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How firms can reduce the risks with fixed price contracts

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ABSTRACT

Firms have had difficulties in dealing with the risks that occur when providing fixed price contracts (FP) for both small – scale and large – scale projects to involved customers. This is general for the most companies surveying customers with the development for a product or service in the IT – industry. Research has paid minimum attention on how firms can implement scientific proven agile methods to reduce the risks with FP contracts to increase profit margin. In FP contracts, the risks lie on the supplier providing the contract, where research has shown that companies have issues in determining the project scope in the planning process and how they can find certain approaches for increasing the dialogue in a buyer and seller arrangement. Therefore, firms are more comfortable in going into Time and Material (T&M) arrangements where customers pay for the time and resources spent under a project process. This study also makes investigations on how firms can make accurate estimations of the development durations that occurs when providing this contracting form and how firms can identify risks into profitable pricing engagements. The study took ground in Lund, Sweden at a company named Sigma Connectivity which is a firm developing services and products based on wireless communication and the phenomenon called Internet Of Things (IoT).

The delimitations that were made for this study was related to the marketing mix concept which conducts of seven strategies for business management of these seven strategies the choice was made to exclude exclude sustainable aspects, physical evidence, internal marketing related to promotion, and location factors. Internal qualitative directive and semi – structured interviews were methods used for determining variables and key issue with FP contracts that was included in the survey based approach to customers. Agile methods such as Feature Driven Development (FDD) and Work Breakdown Structure (WBS) were implemented in order to tackle the challenges of visualising a clear project scope description with clear specification on what is included in a FP contracts in small – scale and large – scale projects.

The results conducted from this study shows that integrating scientific proven methods such as FDD and WBS in a firm, will help them to divide project processes into smaller mechanisms, which will provide sufficient access for an increased project scope allocation forcing the involved parties in a buyer and seller arrangement to hold both internal and external reviews which will enable the possibility of making pricing approaches during the project process. Results also shows that customers find FP contracts to be the most valuable but the difficulties that they have felt in this arrangement is to incorporate new ideas for a project scope change during a project process. The use of the FDD framework and WBS provided results that are vital for firms going into FP arrangements where clearer project scope definitions, key role identifications, increased pricing opportunities and communication channels were founded.

Keywords*: Fixed price contracts (FP), project scope, Work Breakdown Structure (WBS), Feature Driven development (FDD).*

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ABSTRACT (SWEDISH)

Företag har överlag upplevt svårigheter när det handlar om att behandla befintliga risker med fastprisprojekt (FP) när dem förser detta kontrakt till kunder i både små och stora projekt som löper under en längre tid. Detta är generellt sett ett problem för alla företag som förser kunder med strategier för utvecklandet av en produkt eller service inom IT – industrin. Forskning visar att minimal uppmärksamhet har gjorts i hur företag kan implementera vetenskapligt beprövade metoder för att reducera befintliga risker vid fastprisprojekt (FP) för att öka vinstmarginalen. I fastprisprojekt ligger risken hos leverantören som förser kunderna med kontraktet, där forskning påvisar att företag har haft svårigheter vid bestämmandet av vad som skall vara inkluderat i projekt omfattningen i planeringsprocessen, och hur företag kan finna specifika tillvägagångssätt för att öka dialogen i en köpare och säljare arrangemang. Därav är firmor mer bekväma med att gå in i ett Tid och Material (T&M) arrangemang där kunder betalar för tiden spenderad och materialet som använts under ett projekt. I denna studien gjordes också djupa undersökningar i hur firmor kan göra precisa uppskattningar och identifiera befintliga utvecklingsmöjligheter som kan uppkomma när kunder förses med ett fastprisprojekt. Syftet här var att finna potentiella lönsamma prissättningsmöjligheter. Studien utfördes i Lund, Sverige på ett företag kallat Sigma Connectivity som för nuvarande arbetar med att utveckla specifika produkter efter kunders förfrågan baserat på trådlös kommunikation (IoT).

Avgränsningarna som gjordes i denna studien var baserat på Marketing Mix konceptet vilket gjorde det möjligt att exkludera hållbara aspekter, fysiska bevis, intern marknadsföring relaterad till reklamkampanjer, och plats faktorer. Interna kvalitativa intervjuer och semi – strukturerade intervjuer genomfördes för att bestämma och identifiera variabler och huvudproblem med fastprisprojekt, dessa faktorer inkluderades i enkätundersökningen som gjordes åt befintliga kunder. Metoder som Feature Driven Development (FDD) och Work Breakdown Structure (WBS) implementerades på företaget för att kunna hantera och bemöta dem risker som visualiserades under studien relaterat till att konstruera en väl genomförd projekt omfattning, för att kunna förse kunder med fastprisprojekt där det tydligt specificeras vad som ingår i kontraktet. Resultaten som inhämtades vid denna studie påvisar att användandet av vetenskapliga beprövade metoder i ett företags segment kommer att hjälpa dem att dela upp projektprocessen i mindre mekanismer vilket kommer att förse företag med tillräcklig information för att kunna öka nyttan av fördelningen vid ett projekts omfattningsdefinition. Detta visade sig vara viktigt för att öka kommunikationen mellan dem involverade parterna, där interna och externa genomgångar är vitala för möjliga prissättningsstrategier även under ett projekt. Kunderna finner fastprisprojekt (FP) vara mest värdefull men enkätundersökningen tydliggjorde att en befintlig nackdel med denna kontrakttyp är att integrera nya idéer för ändrad projekt omfattning under en igång hållande process. Användandet av FDD ramverket och WBS genererade i resultat som är vitala när företag går in i ett fastprisprojekt (FP) där tydligare projekt omfattningsbestämmelser, nyckelrolls identifieringar, ökade prissättningsmöjligheter och kommunikationsvägar var funna.

Nyckelord: Fastprisprojekt (FP), projekt omfattning, Feature Driven Development (FDD), Work Breakdown Structure (WBS)

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PREFACE

I am currently studying my last year at Blekinge Tekniska Högskola, Sweden in Master Of Science in industrial management and engineering with emphasis on sustainable and innovative product development. This master's degree education is five years long (300HP), where this master thesis project has been written during the last spring term in the education. This study has been made in corporation with Sigma Connectivity and therefore I want to direct special thanks to my mentors Peter Insley, Ola Möllerström and Andreas Wilson for helping me to research in this topic and for continuously coming with feedback during the project process.

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Nomenclatures

Acronyms

WBS	Work Breakdown Structure
T&M	Time and Material contract
FP	Fixed Price Contract

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1. INTRODUCTION

In this section, the author presents discussions and insights on the background, objectives, and delimitations of the focal study. This scientific insight will provide information about the research topic.

1.1 Introduction

Extent research shows that a fixed price contract (FP) gives an incentive for the firm not to perform at their best, this depends on that the compensation related to profit not is optimised (Yuan, Wen, 2012). A FP contract is an arrangement where the payment process not is dependent on resources and time in the project. These projects allow the vendor to extract sufficient information from the customer but the risk affiliation is definitely higher than for a Time and Material contract (T&M) which vendors historically prefer (Gopal, Sivaramakrishnan, 2008). A FP contract is based on a trade – off to the vendor, this imposes larger risks relative to a T&M contract. T&M contracts are based on payments from the client of the time spent for a project and the resources used during this phase. The risks lie here on the customers where research shows that firms respondent of a T&M contract often show low incentive of being efficient (Sund, Hausken, 2012).

However, research has paid minimum attention on how firms can reduce the risks of using FP contracts and gain more profit and on which contracting form that customers finds most valuable in product developing companies (Frick, 2013). As Frick (2013) stated the major problem that firms face when using FP contracts is to determine whether the cost presented to the client is the correct cost calculated. In projects issues, can occur and the time – frame set in the planning process is often changed due to new requirements and a lack of communication between the buyer and seller (Yuan, Wen, 2012). Daily management in a project is always influenced by the contract type presented, and therefore strategies of having more vendors assigned in FP projects has been implemented due to that the vendor bear a higher risk (Sund, Hausken, 2012). When investigating in current contractual regimes it shows that vendors in some circumstances prefers using a FP contract for certain projects than T&M contracts. In T&M contracts the vendor is fully protected from the risk and research shows that these contracts generally provide higher profitability compared to FP contracts (Gopal, Sivaramakrishnan, 2008).

Research also shows that a firm arranging a FP contract has problems in determining what should be included in the project scope (Norrman et al, 2012). Scope changes can occur constantly and therefore it is hard for the vendor to calculate a price for a FP project early in the initiation phase (Khan, 2006). The research that needs to be made is to get insight on which tools in software methodologies that can be implemented to increase the vendor's probability of gaining profit and reducing risks in FP arrangements (Mirzaa, 2013). Prior research conducted by Gopal and Sivaramakrishnan (2008) has examined preferences on risk sharing in contractual environments where the definition of risk in software projects includes the probability of incurring costs of renegotiation.

Given this primacy of the current risk exposure in FP contracts, if the vendor prefers T&M contracts their incentive of delivering within a time – frame often can be low, this depends on that new information often will be available where scope changes will occur daily (Norrman

et al, 2012). In a FP contract where the customer bears the risk and the client expects the project delivery to be executed within the time – frame firms needs to investigate more on how they can increase both internal and external communication and how they can define the project scope better (Khan, 2006). This investigation will also provide analysis, tools and give indications on which preferences customers have in the offshore domain to visualise a relationship between FP contract preferences and the actual probability. However, the trade – off between protecting and conquering the risks with the information from the customer will also be addressed.

