# An empirical comparison of pricing models in information technology service outsourcing in Indian context

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## Abstract

**Purpose** – The information technology (IT) outsourcing has been inexorably growing in spite of its downsides. The main reasons are financial gains and cost reductions, as well as it allows companies to focus on their core selling areas. Within IT outsourcing, offshoring has become a big success because it greatly reduces costs. Countries like India, China and Philippines are attracting a lot of IT outsourcing work. In order to save costs, companies have to work out the best pricing models with the vendors so enable profitability at both ends. The main pricing models prevalent in the industry are Time and Material (TnM) and Fixed Time Fixed Price (FTFP) alternately also referred as Fixed Price. There are various other pricing models now, which are mainly variations of these. The purpose of this paper is to show an empirical comparison between these models from the vendor's perspective to see which of them has greater acceptability.

**Design/methodology/approach** – The paper is an empirical paper in which literature survey has been done to study various pricing models in the IT service outsourcing industry, on the basis of same, two most used models have been identified, namely, FTFP and TnM, hypothesis were formulated, Likert scale questionnaire was formed. Subsequently data were collected and Wilcoxon signed-rank test was carried out to compare the variables defining the FTFP and TnM models of pricing. In total, 68 firms were targeted and 120 responses were received. The two models were studied against parameters like usage, profitability, risk, deliveries meeting project schedule, good quality code, the pricing model used by respondents' majority of times and whether either of them lead to increasing costs.

**Findings** – This study has found that TnM is less risky for vendors, more profitable and vendors are able to manage better quality delivery compared to FTFP. Also it has been statistically proven that the pricing models TnM and FTFP do not impact the usage and schedules in any way. These are important findings as there have been no earlier research papers which have compared the pricing models with reference to Indian IT service outsourcing industry.

**Research limitations/implications** – The two major pricing models TnM and FTFP are studied in the paper below. Data were gathered from 68 companies. As per results, TnM is more profitable, less risky, does not lead to increasing cost and produces good quality code as compared to FTFP also it has been statistically proven that the pricing models TnM and FTFP do not impact the usage and schedules in any way. The implications bridge a gap between theory and practice, as theoretically many pricing models exist, however, what are practical applications and justification *vis-à-vis* different aspects has not been approached statistically so far in the given context. Further research can be done on other variations of pricing models and to establish which one should be the preferred model and in which circumstances.

**Practical implications** – There are major practical implications of the paper as it fills the gap between the theoretical discussions of pricing and identifies and statistically proves importance of various aspects of pricing in practice.

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**Originality/value** – The paper is original and adds value in terms of advising the IT service outsourcing companies as to which pricing models to use.
**Keywords** Information technology strategy, Benchmarking, Service industry, Fixed Time Fixed Price, Pricing models, Time and Money
**Paper type** Research paper





## 1. Introduction

The information technology (IT) outsourcing has been inexorably growing in spite of its downsides. The main reasons are financial gains and cost reductions, as well as it allows companies to focus on their core selling areas. Within IT outsourcing, offshoring has become a big success because it greatly reduces costs. Countries like India, China and Philippines are attracting a lot of IT outsourcing work. The contracts used between clients (service receivers) and vendors (service providers) in IT outsourcing have details about the type of pricing model to be used. There are different type of external services required by companies, namely, Internet Service Providers, Application Service Providers and Network Service Providers (Lin, 2002). Pricing model refers to the basis on which money will be given to vendors. The two most common pricing models, namely, Time and Material (TnM) and Fixed Time Fixed Price (FTFP) have been discussed in this paper. There are more variations of these models like outcome-based servicing model, etc., which will be discussed as well. Back in 1993 pricing was a big conundrum and companies were struggling to come up with a suitable pricing arrangement in a client server model. Today, however, there are many customized pricing models which are being used per convenience of the client and vendors.

Contracts play a role in shaping up the relationship between client and vendor (Qi and Chau, 2012).

