organization in nurturing their managerial and leadership ability.

The certifications examines the organization in planning and preparation by evaluating the vendors and selecting the proper organization. This also provide the relationship management and service quality management and also reduce the risks of cost and risk management. The maximum number of certifications ensures maximum safety to vendors.

3.5 Vendor performance

There are various measure available for companies to get the financial performance of vendors to evaluate them. It also helps the company to evaluate vendor financial performance, which acts as base for company to compare different vendors and select the appropriate for them. As financial performance is one of the most important factor for vendor comparison and selection. The measures are z score and Financial stress score.

Altman Z score is the financial model which gives the possibility of bankruptcy in company, it was created by Edward I. Altman. It gives financial health of company, lower the z score higher is the probability of bankruptcy and vice versa. It give the probability of bankruptcy for company within 2 years

T1 = working capital/total Assets. It measures the net liquid asset of a company relative to the total assets.
T2 = retained earnings/total Assets. It measures the financial leverage level of a company
T3 = earnings before interests and taxes/total Assets. It measures productivity of a company's total assets.
T4 = market value of equity/book value of total liabilities. It measures what portion of a company's assets can decline in value before the liabilities exceed the assets.
T5 = sales/total Assets. It measures revenue generating ability of a company's assets

$$Z\text{-score} = 6.56T_1 + 3.26T_2 + 6.72T_3 + 1.05T_4$$

These a linear combination of ratios for non-manufacturing private firm. There are different models of Z score available for manufacturing firm and others. It has been seen from the previous studies that the model is accurate about 80-90% for preceding one year of the event. The Z score is widely adopted by management accountants, auditors, database systems used for loan evaluation.

Financial stress score gives the likelihood of business failure within 12 months. Company that has ceased its operation with loss to creditors, ceased operations for handling bankruptcy, voluntary withdrawal from business operation without paying to its commitment such a company is said to be financially stressed company. Lower the financial stress score percentile higher the probability of failure and vice versa. The financial stress risk class is the collection of groups which are separated according to probability of failure, it helps the customer to segment there account in different risk group segments of their condition.

Both of the above measures can be used to evaluate the vendors for comparison and to evaluate their financial status, which helps the industries for selection of vendors. The financial status is one of the most important criteria for vendor selection procedure.

3.6 Software testing

Software testing has been an integral part of the software development process, which conducts the job of validating and verifying the software at all levels with the intent to find any and all of faults that might've been overlooked in the development process.

This particular step accounts of more than 50% of software development costs and hence this is to be done with much more priority and also with precision. Henceforth this step is considered as a singular factor in selecting vendors other than the software development process.

Software testing procedure has a whole testing spectrum which tests the software on each levels with different approaches, the spectrum contains

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- Unit testing
- Integral testing
- System testing
- Functional testing
- Acceptance testing
- Beta testing
- Regression testing

The broad classification of thesting techniques is done ion two of the which are

- **Black box testing**
- **White box testing**

These are the two major approaches applied while testing a software product, here the black box testing technique takes in account the outputs or results required by the user. Whereas white box testing may take all of the levels of a single software and to detect logical errors in a program code, debugging a code finding random typographical errors.

Testing plays a significant role in getting the software product finalized and to get it up and running in the market. Here all the pre market testing gets and brings up the flaws which gives and upper hand while using the product and saving time of instant problem facing and breakdowns.

3.7 Ethics and Employee motivation

The performance of any organization can be easily realized by their working ethics and motivation level of their employees. Work ethics can be defined as the values based on hard work and diligence. Realization of company performance can be done by code of ethic. Holding various good work ethics factor not only enhance the goodwill and growth of organization but also advantageous for the employee working in the organization. Various work ethics organization should enforce in their code of ethics are

- Employees equality :
  Ethical organizations have common treatment for all the employees irrespective to their gender, cast, and lifestyle and provides equal chance of promotion.
- Communication :
  As the employees are the back bone of organization there should be equal right to communicate their ideas. There should be transparency throughout the hierarchy.
- Respect for employees:
  Ethical organization respects their employees and in return it enhances the self-motivation among the employees.
- Proper salary and promotion policies:
  Employee should get proper salary as decided and on time. Promotion should be done on the performance basis will in retune increase the participation of employee and leads to greater job satisfaction.
- Working hours and schedule:
  Employees should be properly scheduled in batches to overcome the fatigue and this will improve quality of work. Holidays should be prescheduled and should be circulated among the employees.

To develop a good work ethic organization can

1. Written code of ethics:
   Ethics should be predetermined and should be in a printed form which can be easily circulated among the employees. This will also educate the employee about what an organization want from them.
2. Ethical training program:
   Higher authorities should train the employee as per the code of ethics this will strengthen the basic foundation of organization on initial level.
3. Higher authority should follow the code
   This will set an example in front of juniors and they will adheres to the company code of ethics.

Whereas being a qualitative quality employee's level of motivation became hard to evaluate. Motivation of employees is the key factor which drive them to enhance the quality of work which in return profit them self in

terms of incentives and also profitable for firm in term of increase in goodwill due to higher quality of work. For a small firm it can be easily evaluated by personal interview but for large and offshore firm it is hard to evaluate by individual evaluation.

For large and offshore industries this can be done the method of surveying. This surveys can be conducted by constructing a questionnaire which based on the principle of multi factor analysis. Multi factor analysis is the factorial method in which table is formed and various group of entities are is described by the variable which can be quantitative or qualitative.

Hitka&Rajnoha (2003) and Zámečník (2007) have applied cluster analysis which is a Multi factor analysis method to form a universal questionnaire. Main aim of this methodology is to construct different group of employees having same level of motivation. Then this groups are analyze on the basis of motivational factor which are different for each individual groups. Cluster analysis consist of three major steps. It is initiated by the selection of the particular organization or group then profiling of group is to be done which involves naming of group and followed by description of their characteristics.

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