1.2 Company background

This study is investigated in Lund, Sweden and it is made for the external part called Sigma Connectivity which is a company that was established 2013 when Sony Mobile decided to downsize their leading development unit in Lund. This led to that the firm made decisions which ignited a transformation in bringing innovative consumer products into an engineering design house. Sigma Connectivitys strategy of not being product owners but product developers have been shown to be a successful approach where the firm is growing year after year. They increased their revenue with 12 % last year and are aiming for further growth with their 2,3bn SEK in revenue and over 2500 employees in the whole Sigma group now. Described at sigmaconnectivity.se (2017), their switch in focus from in – house development to finding external client needs has unleashed huge potential. They run one of the worlds truly independent labs, and gives their customers all the necessary tools to discover new design, prototype and product approaches.

The company which will be studied is currently offering four type of contractual forms; FP contracts, T&M contracts, T&M with price ceiling and work packages. Sigma Connectivity historically makes the most profit in T&M contracts and this is not something unknown. As Gopal and Sivaramakrishnan (2008) stated in their research study contracts where the customers bear the risks will often lead to incentives where the firm takes advantage to gain more profit than calculated and defined in the project scope, early in the project initiation phase. Historically all FP projects held at the company has led to revenue losses and the firm has a huge challenge in finding strategies which enables a more detailed scope description and cost calculations. Due to the preferences for customers to choose FP contracts generally (Frick, 2013), Sigma Connectivity wants to investigate on which tools that can be implemented to determine the price for this contracting form in a secure way, where incentives for the vendor and client to take advantage is minimised.

In the planning process Sigma Connectivity also wants to identify scientific research approaches for increased comprehensive dialogue between the involved parties. This is related to the research conducted by Sund and Hausken (2012) where they stated that FP contracts from economic perspectives often leads to revenue losses dependent on that the ability for firms to have both internal and external communication with the involved parties often is low. Sigma Connectivity also wants to address a methodology for enabling more sufficient pricing approaches in FP arrangements.

As Gopal and Sivaramakrishna (2008) also clarified firms needs to be better on finding the relationship between risk aversion and project scope definition. The problem therefore lies on how the firm can unravel the risks in FP arrangements to find pricing approaches which generates higher economical profitability.

1.3 Objectives

The purpose of this study is to look on how the implementation of the agile software methods FDD and WBS framework can help firms to reduce the risks when going into fixed price arrangements, where the aim also is to investigate on how the five steps composed in the FDD framework can establish strategies for a more secure pricing approach in this arrangement. The choice of using FDD and WBS is based on that these tools have the characteristics of dividing large projects into smaller mechanisms, making it easier for firms to manage their costs, and reducing general risks when forcing customers to pay a start – up cost.

1.4 Delimitations

The Marketing Mix concept presented in the theoretical framework below was established by Philip Kotler and presents an idea of variables included in management for firms within the IT industry (Rafiq, Pervaiz, 1995). The "7PS" described in this process was used to visualise key variables both independent and dependent that must be included when pricing FP contracts and to determine which risks that can be reduced. This tool was used to visualise what should be included and excluded, when visualising risks in FP contracts.

In this framework, the processes shown in figure 2.1 named physical evidence, promotion and place were overlooked because it was shown that the variables included in these phases did not make sense when finding strategies for more secure FP contract allocations.

1.5 Research questions

- Which key variables must be determined to build strategies for more detailed pricing approaches in a FP contract?
- How can firms provide clearer specifications in a buyer and seller arrangement about what is covered by the scope in a FP contract?

2. THEORETICAL FRAMEWORK

In this chapter, the author presents the key concepts based on the literature review that has been made. The author also presents and describes how these concepts can be used to tackle the risks of using fixed price arrangements by proposing conceptual models which will be elaborated and that are for interest of this study.

2.1 Marketing Mix and the key variables for pricing in management

Marketing mix is a concept and an idea of variables related to marketing management which is used to involve and attract customers. This concept is used as a toolbox to visualise the department in a company that can be highly related to management and customer needs (Rafiq, Ahmed, 1995).

Figure 2.1. The 7´P´s Marketing Mix in management (Pervaiz, Ahmed, 1995).

The managerial problem of pricing services is something that has been a subject for a long time. Marketing mix approaches related to the study of pricing a service has been vital because it enables a unique perspective on the key issues related to managerial pricing strategies. The marketing mix principle is a realistic way to realise the issues regarding pricing of different services, because variables determine it such as promotional activities, advertising, design of a product and distribution. This concept shows the variables relevant under each "P" for a firm within the IT – industry (Roy, Henry, 1995). The overall strategies employed in the

marketing mix concept is for services of longer range, plans and procedures, and should be considered due to the more dynamic pricing approaches firms are using since the last decade (Borden, 1994).

In the buyer and seller interaction the influence process is defined by the marketing mix, which emphasizes the relevance of building customer relationships in marketing approaches (Pervaiz, Ahmed, 1995). Philip Kotler claimed that the price issue is the most sensitive variable to deal with when comparing customer behaviour with other factors (Jia, 2012). To forecast the responsiveness related to a marketing – mix variable shown above in the figure, a firm must make a market analysis of current competitors to see if there are similarities in their product attributes and service approaches (Luan, Sudhir, 2010).

2.1.1 An insight in current pricing strategies

Now, there is no universal pricing approach for software vendors, therefore it is a huge challenge for companies to find a pricing strategy for fixed price projects where the risks of having one part more beneficial than the other is reduced. A fixed price contract is an arrangement between a buyer and seller which is intended to only cover the costs for the development of a service. Time and Material contract (T&M), is an arrangement where the seller gets paid for the time spent related to number of hours, material, and labour.

"*Research has shown that companies within the software business increases their profit margins more by using Time and Material contracts (T&M) than fixed price contracts. The reason firms within the software industry still uses fixed price contracts depends on that for some specific projects the return can be more profitable than for a T&M contract*" (Gopal, Sivaramakrishnan, 2008).

There are three major pricing strategies related to pricing of a service, these strategies are called: cost – based pricing, competition based, and value – based pricing. The challenge with value – based pricing is to visualise customer needs before setting the price for a fixed – price contract, to do this, it is important to have a clear overview of the competitors pricing strategies and pricing approaches. The other challenge is to quantify the economic value for customers when a reduction in price for a service is determined (Calabrese, Francesco, 2014). Value – based pricing is a pricing approach that can be profitable and effective if the firm has an awareness of its value.

Research has shown that even if this pricing strategy can be profitable and has its benefits only 17 percent of firms implements it as a pricing strategy in their firm after the use of the marketing mix concept (Calabrese, Francesco, 2014). Further research also shows that software vendors pricing approaches to customers can be too complex and too large, where there is a complexity related to their combinations with each other (Wirtsching et al, 2009).

2.1.2 Contracts in fixed – fees arrangements

The design/bid/build is a contracting strategy where the design/build construction phase specifically defines the value perceived of actual changes that can arise if the buyer tends to present new information. It is important that the engineer involved in the project has clear understanding of different contracting strategies because it will help the firm to steer and control projects of separate sizes. This contracting strategy helps the supplier to increase the life length of a new service, shown in the figure below (Sturts, Griffis, 2005).

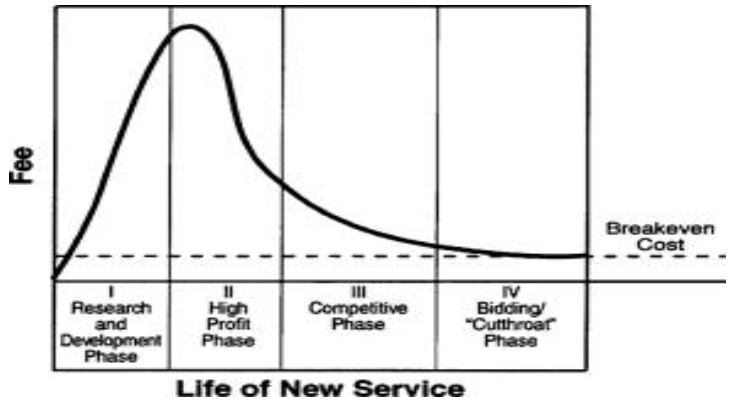


Figure 2.2 Life – cycle price potential (Sturts, Griffis, 2005).

Conjoint analysis is a methodology where the attributes of a product or service is analysed. Under this analysis one vital concept called value – bidding analysis is important in determining the decisions a customer makes when choosing a product developing company and it also increase the probability of taking a clear advantage ahead of competitors when talking about contracting arrangements (Sturts, Griffis, 2005).

For management consultancy firms using fixed fees arrangements strategies has been enabled to reduce risks. It is important that the consultants describe the contingency arrangement for the client to affect the relationship over a long time in a positive way. This can be done by having comprehensive dialogue with the client to define the scope of work (Connell, Zanell, 2011). The second factor that affects the firm's perception of defining the project scope depends on the clients approaches of presenting the solution that they want to develop. If consulting engineers accepts a job without a well-defined scope it will result in that they will charge more money through the job causing conflicts between the involved parties (Norrman et al, 2012).

Research also shows that firms should focus more on their uncertainty regarding their pricing approaches. By using contingent – pricing strategies firms will be able to reduce this level of uncertainty for their IT services (Kun, Chang, 2012). Given the role of a service, the orientation of increasing revenue generation is shown to be the highest if the firm charges fixed pricing per a specific period (monthly) and gives continuous support and maintenance to their customers (Sainio, Marjakoski, 2009).