### *1.1 Literature survey*

Pricing is an important of any client vendor relationship (Min and Joo, 2009) (Jain and Khurana, 2013). Vendors are always willing to gain higher value and potentially higher margin of work. Among the contemporary pricing models popular ones are gain-sharing agreements, incentive-based contracts, consumption-based shared risk-reward arrangements and demand-based pricing:

(1) in the gain-sharing pricing the vendors and clients share the gains achieved by applying the expertise;

(2) in the incentive-based contract additional money is paid to the vendor for attaining delivery levels above the contract's agreements;

(3) in the consumption-based pricing model costs are based on the actual usage, for example disk space used or calls received or answered; and

(4) in the shared risk-reward pricing model clients and vendors create a solution or service together and for a defined period of time profit sharing is done by the vendor.

There are plethora of other similar pricing/revenue sharing models available in the business today. Many outsourcing arrangements expect a flexible pricing model (Ekanayaka *et al.*, 2003), some businesses intend to find out the net costs by discussing the benefits of the model in their context (Fink, 2003) (Hong *et al.*, 2010). Pricing is an important aspect of client vendor relationship (Kirti and Chatterjee, 2011).

However, all the above are apparently built on top of the two basic models, namely, FTFP and TnM.

*1.1.1 Pricing models.* About FTFP. In Fixed Price model, the client and the vendor decide on a total price, for the application or product/products that the vendor is expected to deliver over a predefined time frame, before the project begins. This is mostly on the basis of expected time estimated by the vendors' team as well as IT industry benchmarks for work like application development and maintenance. Clients tend to prefer this model if their requirements are clear to an extent (Dasgupta and Mohanty, 2009). Mostly a detailed contract, having details about pricing model, expected gains by clients and adaptability expected by vendors, etc., is favorable to clients (McDougall, 2004).

Fixed pricing can lead to failures if the requirements are not complete or are loosely worded, which is mostly the case. Hence when using FTFP, it is advisable for clients to continue monitoring the project at intervals and ask for demonstrations in a phased manner to check whether the application meets the requirements. Further, constant requirement clarification should be given to vendors as work progresses. The contract should have provision to accommodate scope creeps to ease the process. A key element of contracts is Service-Level Agreements (SLAs). The vendor provides written guarantee of certain services and pays penalties in case it is unable to deliver according to the SLA. However, SLAs can inhibit good work if the client wants to take advantage of technological advancements. Therefore, companies must make SLAs flexible to accommodate changes (Lin, 2002). Vendors also sometimes prefer this model, simply to win more contracts and clients. Companies like TCS, Infosys, HCL and Wipro are using this strategy to beat multinational rivals in getting contracts. Apart from this, large companies can be more efficient by charging in such a way that they can afford hundred team members, however, using efficient mechanisms get the work done by lesser people. This leads to direct savings for companies. In fixed price contracts, companies must drive quality, efficiency and extra value adds to gain customer trust as well as profits. Fixed price requires a lot of monitoring and controlling. A proper contract with clarity in requirements and expectations is a must. Details about how to handle scope creeps and estimate revisions are required. In cases of issues, root cause analysis of issues should be done to prevent recurrence due to paucity of time. Change management should be given proper consideration.

This model involves a lot of negotiation between client and vendor during scope creeps or requirement loopholes. The client would try to include it within agreed price, however, the vendor would like to buy more time and money to deliver them. At times the vendor is forced to compromise on quality simply because of the pressure to complete the project within the agreed time frame. All this may strain relationship between the client and vendor.

About TnM. The TnM model is a flexible model that allows for requirement changes and enhancements. TnM expects companies to set categories of their employees based on the skill level and years of experience. Mostly the designation given to the employees speaks of both. The contract has details about the hourly or monthly rate as per designation (Sneed and Sneed, 1997) (Dasgupta and Mohanty, 2009). Therefore, the billing is done as per negotiated and could be daily, weekly or monthly based on the rates of individual skill sets and hours devoted by the vendor's team. Many a times when the hours are exceeded, the hourly rate is used to calculate overtime. However, sometimes vendors do not claim that unless the hours can be completely justified.

Constant participation and supervision is required by the client as requirements are given in a phased manner and is the responsibility of the client to keep the vendor's team busy. Hence, the client must ensure constant work is provided and needs to provide clarity on requirements in order to prevent rework. Sometimes an upper limit is set to the amount of cost escalations and therefore, it becomes "TnM with a cap." Further in this model, any additional equipment that the client wishes the vendor to buy can be billed to the client (Goldschmidt, 1986). The downsides of this model which makes it unpopular for clients is that offshore vendors tend to overrate employees by billing employees having lower skills at inflated high skill rates (Tarvin, 1992). This is because clients are far off and do not have much interaction with team members. This can be overcome if clients indulge in frequent communication with team members using applications like Skype, Conference Calls or visits to vendor location. Also the client needs to stringently make sure that the vendors' team is working as per estimates of the tasks because billing is hourly. A slack team could unnecessarily bill the clients for efforts not made. Further, TnM projects can fail because lack of good project management, right fund allocation and mismanagement of scope changes.

To summarize, when choosing a pricing model following points need to be given consideration:

(1) Scope: a fixed price contract is appropriate when it is possible for clients to document most requirements and have proper management control in place to handle the project. The users at client side must be ready for the change and must play a role in determining the scope and changes. Proper processes must be in place during transition of knowledge to vendors and during implementation phase. The management should be aware that regular monitoring of work and scope as well as proactive resolution of vendor queries will help in having a successful delivery.

A TnM project does not have a requirement of complete clarity on scope. The intention is to provide vendors with requirement details at intervals. Regular interaction between client and vendor teams is required to ensure clarifications on scope and technical front are made. The vendor team delivers the application in sprints (modules or units of delivery) to the clients and the clients are expected to provide requirement details to the team before work on the next sprint needs to begin. Client monitoring and involvement is highly recommended in this kind of model to achieve the desired results.

(2) Resources: resources in both types of models must have the skillset necessary for implementation. Since the interaction level between client and vendor is more in TnM, resources for TnM projects must be good at communication with international partners.The time to be devoted by resources should be clearly laid out in offshore outsourcing engagements. The interactions between client and vendor team members should be done in the context of the type of model being used. Small changes and clarifications should be quickly discussed and resolved to prevent delays.

(3) Budget and timing: budgets should have been approved before time especially for FTFP projects as the contract states everything based on final delivery. Hardware or software requirements must be considered beforehand to prevent delays in project schedules.

(4) Methodology: the methodology to be used during implementation must be clearly thought of. In case of FTFP, waterfall method can be adopted. However, clearly laid out requirements is a must apart from close client monitoring. Agile methodology (Pressman, 2010) is more suitable for TnM where requirements are given in chunks. Using waterfall methodology in TnM is not suitable and similarly using Agile in FTFP may not be an appropriate choice.

(5) Governance: since monitoring is important for both models, a project management tool can be used for governance and status reporting. This will bring clarity to both sides of the management on a daily basis.

As discussed above there are many other models which are built on top of the above stated models. Also there are contracts where the client reimburses the vendor on certain costs not predicted ahead of time, which is called "Cost Reimbursable Model."

The complexity in the current scenario increases as companies are trying to find a new ways of billing for an "Outcome-Based Model." The Outcome-Based Model implies delivery requirements will be predefined and the billing will be done on the basis of the results achieved.

Projects that are broken into modules with weekly/fortnightly sprints as deliverables have greater chance of succeeding as the client also gets to see the deliverable and rectify any mistakes in requirement and the vendor also tends to clarify requirements for each delivery. Since the payment is hourly/weekly/monthly as per effort made by the vendor, neither one bears the complete risk as well as vendor need not compromise on quality. This speaks in favor of TnM model.

The first hypothesis which can be generated from above is:

*H1*. There is statistically significant difference between whether people have worked more in TnM or in FTFP pricing models.

## 2. Parameters for comparing pricing models

The pricing models can be compared on various parameters to gauge the popularity, risk, profitability, etc. Below are given descriptions of such parameters.

### *2.1 Profitability*

Outsourcing provides an organization the opportunity to focus on its core business and also substantially reduce costs when offshoring. Reduction in costs immediately ensures more profits. Offshoring is a profitable way of doing business (Dunn *et al.*, 2009). At the initial stages and at intervals a client must constantly monitor the operations of the vendors to ensure that work is being done as per expectations. However, once the processes are established and relationship starts, the client can make sure its team focusses on building the core business, which will eventually reap more profits to the organization. Care must be taken to monitor the activities of the vendor from time to time (Antunes, 2003).