Customers that accept medium interruptions attracts the largest groups of companies involved. This depends on that these customers are more open for change requisitions which results in that firms only can charge premium prices due to the low bargaining power that these customers hold (Trento et al, 2016). Initiated changes arise in the response of customer's new requirements when developing a customised service. Key customers' requirements often arise in the design process of a service, where innovation in material, components wants to be implemented in the construction phase. Firms should therefore provide information to customers only if they bring sufficient value, and not only for how much money they must pay for developing a service which not brings value for them in the market (Eckert et al, 2004).

Ten years ago, all software developers and companies sold software solutions through up – front license fees, but as product companies get greater understanding of customised service solutions and integration in complex environments, firms begin to understand the importance

of pricing services in a profitable way. This can be seen in the figure below (figure 2.3), if a firm increase their maintenance with 10 percent of their total services, their gross profit margins rise with about 5 percent (Cusomano, 2008).

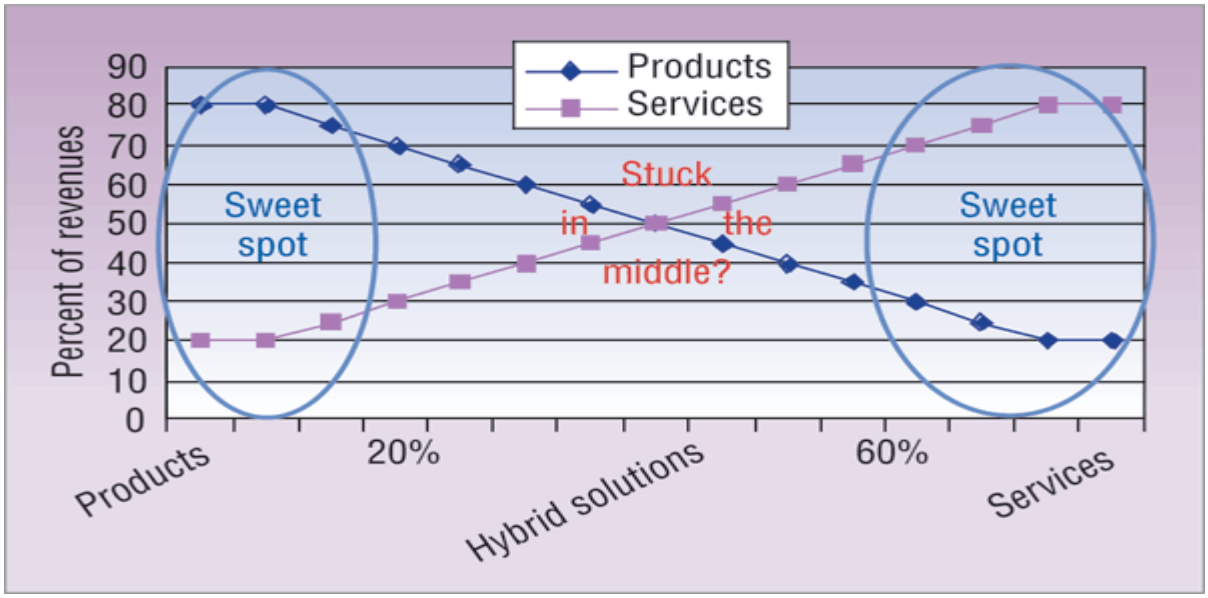


Figure 2.3. Sweet spots for customised service solutions where profit increases at the low and high ends of the spectrum shown above (Cusumano, 2008).

One of the factors in the marketing mix is process. To determine the effectiveness of a customised process model, dimension must be considered; The first dimensions is related to the implementation which denotes the extent to how the process model is used by the participants in a project, where the second dimension considers software projects and its outcome (Perez et al, 1995). Interaction systems for a customised process development are vital instruments for the reduction of costs. These instruments are known as configurations, toolkits and co – design platforms, and they are responsible for guiding the user through the configuration processes (Franke, Piller, 2003).

The process cycle for customised solutions is referred to performance and improvement of software processes. It is divided into three sectors which defines the scope of all processes necessary for the development of a customised solution (Madhavji, 1991). Understanding the role of customisation for customer segments is vital when adopting cost management and organisational structure, and results is that firms will be able to get overall process implications for their information systems (Spring, Dalrymple, 2000).

Developing a service under a fixed price arrangement, the contractor takes the responsibility for determining the best strategy for delivering the service in efficient manner. If the level of uncertainty of the service increases under the construction phase, more effort is needed in documentation. The cost of processing variations will increase, this depends on that the client will need to check the validity of the size claimed by the supplier (Turnera, Simister, 2001). *"Current federal policy expresses a strong preference for fixed-price contracts in federal contracting. Firm fixed-price contracts are depicted as existing on the extreme left of the continuum of risk. As we progress through the various fixed - price flavours and into cost-type contracts, the assertion is that risk shifts from the vendor to the government. We even describe*

contract types on the extreme right (e.g., labour hour and time and material) as "high risk" (Frick, 2013).

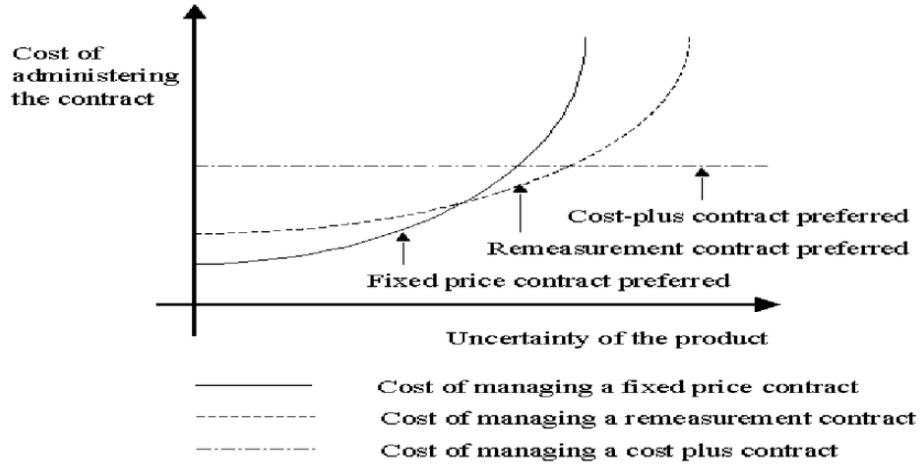


Figure 2.4. The cost of managing fixed price and cost – plus contracts at different levels of uncertainty (Turnera, Simister, 2001).

2.2 Change management implications

The structure of payment varies across different type of contracts, where most contracts prices the software development license, including training, documentation, and maintenance. The schedules of payment are usually based on annual payments where firms pay a fixed fee in portions for each product developing cycle. A contract should be designed in two stages, enabling possibilities for the user and developer to have options to terminate efforts at the end of the first stage in the process (Whang, 1992). The multi – use pass is a tool used for making profitable pricing decisions and to increase more revenue from existing users. This strategy commits a user to use agency's services for a specific service and is likely to add additional expenditures beyond the set price for a project between a buyer and seller (Crompton, 2016). High – passive price strategy is a strategy where the firm monitors its pricing strategies at high positioning to enhance margins in small target markets, and to cover the costs of high qualitative product developments. Low – passive pricing strategy can be used by medium – sized producers where the cost features are lower than their competitors. Due to that the company has less risk potential buyers, it will result in services with low price but also with low quality (Piercy et al, 2010).

The ability to convince customers for a price change in a service has two major disadvantages; If the firms doesn't agree on pricing actions internally it will lead to uncertainty and less knowledge about why a price change is vital related to revenue aspects. If the project manager acknowledges that the prices the firm's charges for the development of a service is lower than the current market price, then the marketing department in the firm must analysis current customer needs to extract the possibilities of raising the price over the market equilibrium (Shantuna et al, 2003). Other findings that can be drawn from pricing simulations is that the managers are the main force within the market and that switching strategies based on past performance could be vital to enhance investment returns (Bird et al, 2010).

Research also shows that a company offering IT – services for more than 100 countries, abused their authority to manage large volumes and service capability, providing different contract forms to specific customer segments. This led to an extreme price differentiation for the same services, and an increase in unprofitable businesses. The firm started to analysis which segments that generated a loss in revenue, and started to centralise their authorities by focusing on a smaller group of customer segments. This increased their revenue with 1.5 percent (Hermann et al, 2003).

In order tackle change the most important driver is to implement a new category of integrated software management pricing, and to do this these two key processes is vital in a product developing company. The first aspect is to set a clear pricing policy involving both documentation and standardization of rules related to the assistance and feedback providing process to sales managers, managing companies' list prices and customer segments. The second key is to provide easy access to comparable price quotes, to ensure that the implemented pricing method is based on the company's value and policies (Davidson, Simonetto, 2005). The switching barrier is a phenomenon that refers to the difficulty of switching providers, which are locked with a customer that has a low level of satisfaction of the services that has been provided. Switching costs refers to the cost incurred where time and money are the key variables for this phase (Kima et al, 2004).

2.2.1 Literature study

Agile software methods are methods used to reduce the cost of change throughout a project. Extreme Programming is a tool where the aim is to involve the software development team in a process to produce first delivery in weeks. This tool is vital because it helps the company to get constant feedback under a contracting arrangement, and it also defines the project scope well without constantly getting new information from the seller. By improving the design quality continuously, the next phase for the development will be less costly (Highsmith, Cockburn, 2001).