In case the FTFP model is chosen, the client will benefit if the complete requirements are known in detail and the vendors' team is also competent. The contract should have realistic details for any scope creeps and should account for the extra time taken to complete those additions to requirements. However, it must be clear that FTFP would not be profitable to clients if the requirements are not clear which then gives an opportunity to vendors to charge extra for every change/addition to the requirement. Loosely worded requirements also can lead to miscommunication of

requirements to vendors. In this case the deliveries would not be up to the expectations of the end user.

The vendor tends to benefit from FTFP if it has a good team and has estimated the project properly. Furthermore, profits can be managed if vendor anticipates completing the work in lesser time than estimated and with lesser resources. FTFP will not be profitable to vendors if the estimation has not been done accurately and the contract does not account for scope creeps properly. Many a times in order to complete the task; the vendor needs to add resources at its own cost.

TnM model would be profitable to clients when requirements are not complete and there is a need to start the project. Diligent monitoring from the client side can ensure that the time taken by the vendor's team is well utilized. Also it needs to be ascertained that the billing is as per skill level and authentic and that the vendor is not billing for an unqualified person. The client manager/team must constantly supervise the project to ensure complete utilization of the vendor team. Also there is a chance that vendor might bill extra hours to the clients, if clients are not closely involved. TnM is profitable to vendors mostly as the team is billed at an hourly rate per week/month. As long as the team is performing as per skill level and work is getting completed as per expectations, the model would be profitable to them. If, however, the vendor team is not performing as per skill level, the clients may be unhappy about the outcome and might not be willing to pay the full amount that is due.

The hypothesis which emerges from above is:

*H2*. There is statistically significant difference between profitability of TnM or FTFP pricing models.

### *2.2 Risk*

An IT outsourcing agreement has various associated risks. Categories of risks include risks due to uncertain requirements, complexity of the application being developed, capability of the vendor to implement the requirements, risks related to end customer involvement and financials, as well as contract compliance feasibility (Dasgupta and Mohanty, 2009). The contract that is signed is mostly unable to capture the hidden risks. The vendors' team is usually unaware of the business domain of the client. This leads to requirement of transition. The transition phase is difficult to ascertain and underestimated. The scope of work also gets revised with time and the vendors re-estimate the work, which may be more than anticipated by clients. The sheer complexity of technology makes it difficult to generate a near accurate estimate. Therefore there can be delay in deliveries (Dhar and Balakrishnan, 2006).

Though in case of FTFP, most of the risk gets shifted to the vendors, the clients face the risk of being over charged for scope creeps as well as the risk of non-delivery at the scheduled time. The benefit for clients though is that, since requirements are supposedly near complete client involvement and monitoring does not seem necessary to clients, as payment will be on delivery of application or product. The vendors are more at risk in this model if requirements are not clear or loosely worded and if estimation was not done correctly. Sometimes vendors have to take losses to complete the work and deliver.

In case of TnM, the risk is more on the client as there is dependency on them to give requirements to vendors at scheduled intervals. The billing by the vendor is done hourly/daily/monthly and hence close intervention is needed to see that billing is justified. The clients, however benefit as they get a chance to see the product/application at intervals and make corrections. Further, they get involved with the team

and tend to develop good rapport with vendors team. The vendors also benefit as risk is not much and as long as the team is skillful as per requirement, the relationship is expected to continue. In case the vendors' team is taking too much time to complete work due to incompetency, lack of business domain knowledge or any other reason, the vendor is at risk of losing the project.

The hypothesis which emerges from above is:

*H3.* There is statistically significant difference between the risk factor in TnM or FTFP pricing models.

*2.3 Project schedules*

In FTFP the project schedule is fixed right from the beginning of the project. The client benefits as expected completion date is known and price is fixed. However, a lot depends on the scope and whether the clients were able to freeze the scope and how many scope creeps were there. The delivery schedule in TnM is defined as sprints of weeks or months. The demonstration is mostly given to clients on completion of the sprint. The client expects the sprints to be completed within the estimated time frame. Further the amount of transition time given by clients to vendors and knowledge sharing also can affect the speed of the vendor team.

The hypothesis which emerges is:

*H4.* There is statistically significant difference between project schedules being met easily by TnM or FTFP pricing models.

*2.4 Good quality delivery*

When the delivered application or product is as per requirements of the client with high quality and low maintenance code, it is considered quality delivery. Generally when technical work is outsourced, quality does not just depend on financial penalties laid by customer or bonus for good quality work. This is because a vendor does not intentionally provide low-quality work it is unable to control the work or is unable to maintain a good team. Managers are needed at both client and vendor side, to ensure that diligence is done by the team and should ensure good recruitment. Also errors in the software may be the result of loosely worded or incomplete requirements provided by the client or lack of knowledge about the clients business domain (Jayanty, 2006). The quality can be improved by putting thorough processes in place and excessive low-level task allocation and monitoring by client managers. This holds true for both FTFP and TnM.

The hypothesis which emerges is:

*H5.* There is statistically significant difference between quality of code being produced between TnM and FTFP pricing models.

*2.5 Cost*

The evaluation of whether to outsource starts with the consideration of cost benefits. Outsourcing leads to cost benefits (in most cases) and this can be clear if cost of doing the task in house is calculated properly which would include cost of administration of managing people, location, taxes, costs of buying hardware, software, managing depreciation, time taken to develop, test, integrate with old system, keeping up with new technology, managing or contracting skilled professionals, etc. (Antunes, 2003). IT outsourcing leads to reduction is costs (Wang *et al.*, 2008) (Smith *et al.*, 1998).

The hypothesis which emerges is:

*H6.* There is statistically significant difference between either of TnM or FTFP in terms of not leading to increasing costs.

*2.6 General popularity of the pricing model*

Among the parameters it is also important to gauge the general popularity of the models leading to choice of the same in proposed projects. Mostly the client would prefer the FTFP model provided that the scope of requirements is relatively clear. The vendors would negotiate for TnM. Which model will be chosen, ultimately depends upon scope clarity and what the client prefers.

The hypothesis which emerges is:

*H7.* There is statistically significant difference between either of TnM or FTFP being used in majority projects in companies.

## 3. Methodology and data collection

*3.1 Variables and questionnaire design*

The intent was to compare TnM and FTFP models on the basis of usage, profitability, risk, deliveries meeting project schedule, quality of code, the pricing model used by respondents' majority of times and whether, either of them lead to increasing costs as is evident from the hypothesis stated above.

The above-mentioned parameters were measured through a questionnaire prepared with questions as given below. The participants were asked to rate the following on a Likert scale of 1-5 where 1 represents strongly disagree and 5 represents strongly agree (Table I).

| Variable name/questionnaire | Description |
|---|---|
| You have worked more in TnM model with your clients<br>You have worked more in FTFP model with your clients | Represents whether the participant has worked more in TnM and FTFP models |
| TnM model is profitable<br>FTFP model is profitable | This represents whether the models seem profitable to the participant |
| TnM model is not very risky<br>FTFP model is not very risky | This represents whether the models seem risky to the participant |
| Project schedules are met easily in TnM model<br>Project schedules are met easily in FTFP model | This represents whether project schedules can be met easily in the two models |
| TnM model leads to good quality delivery<br>FTFP model leads to good quality delivery | This represents whether good quality deliveries can be achieved using these models |
| TnM model does not lead to increasing cost though it has dependencies on client knowledge transfer<br>FTFP model does not lead to increasing cost though it has dependencies on client knowledge transfer | This represents whether using these models can lead to increasing cost. |
| Majority of projects are following TnM model in your company<br>Majority of projects are following FTFP model in your company | This represents whether majority of projects are following TnM or FTFP in the company that the participant is working in |

**Table I.**
Questionnaire used

*3.2 Data analysis*

Data from 68 Indian software firms were collected and analyzed. Mostly questionnaire was circulated to manager and above positions. About 200 people were targeted as a sample. Social sites like Facebook, Linked and e-mails were used to circulate the questionnaire. In total 120 responses were received, out of which 15 were discarded due to data insufficiency. In total, 105 responses were used for analysis. We have used Wilcoxon signed-rank test to determine which of the two pricing models scored over the other in the parameters being analyzed (Smith *et al.*, 1998). Table II depicts the organizational and the number of responses from organizations of varying strength.

Table III shows the descriptive statistics of parameters used to compare the two pricing models namely, usage, profitability, riskiness, project schedules, code quality and cost.