2.2.2 Feature Driven Development

Feature – driven development (FDD) is a work process used for agile software development methods which can be used to tackle the difficulties and risks with different contracting types. Five different processes compose this agile method: Start by developing an overall model: Experts and developers collaborating with software systems uses this tool to define the scope and context of every area for a problem. In this step a project initiation phase is created (Richly, Ticha 2008). Build a feature list: A list of features is created where this list describes an object and its method. A feature in a contract is defined as a small client – valued piece that needs to be implemented within two weeks (Highsmith, Cockburn, 2001). Plan by feature: The feature – sets are assigned by a customer's representatives, where technical dependencies are involved. Here you create a predictive metric, of the planning process for a software developing company. Design by Feature and Build by Feature: These two processes are a part of the construction phase, after setting requirements in the start – up phase with clear specifications on what is going to be covered by the project scope and the cost, members of the feature – team will collaborate to develop useful design models and interfaces for their features (Richly, Ticha 2008).

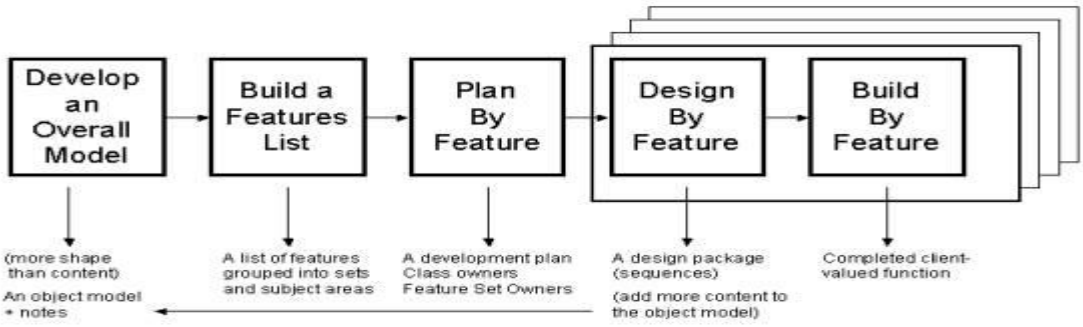


Figure 2.5. The five processes for the agile software method FDD (Richly, Ticha 2008).

The heart of agile methods is based on the idea to give the customer the ability to introduce new requirements. The problem with this is that this doesn't generate clear agreements with the client regarding budget and schedules before the project start (Samireh, 2012). Four steps describe the value that a firm can get by using agile software developments in complexed contracting forms. Individuals and interactions in the projects are more valued than the processes and tools used for developing a service. Working with the development of software is more valued than comprehensive documentation, and the primary objective of this method is to make the client engaged in the project early to get constant feedback on the ongoing process. Responding to change is more vital than following a project plan (Alashqur, 2016).

Research shows that companies dealing with large – scale and complex projects must coordinate the balance between control and flexibility. To ensure that the discipline for a large – scale project is held to keep the time – frame correct, companies must implement iteration planning activities in their management segments (Mishra, 2011). A method for assessing the level of creativity is relevant to help selecting the most creative and cost efficient services. Agile software methods can help to identify this level of creativity, and current measures and how these relate to the software industry from a profitable point of view (Crawford et al, 2015).

Those who practice the processes involved in management realises that a scope change can occur constantly in the build-up process for a service. An effective scope change control variable must be described early in the start – up phase, where it is important to classify the reasons for changes in the project scope (Khan, 2006). The scope statement provides correct justification for the project existence, and it lists the deliverables at high – level to define the project objectives. Research shows that companies focusing on pre – project planning made the most revenue due to the complete scope definition instead of just focusing on the project execution and construction phase (Mirzaa et al, 2013).

In most cases, it is better to deliver a large service for project management and to break it down, to visualise what will be executed in the different process areas. By doing this firms will be able to accurately estimate which information that needs to be added at some point, such as durations of the task. The costs can then be added at lower levels for each high - level point of deliverables (Desmond, 2014). The FiSMA scope management concept is used to integrate time, cost, quality, and risk management in a company. The scope for a project will never change without possible consequences related to budget, quality, and risk. If the budget must be tightened, companies must change the scope requirements by increasing their project risks. Therefore, a company must make precise budget calculations. To do this firms can use functional size measurements of the software functions for a project. This enables situational

analysis of non – functional requirements and establishes the project scope based on anticipated confrontations from clients (Dekkers, Forselius, 2007).

Change is a constant feature across all software/hardware developing companies. Customer approaches for change has an impact on the project schedule. Further research shows that companies that have asserted quality software development internally leads to the highest level of customer satisfaction for IT – projects. Quality assessments are vital to achieve goals by using tasks such as monitoring services, planning and controlling variables under each department segment Madhuri et al, 2016). Request For Proposal (RFP) is a strategy that can be used for development projects where the scope is not completely defined, or when continuous changes can occur during a specific project period. In these cases, the supplier is likely to receive cost proposals from different providers that owns the RFP (Joyce, 2002).

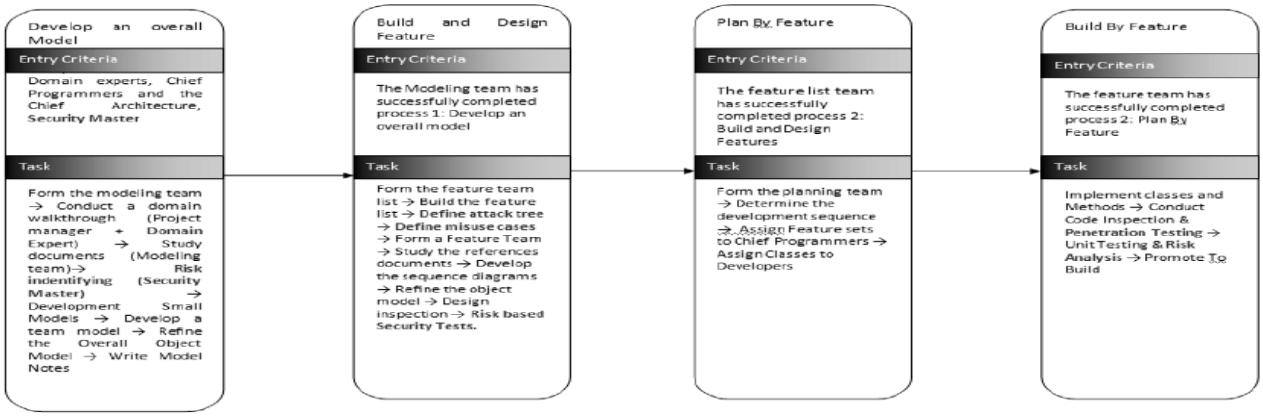


Figure 2.6 Feature Driven Development start – up phase and construction – phase for software development projects (Firdaus et al, 2013).

2.3.2 Work Breakdown Structure

A Work Breakdown Structure (WBS) is a planning process strategy that is developed and executed early after the requirements presented in the Statement Of Work (SOW), that the customer provides to the project managers. This tool acts as a vital part to breakdown work into smaller elements, and it also provides a higher probability regarding the major and minor activities that will be accounted. The customer's responsibility is to form a project management team, where the seller's responsibility is to designate a sponsor (Lu, 2006).

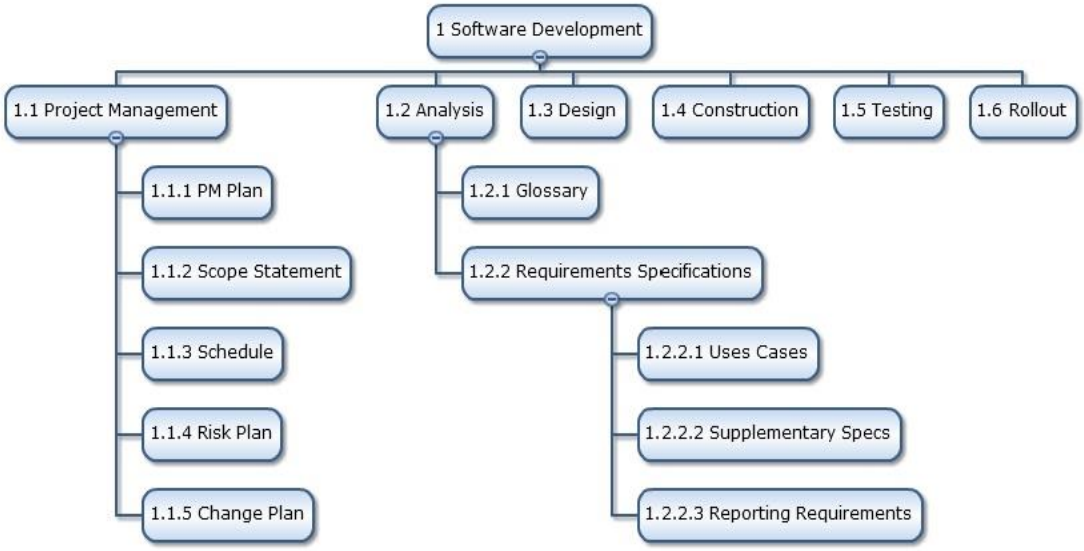


Figure 2.7 A Work Breakdown Structure process for software development (Sequeira, Lopes, 2015)

The scope of work in a project can be defined by WBS, this helps a project team to capture and decompose all the efforts necessary to finalise a project. All the work is written down, planned and assed with combined management plans (Sequeira, Lopes, 2015). If a firm wants to standardise the WBS there are three issues that needs to be addressed before the implementation. The decomposition criteria which reflects on the information that is subdivided over the WBS structure must be well – defined, this is important because the next step is to visualise the order in which these criteria's fits in the hierarchy. The third issue is related to the level of details, which is a factor that decomposes the entire work (Makarfi et al, 2009). WBS helps companies to support their change management approaches in complex contracting environments.