## 4. Results and discussion

*Wilcoxon signed-rank test*

Table IV shows the Wilcoxon signed-rank test used to compare the two pricing models TnM and FTFP gave the following results and Table V shows the test statistics obtained from the same both these are used to arrive at the following conclusions:

(1) Of the total 105 respondents, 36 respondents worked more in TnM and 24 worked more in FTFP and there were 45 ties. The result indicates that respondents worked more in TnM models is not statistically significant, $n = 105$, $z = -0.585$, $p = 0.558$. Thus we have to reject *H1* in this case.

| Range | Frequency | % |
|---|---|---|
| Less than 100 | 40 | 38.10 |
| 100 to less than 1,000 | 11 | 10.00 |
| 1,000 to less than 5,000 | 5 | 4.80 |
| 5,000 to less than 100,000 | 19 | 18.10 |
| 100,000 and above | 30 | 29.00 |

**Table II.** Organizational strength

| | *N* | Mean | SD | Minimum | Maximum | Percentiles | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 25th | 50th (median) | 75th |
| Worked more in FTFP | 105 | 3.6381 | 0.98179 | 2 | 5 | 3 | 4 | 4 |
| FTFP profitable | 105 | 3.581 | 0.84103 | 2 | 5 | 3 | 4 | 4 |
| FTFP not risky | 105 | 3.1524 | 0.92799 | 1 | 5 | 2 | 3 | 4 |
| FTFP project schedules | 105 | 3.3429 | 1.02684 | 2 | 5 | 2 | 3 | 4 |
| FTFP good quality | 105 | 3.3619 | 0.93154 | 1 | 5 | 3 | 4 | 4 |
| FTFP not increasing cost | 105 | 3.3238 | 1.02371 | 1 | 5 | 2 | 4 | 4 |
| FTFP majority projects | 105 | 3.2857 | 0.97778 | 1 | 5 | 2 | 3 | 4 |
| Worked more in TnM | 105 | 3.7333 | 1.03093 | 1 | 5 | 3.5 | 4 | 4 |
| TnM profitable | 105 | 3.9714 | 0.67164 | 2 | 5 | 4 | 4 | 4 |
| TnM not risky | 105 | 3.7238 | 0.94559 | 1 | 5 | 3 | 4 | 4 |
| TnM project schedules | 105 | 3.4381 | 1.07349 | 1 | 5 | 3 | 3 | 4 |
| TnM good quality | 105 | 3.6381 | 0.85624 | 1 | 5 | 3 | 4 | 4 |
| TnM not increasing cost | 105 | 3.581 | 0.99789 | 1 | 5 | 3 | 4 | 4 |
| TnM majority projects | 105 | 3.3905 | 1.02371 | 1 | 5 | 2.5 | 4 | 4 |

**Table III.** Descriptive statistics of parameters

| | | *n* | Mean rank | Sum of ranks |
|---|---|---|---|---|
| Worked more in TnM – worked more in FTFP | Negative ranks | 24[a] | 34.88 | 837 |
| | Positive ranks | 36[b] | 27.58 | 993 |
| | Ties | 45[c] | | |
| | Total | 105 | | |
| TnM profitable – FTFP profitable | Negative ranks | 17[d] | 29.47 | 501 |
| | Positive ranks | 45[e] | 32.27 | 1,452 |
| | Ties | 43[f] | | |
| | Total | 105 | | |
| TnM not risky – FTFP not risky | Negative ranks | 20[g] | 28.73 | 574.5 |
| | Positive ranks | 52[h] | 39.49 | 2,053.5 |
| | Ties | 33[i] | | |
| | Total | 105 | | |
| TnM project schedules – FTFP project schedules | Negative ranks | 38[j] | 41.17 | 1,564.5 |
| | Positive ranks | 44[k] | 41.78 | 1,838.5 |
| | Ties | 23l | | |
| | Total | 105 | | |
| TnM good quality – FTFP good quality | Negative ranks | 26[m] | 30.98 | 805.5 |
| | Positive ranks | 42[n] | 36.68 | 1,540.5 |
| | Ties | 37[o] | | |
| | Total | 105 | | |
| TnM not increasing cost – FTFP not increasing cost | Negative ranks | 30[p] | 32.2 | 966 |
| | Positive ranks | 42[q] | 39.57 | 1,662 |
| | Ties | 33[r] | | |
| | Total | 105 | | |
| TnM majority projects – FTFP majority projects | Negative ranks | 33[s] | 39.08 | 1,289.5 |
| | Positive ranks | 42[t] | 37.15 | 1,560.5 |
| | Ties | 30[u] | | |
| | Total | 105 | | |

**Notes:** [a]Worked more in TnM < worked more in FTFP; [b]worked more in TnM > worked more in FTFP; [c]worked more in TnM = worked more in FTFP; [d] TnM profitable < FTFP profitable; [e]TnM profitable > FTFP profitable; [f]TnM profitable = FTFP profitable; [g]TnM not risky < FTFP not risky; [h]TnM not risky > FTFP not risky; [i]TnM not risky = FTFP not risky; [j]TnM project schedules < FTFP project schedules; [k]TnM project schedules > FTFP project schedules; [l]TnM project schedules = FTFP project schedules; [m]TnM good quality < FTFP good quality; [n]TnM good quality > FTFP good quality; [o]TnM good quality = FTFP good quality; [p]TnM not increasing cost < FTFP not increasing cost; [q]TnM not increasing cost > FTFP not increasing cost; [r]TnM not increasing cost = FTFP not increasing cost; [s]TnM majority projects < FTFP majority projects; [t]TnM majority projects > FTFP majority projects; [u]TnM majority projects = FTFP majority projects

**Table IV.**
Results of Wilcoxon signed-rank test

| | Worked more in TnM – worked more in FTFP | TnM profitable – FTFP profitable | TnM not risky – FTFP not risky | TnM project schedules – FTFP project schedules | TnM good quality – FTFP good quality | TnM not increasing cost – FTFP not increasing cost | TnM majority projects – FTFP majority projects |
|---|---|---|---|---|---|---|---|
| *Z* | −0.585[b] | −3.466[b] | −4.273[b] | −0.652[b] | −2.322[b] | −1.999[b] | −0.734[b] |
| Asymp. Sig. (2-tailed) | 0.558 | 0.001 | 0 | 0.514 | 0.02 | 0.046 | 0.463 |

**Notes:** [a]Wilcoxon signed-ranks test. [b]Based on negative ranks

**Table V.**
Test statistics of Wilcoxon signed-rank test

(2) Of the total 105 respondents, 45 respondents found TnM to be profitable and 17 found FTFP to be profitable and there were 43 ties. Also the mean rank of TnM (32.27) is more than FTFP (29.47), hence, the result indicates that respondents found TnM more profitable is statistically significant, $n = 105$, $z = -3.466$, $p = 0.001$. Thus we can accept *H2* in this case and accept that TnM is more profitable than FTFP.

(3) Of the total 105 respondents, 52 respondents found TnM to be not risky and 20 found FTFP to be not risky and there were 33 ties. Also the mean rank of TnM (39.49) is more than FTFP (28.73), hence, the result indicates that respondents found TnM to be not risky is statistically significant, $n = 105$, $z = -4.273$, $p = 0$. Thus we can accept *H3* in this case and accept that TnM is found to be not risky when compared to FTFP.

(4) Of the total 105 respondents, 44 respondents found that projects schedule were easily met in TnM and 38 found that projects schedule were easily met in FTFP and there were 23 ties. The result indicates that respondents maintained that project schedules are met easily in TnM models is not statistically significant, $n = 105$, $z = -0.652$, $p = 0.514$. Thus we have to reject *H4* in this case.

(5) Of the total 105 respondents, 42 respondents found that TnM projects are able to produce good quality code and 26 found that FTFP projects are able to produce good quality code and there were 37 ties. Also the mean rank of TnM (36.68) is more than FTFP (30.98), hence, the result indicates that TnM projects do produce good quality code and is statistically significant, $n = 105$, $z = -2.322$, $p = 0.020$. Thus we can accept *H5* in this case and accept that TnM aids in producing better quality code when compared to FTFP.

(6) Of the total 105 respondents, 42 respondents found that TnM projects do not lead to increasing cost and 30 found that FTFP projects do not lead to increasing cost and there were 33 ties. Also the mean rank of TnM (39.57) is more than FTFP (32.2), hence, the result indicates that TnM projects do not lead to increasing cost and is statistically significant, $n = 105$, $z = -1.999$, $p = 0.046$. Thus we can accept *H6* in this case and accept that TnM does not lead to increasing costs when compared to FTFP.