The cost impact of change can with this tool be quickly incorporated and evaluated. Performance measurements is a key variable to determine costs forecasts, and these measurements consistent with the WBS increases the value and helps companies to establish predictive metrics for trending and forecasting researches (Baar, Jacobson, 2004). Applying Risk Breakdown Structure (RBS) methods helps companies to overcome problems that arises when using well – known identification models and techniques. This method produces a structured list of risks before a project and helps the manager to focus on the attention to manage these risks (Stosic et al, 2017).

For projects that are initiated by the signing of a contracts, it is very useful to have relevant template contracts which cover the terms and conditions which are important for the company. These template contracts should be modified and developed by the legal department. These templates speed up the negotiation process in a contract (Desmond, 2014).

The Functional Work Breakdown Structure (FWBS), is the second vital project structure which helps firms to visual the scope functions and operations that must be performed to achieve the main deliverable of the project. Project Control Work Breakdown Structure (PCWBS) is the structure that shows the overall components of the projects main delivera-

bles. If firms can combine these two vital project structures with the Relational Work Breakdown Structure (RWBS), firms will be able to accurately calculate how much resources that needs to be included in a contract arrangement (Alireza et al, 2007).

WBS is structured as mentioned before to support contract packages and help project teams to quickly review bids to determine where they may vary from the initiated project plan (Stosic et al, 2017). The significant characteristics of WBS in controlling project outcomes is to classify the mechanisms which decomposes project elements into manageable levels (Jung, Woo, 2014). Categorising risks according to the Risk Breakdown Structure (RBS) provides vital insights in the assessment of exposing current internal risks such as understanding the risk exposure on the project, revealing root causes by using affinity analyses. Focusing on risk developments on high – risk areas will allow firms to create generic responses for risks within contract arrangements (Hillson, 2003).

2.4 Why FDD and WBS?

The thought of implementing these scientific proven tools is based on historical research as (Frisk, 2013) stated where firms today have difficulties in determining the cost for a FP arrangement, especially in large scale projects. The five steps composed in the FDD framework, will force start – up companies to pay an upfront cost. As (Alireza, 2007) stated, firms have had major problems in controlling and calculating the costs for a FP arrangement when dealing with start – up companies where there is a higher risk for them to go into bankruptcy. Firms also have had difficulties in determining which roles that the employees within a firm should have in this arrangement, with the FDD framework the thought is to clarify which roles that can be visualised for each business segment (management, marketing, sales, testers, programmers). Why the WBS framework is related to investigating strategies for a more secure pricing approach depends on that it visualises the sub – tasks in each of the five processes in the FDD framework. The thought also is to create charts for the FDD and WBS framework so that firms can look back from one process to another during an arrangement. These tools requires that firms defines the project scope early in the initiation phase and it depends on the requirements of early defining the key roles in the process and both their main tasks and sub – tasks.

3. METHOD

In this chapter, the author presents the methodological approaches used to determine the key aspects to enable price engagements and increased scope control for fixed – price arrangements. The methods chosen will be presented and discussed.

3.1 Data Collection

Researchers wishing to test theories that are involved within casual group homogeneity are advised to use measures that focuses on units from a whole perspective in order to maximize the group variability in a research sample (Klein et al, 1994). To test a homogenous – group theory researchers can collect data from different groups, using objective measures or expert ratings. Klein et al (1994) also states that researchers that wishes to test theories on individual independent groups are advised to use measurements that draws attention to everyone's unique experience. This is important to maximize the probability of having well established individual variability. Further Klein et al (1994) discusses about the possible strategies for both empirical and analytical data collections. The other type of researchers wishing to test theories that is included in group heterogeneity are advised to use measurements that highlights the position of the individuals involved in the research study. This enables collection of data from number of groups where researchers should ask an expert on each group, where a forced choice scale should be implemented to rank the members with respect to the constructs of interest (Klein et al, 1994).

Collecting data for this research is based on the five steps conducted in the theoretical framework for the FDD framework. Data will be collected as a strategy when sending out a survey to relevant customers. The survey questions will be related to the data extracted from the interviews. The results the conducted from the survey will lay ground for further research in how firms can use the FDD and WBS framework to support contracts with minimal costs.

In implementation research the most important factors are both qualitative and quantitative methods and this depends on:

- The purpose of answering the same questions through research from different available sources.
- Answering questions in a complementary fashion.
- Using one sets of methods to explain and obtain relevant information from the use of other sets of methods.
- Using one sets of methods to get analytical and logical approaches for the use of the other methods involved in questioning and determining the research problem (Palinkas et al, 2013).

Further Palinkas et al (2013) presents a review of mixed methods that can be used in the implementation of the research conducted to reveal seven different simultaneous structural arrangements. Palinkas et al (2013) also presents existent sampling designs which includes the selection of unusual manifestations of phenomena of interest. It is important to select cases with maximum variation where the purpose of documentation is vital in adapting to different conditions, and to identify certain patterns for these variations when selecting correct homog-

enous cases (Klein et al, 1994). If the initial method is quantitative the sample selected for determining the research question may be too wide for everyone from a homogenous perspective to be included in qualitative analyses and will also lack purpose for selecting correct information. Palinkas et al (2013) also states that when having potential participants for the collection of information, it is important to choose participants with experience and knowledge. The lower correlations there are between two dependent variables in forming a research question for quantitative analyses of clean data the higher the rate between both false and positive variation there is (Simmons et al, 2011).

3.1.1 Collection of primary and secondary used data

In the upcoming section a collection of tools used for the data collection will be presented. This section will describe the methods to determine the advantages firms can make when choosing fixed price contracts when using concepts discussed in the theoretical framework.

3.1.2 Documentation

Information is considered as one of the most important factors for enterprises in quality management systems (Grudzien et al, 2016). It is not easy to determine and concretize on which level the quantity and the range of information should be collected to establish a platform for information. The extent of the quality management system documentations can differ from different type of organisations, due to their separate complexities and interactions.

The type of documentation that was conducted in this study was the documentation of the internal services that was made for the company. A business model canvas was constructed to visualise current key activities and stream revenues (Grudzien et al, 2016). This helped to visualise current activities to help the project management team to make decisions regarding future focus areas. Documentation regarding benchmarking activities was conducted to see where current competitors spend their resources and their focus areas for the next upcoming decade. The concept of Marketing Mix presented in the theoretical framework determined the key variables for pricing fixed – price contracts. The picture below describes the process from pricing a FP contract to determining which variables that should be identified in this arrangement. In this case the Marketing Mix concept with the seven business strategies resulted in that the most relevant variables that should be included when pricing a FP contract is: variable pricing, project scope definition, profit margin, and customisable solutions.

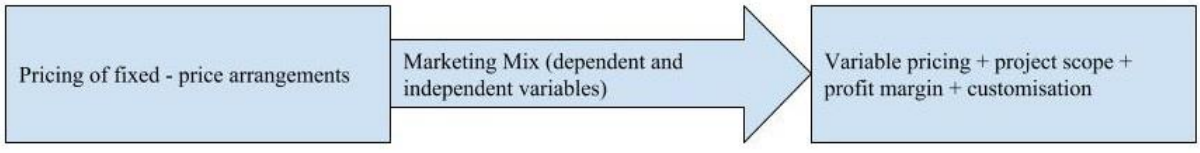


Figure 3.1 Pricing equation that involves both dependent and independent variables conducted after the implementation of the Marketing Mix concept for Sigma Connectivity AB.

3.2 Interviews

The thought of using interviews as a method for data collection was based on getting a deeper insight in the investigated firm's current issues regarding the risks in a FP arrangement. This information was vital where the aim was to visualise which departments within a firm that should be involved when going into a FP arrangement to easier determining the key roles, so that firms can provide this contracting form with clearer specifications. Interviews as a choice of method also laid ground for the survey that was sent out to customers dealing with this contract form, where a lot of time was spent on specifying which questions that would be vital to investigate.

Using interviews as a choice of method in this study was important to increase the knowledge about the research topic and also to broader the perspectives on the significant disadvantages that the firm internally has had when providing FP contracts. It also helped to visualise and identify the key variables in the contracting form were further investigations needed to be made to increase the possibility of providing this contracting form with a clear set scope.

The advantages with the choice of method, having both semi – structured and directive qualitative interviews, was that a lot of preparation before holding the interviews needed to be made. With this preparation, a huge amount of time was spent to research about the topic in order to create and construct interview questions that were of significance to meet the research questions and the founded objectives stated in this study. The questions need to be constructed in a consistent way that doesn't lead the respondents in to other topics not relevant for the study. This was one disadvantage, where sometimes too much time was spent on dealing with issues with minor relevance to the topic.

To establish a strong participant – interviewer relationship the approach was to construct questions after the four independent variables presented in Figure 3.1 as independent variables. In order to solve the problem of pricing fixed – price contracts the Sales and Marketing, and Project Management department was targeted. Five interviews were held with experienced people from these departments presented in figure 3.2 below.

Respondent	Company	Participants and roles	Role for study	Interview type
1.	SC	Project Manager	Key informant	Directive interview
2.	SC	Project Manager	Key informant	Directive interview
3.	SC	Technical Sales	Interview	Semi – structured interview
4.	SC	Creative Director sales	Interview	Semi – structured interview
5.	SC	Business Development and Sales	Interview	Directive interview

Figure 3.2 Represents a table of the participants in the interviews held internal at Sigma Connectivity.

The interviews held were based on qualitative directive interviews and semi – structured interviews. In order to increase the profit when pricing FP contracts all of the respondents stated that a firm has to over price this contracting arrangement to make decisive profit margins. Finding strategies, that enables the possibility to get continuous feedback during the project in a buyer and seller arrangement was also an investigation were further research needed to be made.

As a conclusion of this there is a huge potential in small projects with start – up companies, the problem that the company previously had in FP arrangements was the inability to incorporate new ideas during the project process. Firms today know the issues of the FP contracts but have had difficulties in finding strategies for dealing with them. The FDD and WBS framework will give firms a clear way of working towards these issues. This led to more costs and resources spent from the vendor's perspective. All the respondents stated that the most important key variables that must be determined for more detailed and efficient pricing approaches in FP contracts is:

- A method that increases the comprehensive dialogue in a buyer and seller arrangement.
- Finding the possibility to divide the project process in smaller mechanisms enabling strategies for better scope control allocations.
- Finding a strategy were firms can price the project in intervals; Execute → Price → Execute → Price.

The respondents (Sigma Connectivitys customers, Doro, Facebook, Google, Fingerprints) also clarified that in order to provide clearer specifications in a buyer and seller arrangement about what is covered by the scope the firm internally must be better on documenting each process going on during the project process. The survey, the implementation of the FDD framework and WBS led to further investigations after the respondent's statements. Finding scientific proven tools that could increase the dialogue for more detailed scope agreements was one of the main objectives stated in the build - up phase for this study.

3.2.1 Key variables for determining interview questions

Value - based pricing is a pricing strategy that takes the customers perceptions of service value into account, and it allows firms to earn higher levels of profit margins than other pricing methods (Calebrese, Francesco, 2014). To price projects and contracts using value – based pricing it is important to understand customers service values. The interest of study for this independent variable was therefore to see how Sigma Connectivitys competences increases the customer's willingness to pay for a service, and how they attract customers for projects. This is according to Calabrese and Francesco (2014) related to the profitability of new services and for communicating a firm's service quality to customers, which help firms to attract new customers for service development approaches.

Customisation is the other independent key variable for pricing fixed fee arrangements in the company. When talking about this phenomenon there are several of processes in a product developing firm which can be customised after customers' requirements such as resource allocation, control flow, software sections and monitoring (Bressani, 2011). Monitoring a process when using customised approaches can be leveraged to reduce the perceived lead time of cur-

rent outsourcing relationships. Bressani (2011) also states that firms within the software industry acting as product developers must enable control over externalized business processes to synchronize their internal business. Product customisation are solutions that are customised to a specific group of clients that wants to implement a new or developed solution in their business (Mujtaba et al, 2010). Further research also shows that Mujtaba et al (2010) states that customised solutions are of high priority and cannot be implemented in the next release for the overall product or service. This is challenging in markets that are dynamic, where companies have to deliver customised solutions with short lead time. Customised solutions must be integrated quickly, this depends on that market needs change and that customization can become obsolete (Mujtaba, 2010). This key variable led to interesting research approaches where the direct qualitative interviews were held to justify how Sigma Connectivity in fixed fee arrangements structures their customised processes, and also to clarify how the organisation deals with scope changes when new information is available from the customers.

Project scope change is a reality for any project, and it is important to have great control of the tangible assets that can occur when the client provides new information. Scope creep holes can result in horrendous proportions and may force project cancellation (Khan, 2006). Khan (2006) also determines that an effective scope change control mechanism can lead to that firms gets more sensitive in the project planning process phase and have easier to classify the types of scope change requests that can occur during fixed – fees arrangements. After the project initiation phase the objective must be defined to clarify the expected outcome for the project (Overgaard, 2010). Overgaard (2010), also determines that project execution requires that every member in the project team understands the goals, values, and expectation. A clearly defined project scope will help all participants to have full access instantly to all relevant data.

The Project Definition Rating Index (PDRI) can help a project team to define overall project requirements for developing and constructing a project team under specific contracting forms. It can also be used to understand the current baseline of project definition (Dumont, 1997) Dumont (1997) also clarifies that the PDRI can help the project team to determine which factors are the most relevant in the package of the project scope. It also reflects on the quality and completeness of risk assessment by highlighting the weak areas. The PDRI also helps teams to identify the key areas that needs to be developed when a scope change occurs in product development (Khan, 2006).

The further investigation for this focal study when using both directive and semi – structured interviews was to visualise and get a deeper understanding on how Sigma Connectivitys approaches for fixed – price projects looks like and where further research needs to be made in order to get stability for the actual return related to these projects. The investigation for developing relevant questions also lied on how Sigma Connectivity could enable a better risk exposure under the fixed price contract to induce the vendor to adopt strong and well established risk mitigation strategies (Gopal et al, 2008). Gopal et al (2008) also states that if a firm is given the primacy of risk exposure the vendors preference would be to choose a Time and Material contract (T&M) over the fixed price contract (FP). The vendor will prefer the FP contact if the information rents available provides higher value than the cost for risk protection (Gopal et al, 2008).

The investigation during this key variable of increased profit margin lied on which contracting form the employees at Sigma Connectivity finds the most profitable and also to see the Sales and Marketing and Project Management departments perspective on how the firm can

tackle the risks of going in loss when using FP contracts, and to investigate on which pricing strategies they find most profitable in this contracting arrangement.

Increased profit margin is something that all product developing companies within the IT – industry strives for when providing FP and T&M contracts. Pricing has historically been a huge part of the marketing functions coming from costs and the impacts of analysis related to finance (Calogridis, 2006). Calogridis (2006) further determines and states that the sales for a company has a big stake in service pricing strategies, where the company's leadership must have a desire to have pricing as a central strategy to increase profit margin. Marketing has a very strong interest in the price points created for all contract types, where marketing product managers should own the pricing analysis tools to determine the most sensitive key alignments. The examined supplier's responsibility for delivering the services within the period must determine the situation in which the manufacturer would accept the presented contract (Timothy, 2007).

For a FP contract the operator or client pays the service provider a fixed price for the completion of a project within a specific time frame. If the supplier exceeds the specified time, the contract is renegotiated which results in lower payment per day for the supplier as a punishment for not following the project planning process in the initiation phase (Sund, Hausken, 2012). Further investigation needs to be made according to Sund and Hausken (2012) regarding how firms can increase the contractual opportunism and also how the agents can increase their incentives of developing for maximal effort. The supplier in this contracting arrangement may work for its own goals rather for the customers and therefore it is important to have continuous comprehensive dialogue between the buyer and supplier to determine the key roles and key aspects involved in the project scope (Turnera, Simister, 2011).

A market exchange problem can be visualised when the inability of the seller to contract with a buyer on a source for an extent transferred idea is clarified. When having an intangible property such as IP, the source around this property may be difficult for a third party to verify. If important ideas for industries originate outside the industry area it is vital to understand the market for ideas and its importance when providing a contract form to the customers (James, Yao, 2002). The interviews related to this key variable provides the tangible information regarding developed pricing strategies, risks within FP contracts and also gives incentive on customer's behaviour to define clear scope management approaches.

3.3 Survey

After the interviews held the aim was to investigate on which method that would provide information for raised value to the company when pricing FP contracts. The information received both non – verbal and verbal data and it was shown to have the most relevance in a survey. As David et al (2016) states companies which engage in surveys have a problem in determining which results that are valid for further research. To reduce this problem of firms engaging in surveys, keywords from the interviews related to the current problems of pricing FP contracts were determined in order to see which contracting form customers finds most valuable and how firms can increase the potential of making higher profits with FP contracts.

The use of internet surveys in scientific research could be considered as an additional option to determine the customer's perspectives of a current issue (Tsuboi et al, 2015). Tsuboi et al (2015) also states that when selecting the right respondents, it is important that the company

involved in the research study should be aware of the possible outcomes from a survey based approach.

Several benefits exist for using a survey in a focal research study, the first one is related to colleting the data. With a survey the possibility to easy collect data depends on the possibility of administrating it to many individual at a single time. The data is very easy to analyse and can be used for the description of the population of interest (Aaron, 2012). Aaron (2012,) also states that some of the research methods can be inexpensive and helps to keep the current budget for a research approach low.

The survey conducted vital information to enable the implementation of the scientific proven tools FDD and WBS. The aim with survey was to investigate on which contracting form customers finds most valuable, and also to identify current risks with both T&M and FP contracts, the most profitable pricing strategies and project evaluation. As a conclusion of the 104 respondents which engage in the survey the answers with most significance to the research topic was:

- It is hard to incorporate new ideas in FP contracts (figure 4.2).
- Follow – up with customer is the best way for a project finalisation (figure 4.6)
- Value – based pricing is the most optimal pricing strategy in a product developing firm (figure 4.7).
- The supplier's competence is the factor with highest relevance when choosing a supplier for a project delivery (figure 4.9).

The bullet points stated above was the answers that most of the respondents found as current issues in product developing firms. The survey helped the research study to demarcate itself were the key variables were determined that later could be integrated in the concepts of FDD and WBS.

3.3.1 Why a survey?

The choice of using the survey as a method for this study was determined after that the research questions were established, where close internal communication was held with the project managers at the company. Early in the process the interest lied in making a survey, understanding their incentives and their opinions regarding current risks in both T&M and FP contracts. Making a survey study reliable is all about finding a good number of respondents that has the knowledge about the research topic. The disadvantage that was faced during the process with the survey, was that a huge amount of time lied on finding current customers through social medias, e – mail, with the knowledge about FP and T&M contracts. In this research study, the survey was vital in determining the objectives stated and also to find the key variables that could be investigated and integrated in the FDD framework and WBS for profitable pricing engagements.