(7) Of the total 105 respondents, 42 respondents said that majority of projects in their company are TnM projects and 33 said that majority of projects in their company are FTFP projects and there were 30 ties. This result is not statistically significant, $n = 105$, $z = -0.734$, $p = 0.463$. Thus we have to reject *H7* in this case.

We can thus conclude that TnM is more profitable that FTFP. Clients generally use TnM when the requirements are not complete at the start of the project and thus deliveries are expected in sprints and requirement building and elicitation goes on in parallel. Since this makes the project time and schedule variable, it leads to an elongated project thus generating more profits for the vendor. Further, since the clients have to closely work with the vendor to continuously give requirements and clarifications and also test the sprints in shorter duration, any discrepancy in expectations is caught earlier and can be rectified. Hence, TnM is less risky compared to FTFP. As long as the estimation done when requirements are given is near correct, the team is in lesser pressure. Also requirements keep changing and team can justify the time being taken for work.

This positively influences the quality of work. Also, since the clients keep testing the sprints the work completed is naturally as per expectations of the client. As per current data, TnM also does not lead to increasing cost as billing is done as per pre-decided rates based on the skill level of the vendors team.

In the FTFP model, most of the requirements are frozen at the start of the project and hence, estimation and project schedule are also prepared accordingly. Any increase in requirement is treated as scope creep and is estimated separately. However, many a times estimations are not done correctly as well as there are discussions between clients and vendors on what are scope creeps and what was within scope. Clients argue that everything is within scope. Since work increases but the time of delivery remains the same, FTFP becomes less profitable to vendors. Sometimes extra unbilled resources are used to complete the project on schedule. This aspect also makes FTFP risky because if more resources are not available or for some reason delivery is not met, it can lead to loss of face and potential loss of client. Since more resources may be used which are unbilled, it can increase costs for the vendor as well. Also the resources may not be of the skill required and can, therefore, compromise on the quality of work produced.

## 5. Conclusions and further research

When the client and the vendor establish an IT relationship using a contract, it also has to be established what pricing model is going to be used to facilitate the payment terms.

In theory many such models have been prescribed, however, this papers identifies two most popularly referenced models, namely, FTFP and TnM and key aspects (through detailed literature survey) of the same which are: profitability, risk, deliveries meeting project schedule, good quality code, the pricing model used by respondents' majority of times and whether either of them lead to increasing costs, which pricing model was used majority of times in the companies of respondents. Data were gathered from 68 companies.

Following hypotheses were proven:

*H2.* There is statistically significant difference between profitability of TnM or FTFP pricing models.

*H3.* There is statistically significant difference between the risk factor in TnM or FTFP pricing models.

*H5.* There is statistically significant difference between quality of code being produced between TnM and FTFP pricing models.

*H6.* There is statistically significant difference between either of TnM or FTFP in terms of not leading to increasing costs.

And following were rejected:

*H1.* There is statistically significant difference between whether people have worked more in TnM or in FTFP pricing models.

*H4.* There is statistically significant difference between project schedules being met easily by TnM or FTFP pricing models.

*H7.* There is statistically significant difference between either of TnM or FTFP being used in majority projects in companies.

The above paper bridges the gap between theory and practice as the theoretical inputs regarding the models have been collected and have been statistically verified by practitioners.

Further research can be done on other variations of pricing models and to establish which one should be the preferred model and in which circumstances.

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## Appendix

| Subject | Items |
|---|---|
| Time and Material | You have worked more in TnM model with your clients |
| | TnM model is profitable |
| | TnM model is not very risky |
| | Project schedules are met easily in TnM model |
| | TnM model leads to good quality delivery |
| | TnM model does not lead to increasing cost though it has dependencies on client knowledge transfer |
| | Majority of projects are following TnM model in your company |
| Fixed Time Fixed Price | You have worked more in FTFP model with your clients |
| | FTFP model is profitable |
| | FTFP model is not very risky |
| | Project schedules are met easily in FTFP model |
| | FTFP model leads to good quality delivery |
| | FTFP model does not lead to increasing cost though it has dependencies on client knowledge transfer |
| | Majority of projects are following FTFP model in your company |

**Table AI.**
Details of questionnaire used

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