The explanation of using a survey based approach lies on improving the perceived information from the customer's perspective (Scheel et al, 2014). In this the investigation lied on which contracting form customers found most valuable, and also to see how they tackle the risks of using T&M contracts, where the financial risks lie on them. The use of a survey depends on the ability to present an attribute explanation of a firm's current issue to provide feedback in an efficient way (Scheel et al, 2014). The conducted information from both the

directive and semi – structured interviews resulted in the determination of the key issues stated below:

- Which risks customers think has the biggest influence on the financial framework regarding FP and T&M contracts.
- To look on which driving factors that are most important for pricing a service (gross profit, interest rate, cash management).
- How the customers grade budget overrun.
- How they evaluate a project (meeting with customers, surveys, final reports).
- Which pricing strategy they find most relevant for a product developing company (value – based pricing, price discrimination, penetration pricing, cost – based pricing).
- Which process overall that they think generates most revenue (service design, customisation, operational efficiency, standardisation).
- What the most important factors are for a customer's when selecting a supplier for a project delivery.

The survey was constructed with 9 mandatory multiple questions where the last question required a more detailed description of the customer's current problems of using T&M contracts. Aaron (2012), determines as mentioned above that due to the low budget used for this research the easiest way to get relevant information for the implementation of other methods was to use a survey based approach.

3.3.2 Selecting respondents

During the past decade, online research for sampling information has increased massively. To tackle this growth researchers have developed new strategies for accessing respondents. Further research shows that it is common for individuals to use more than one sample source for collecting relevant information for a problem (Terhanian, Bremer, 2012). Terhanian and Bremer (2012) also considers that firms should use more than one sample because it might address the need for more respondents, but it might also decrease the representativeness and reduce response accuracy.

The survey in this study was sent out large sized enterprises (more than 250 employees), within the IT industry. With help from the project manager internal at the company, the survey was reached out to current customers, the choice of sending this survey out to current customers depended on that they during previous years have had a FP arrangement with the company, and therefore the possibility to extract more information about current issues in this arrangement was possible. Social medias such as LinkedIn was also a tool used to increase the number of respondents. The most important thing was to target a group which had good knowledge of the topic. To do this, short briefings were held continuously with the project managers.

3.3.3 Key issue determinants for the survey

Looking on the financial risks was related to research regarding current federal policies and the risk that software vendors (sellers) take in creating FP contracts (Frick, 2013). Budget overrun is a phenomenon that over the last years has inflicted IT based systems, this depends on that firms within this sector makes large investments in information technology to take competitive advantage (Calisir, Gumussoy, 2005). Calisir and Gumussoy (2005) also states

that firms know the risks with FP contracts, and the interest therefore lied in investigating on which level firms grade budget overrun to see if the firm is a risk taker.

Project evaluation is very important to attract customers back for future projects. By making investment decision after a project firms will be able to get substantial knowledge and analyse capabilities between the buyer and seller (Olsson et al, 2010). This was involved in the survey because if a firm making arrangements for both FP and T&M contracts and lack incentives of having continuous comprehensive dialogue with customers it is hard to define a clear project scope and the budget is therefore often consumed (Frick, 2013).

Risk can be called as a measurable part of uncertainty in a firm, and to treat this it is important to deviate it from the desired level. For FP contracts a positive and negative deviation must be considered (Dziadosz et al, 2015). The risk factors of using a FP contracts must be classified and divided into different risk factors such as impact and categories related to decisions to achieve specific objectives according to Dziadosz et al (2015). The interest therefore lied in investigating on which risks that are most significant for customers when using both FP and T&M material contracts. The aim with this was to visualise and concretize how the concepts described in the theoretical framework (FDD, WBS, and Marketing Mix) can be adopted and implemented to tackle these risks. As Frick (2013) mentioned 31 % of FP projects leads to a budget overrun, this depends on unclear specifications between the buyer and seller when creating the contract. If firms will be aware of the major risks that customer thinks have biggest influence on the financial framework for this contract the implementation of already established tools will be easier to handle (Calissir, Gumoy, 2005). Dziadosz et al (2015) also presents the basic classifications of random factors of risk that can occur in a contracting environment. These are financial, technological, and organisational risks.

In a heterogenous customer market pricing strategies are beneficial, this depends on that their purchasing behaviour varies over time where their willingness to pay differentiates from customer to customer (Dolgui, Proth, 2010). In these markets the demand variability and also the degree of uncertainty is high, therefore a firm which masters pricing in these markets can earn very high profits when developing both customised and standardised solutions to a customer. Dolgui and Proth (2010) also presents a conjoint measurement analysis used for market segmentation where these tools can reveal the major characteristics of a service. This approach can be conducted with a well – known signal theory which gives notice of the competitors pricing approaches for a long time in advance. Conjoint measurement also applies service quality and trademark reputation in the business internally.

Considering which pricing strategies customers finds most valuable for product developing firms in the IT – sector will help Sigma Connectivity to define the project scope when providing FP contracts to the customers. If a customer finds value – based strategies as the most profitable pricing strategy, Sigma Connectivity will be able to set a value for developing a customised solution and present this to the customer with clear project descriptions both in the project initiation phase and the construction phase (Gopal, Sivaramakrishnan, 2008).

Further investigation lied on which factors that the customers found most important when choosing a supplier for a project delivery. Knowing this firms will be able to accurately estimate how they can tackle change order implications for FP contracts (Dolgui, Proth, 2010). To the best of our knowledge, there is at the moment no supplier optimisation model that incorporates the elements of price, experience, and competence. The use of Burkes Model in

firms can help them to incorporate knowledge sharing elements, and to investigate on the optimal sourcing strategies which is related to the quality of the supplier's capacity for delivering a service within a specific time frame (Lester et al, 2013). In T&M contracts the risks lies on the customers and therefore the supplier prefers this contracting form (Gopal, Sivaramakrishnan, 2008). If the client has the complete information necessary about the supplier's capacity regarding cost structures, Gopal and Sivaramakrishnan (2008) states that there is no major reason that this information not will be leveraged. When observing, the factors regarding T&M contracts, it is shown that if customers doesn't provide any private information to the supplier it will increase the supplier's preference of using T&M contracts, therefore it is important that customers provide correct information to the supplier when they want to develop a service under this contract form. The interest here lied in investigating on how Sigma Connectivitys current customers tackle the risks of using T&M contracts where they are responsible for the financial framework. By sharing this information, the supplier's preference of only using T&M contracts for higher profit margin will decrease and firms will be able to switch focus by finding new strategies to deal with other alternatives of contracts (Gopal, Sivaramakrishnan, 2008).

3.4 Feature Driven Development

The FDD is as mentioned before an agile software development method that is composed and described by five methods making it easier for firms to define the project scope and also the requirements set up before a project start (Rychly, Ticha, 2008). The first process of *"Developing an Overall Model"* is used in collaboration with experts and developers, to create a domain object model. This domain object model is divided in series of walkthroughs in a software systems scope. This model also presents a context for each problem in the current domain, to help capturing the key abstractions and their relationships in the whole system (Rychly, Ticha, 2008). In this first FDD process recommendations of using UML visual models with objects that are coloured is vital according to Rychly and Ticha (2008). The implementation of this overall model will help Sigma Connectivity to estimate the FP contract initiation phase by being able to visualise key roles internal in the company. In this phase the entry was to select the domain experts, chief programmers, and the programmers for this overall model. The exit criterions were focused more on making class diagrams related to the model shape. This initial model provides a basis for the feature – lists in the second FDD process.

The second process supported by this tool is called *"Build a Features List",* is a list of feature where each feature gives the description of an object in the domain model. These features can be defined as a small value piece to the client of a systems functionality (Rychly, Ticha, 2008). Rychly and Ticha (2008), also states that these features are divided into areas of subject which visualises business functions or business domains. This feature lists were constructed in a way with a team consisting of chief programmers that were formed to compose the systems functionality to easier divide the specifications in a FP contract.

The domain was also broken down into smaller areas, where each area was broken down in several activities. By building a features list Sigma Connectivity will be able to provide correct information about what is covered by the project scope. The interaction between the buyer and seller will be forced to be held continuous, where the buyer will understand the specification of purchasing a FP contract. This list is composed within a time - frame of two weeks as Rychly and Ticha (2008) states. The risks regarding what is covered by the project scope, will be reduced as the clear specifications in this list will help Sigma Connectivity to provide a FP contract were new ideas rarely will be incorporated.

The third process *"Plan By Feature"* can be described as the process where the feature – sets in the earlier process are analysed and their time intensities are estimated in a simple way. These feature – sets are sorted according to priorities by the customer's representatives (Rychly, Ticha, 2008). Here a timetable for the feature sets was created included the time of a project and its estimated duration. Rychly and Ticha (2008), presents two requirements that are contrary to each other. It is important to keep the start – time and duration of the whole project with the permit of individual planning in the scope characterized by feature teams from each process. In order to balance and control these requirements it is important to split the whole project in intervals of two weeks. A burn down chart was here created where the exit criterions consisted of looking at the current business activities with both monthly and daily dates. This burn down chart also shows the responsibilities of the chief programmers assigned to the business activities within the firm. This process will help Sigma Connectivity to estimate the current activities within a framework of two weeks. What is included and excluded in the contracting form will be determined.

The three processes described above are the processes involved in the project initiation phase when talking about the construction phase, two processes called *"Design By Feature"* and *"Build By Feature"* are involved. Here the members of the feature – team collaborate to make a sequence diagram and designing interfaces (Richly, Ticha, 2008). Further research shows that Richly and Ticha (2008) also investigated on these two processes where results shows that these are processes that focuses on designing and building customised individual features. In the *"Design By Feature"* a chart was constructed too cover the memos that integrates and describes the design package in a clear way. Here the feature team is dependent on the chief programmer and also the class owners developing software solutions that are customised. In the *"Build By Feature"* the investigation lied on making a chart for the code inspection related to classes that have been promoted to build. To complete these phases both the start – up phase and the construction phase roles needed to be defined. And it was shown that the roles could be classified into three categories:

- Key roles: Project manager → responsible for leading the project. Chief architect → responsible for designing the overall system, both the start – up and construction phase. Manager responsible for development → Coordinating the different teams, continuous dialogue, and feedback. Class owners, chief programmer, class owners → Their main target is to visualise detailed knowledge of user requirements.

- Supporting roles both in the project initiation phase and construction phase: Release manager → controls the progresses of the whole process. Language experts → Experienced programmers. Building engineers → Building the processes. Individuals responsible for administrating the system → technical support of a project responsible for continuous communication with the customer regarding what is covered by the scope.

- Additional roles: Testers → verifies that a system fulfils the requirements. Deployers → Maintains the data collaborated and calculates on the next release for a customised service. Technical writers → Documentation.

The implementation of the start – up phase conducted by the first three processes will lead to that Sigma Connectivity will have a great position when estimating the costs for FP contracts.

In the first three processes, it is all about modelling and listening to customers' requirements. This feature lists built in the project initiation phase is all about a complete statement of requirements, where the construction phase is used to accounting for dependencies related to class and area functionalities. Richly and Ticha (2008) states that there are many similar features that can be recommended by the five processes composed in the FDD method description. This tool supports top – down and bottom – up approaches to create feature lists and it also decomposes features into activities. It helps to estimate the risks by breaking down projects into smaller parts where the roles above have a huge effect on the outcome. The FDD phase, contains a predictive metric, and it is used to calculate available indicators early in the project. This tool will help the customer to allow estimates to be evaluated and tested at the project start. The project scope and the duration of the project will be negotiated with clear descriptions. The five processes described will result in a low-cost entry for the project.

3.5 Work Breakdown Structure

The project and the system it supports and delivers, a product or a service always needs to be developed and tested in a specific way. Each component involved in the development and the test execution should be involved in a project plan. Work Breakdown Structure (WBS) is as mentioned before a framework and a process for integrating the different perspective of a complexed system (Sharon, Dori, 2013). Sharon and Dori (2013) also provides further research the WBS framework and they state that this tool is the source for project cost estimations, schedule planning and risk mitigation. In large and complex projects the WBS corresponds to the layer of the system infrastructure, and it also provides detailed information on project activities, showing current input and output resources (Ren et al, 2014). Ren et al (2014), also states that project managers need to integrate project domain frameworks if they want to facilitate the creation of a work process model.

The construction of charts in the FDD process described above generated domain knowledge that was critical in order to create a WBS – chart for the optimisation of pricing FP contracts with a more defined scope and clearer specifications in a buyer and seller arrangement. As Gopal and Sivaramakrishnan (2008) stated the return when using a FP contract can be higher if firms can control the structure of the initiation phase and construction phase in a manner where the scope covers all the costs constructed in the planning process. Sigma Connectivitys different departments where here broken down into smaller categories as shown in the picture below. The FDD tool was a help to visualise the key roles interacting under each department which enabled easier strategies to break down it into different categories when using a WBS framework. This tool will help Sigma Connectivity in the planning process when providing FP contracts and it will also lead to increased comprehensive dialogue between the buyer and seller (Ren et al, 2014).

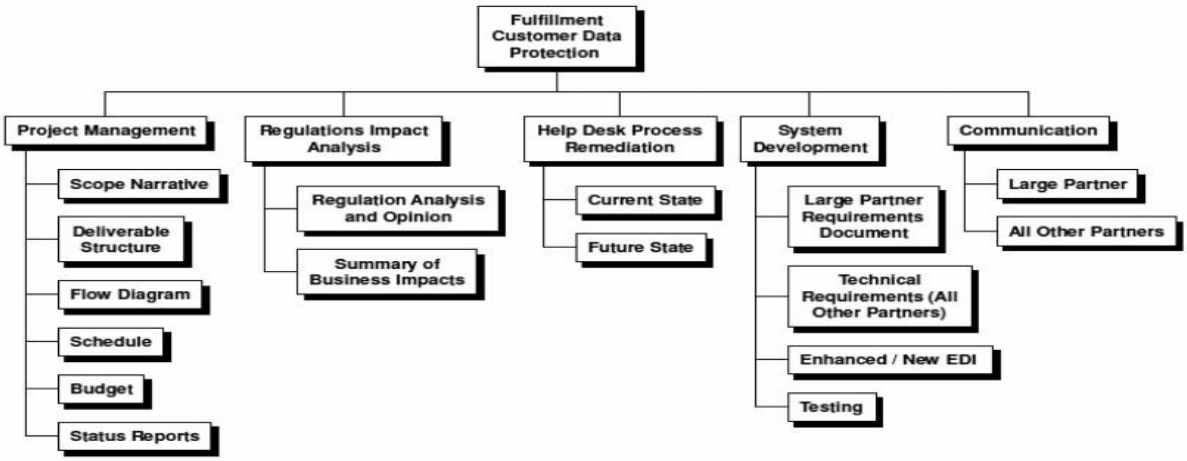


Figure 3.3 an example of the Work Breakdown Structure for system development (Sharon, Dori, 2013)

Further research also shows that the WBS decomposition requires support from the software engineering department and in order to study the transformation of current management objects firms must accurately capture the features incorporated in the management section (Ren et al, 2014) (Sharon, Dori 2013). This process enabled strategies where the research of management integration using the FDD framework described above helped to identify and prioritise the fundamental information resources for each department in the WBS, and also to identify the key data resources for large complexed project in a FP arrangement. This method has according to Sharon and Dori (2013) been very successful in large projects where managers have had hard to define what should be covered by the scope. It also helps to visualise and identify possible threats quickly if a project is under danger. Ren et al (2014) also states that this tool increases the dialogue in a buyer and seller arrangement where it is easier to understand the customer's perspectives about what they want to develop. Presenting this WBS structure in the planning process to customers is vital in determining which key roles that will interact under the project process and also how the time frame can be held without complications (Sharon, Dori, 2013).

4. RESULT

In this chapter, the author will present the results based on the concepts described in both the theoretical framework and in the method section.

4.1 Interviews

The five interviews held provided information about how firms can tackle the risks in FP arrangements and also how Sigma Connectivity market themselves, their pricing strategies and which opportunities they have from not being product owners but product developers.

4.1.1 Marketing approaches and cost estimations

The first respondent also acted as a key informant during the whole process and his role in the company is as a project manager. He stated that Sigma Connectivity market themselves as a design house and that this at times cause confusion with some companies wanting Sigma Connectivity to take complete product ownership, but in the most cases they work for customers that want to be the product owners themselves. When asked about which contracting form that produce the most stable profit margin this respondent answered that T&M contracts provides this. Further discussions also provided information that although many FP contract can be significantly more profitable; one bad FP project can wipe out the profit from several others. The firm is currently improving by adding a risk margin to FP projects based on the estimates calculated related to the risk factors. There is a lot more to do when using this contracting form for large projects, the problem Sigma Connectivity has is to calculate a price for a whole project at the beginning, this depends on that under this contracting arrangement it is very hard to implement new ideas and it is also difficult to know everything that will affect the project scope early in the process.

When talking about how Sigma Connectivity price projects the respondent clarified that they make bottom up calculations of what they believe that the project will cost them for developing a product. This also includes a certain minimum profit margin. If it is a FP project, then an additional risk margin also is added to cover the risk in the project. It is the up to the sales and marketing department to determine what they believe that they can sell the project for. In many cases, large companies with experienced sourcing departments will try to break the quotation down into hourly rates so that they can put pressure on the price. If firms want to price a FP contract it is very important to involve the key roles in the documentation, where the Sales and Marketing department in corporation with the project managers should make a credit check on the customers. Sigma Connectivity needs to be better in documenting the project processes and also to have comprehensive dialogue with the customers for small projects. When having projects with start – up companies where the risks of them going into a bankruptcy it is important to take an up – front cost for the FP project before the project starts.

4.1.2 Consultancy market and pricing of FP contracts

The second respondent talked a lot about how Sigma Connectivity market themselves and how their strategies makes them stronger than the competitors. Sigma Connectivity market themselves on social medias, here we talk about medias such as LinkedIn and Facebook. They reach out to different type of customers from different businesses, sometimes customers can

be involved in a large-scale project and never return. Sigma Connectivity always strive to reach out to continuous recurrent customers where their aim is to build a strong relation and partnership. When asked about how they attract customers back in the future for another projects the respondent answered that it is important to monitor the customers at least three to four times per year to see potential development opportunities. It is important to get feedback during the project on how the cooperation between the buyer and seller works. Sometimes small projects can be larger if the customers want to incorporate new information continuously but this is shown only to be successful when using T&M contracts, in a fixed fee arrangement new ideas are rarely integrated and it is up to the firm to make bottom up calculations regarding the costs for developing a service under this contracting form.

When pricing a project the respondent stated that it is demand and supply that controls the price. The prices can sometimes lie between 550 – 650 SEK for an experienced engineer in software development but for IT services the price per hour is much higher, and therefore the companies can use the market and increase their price to 900 SEK. It is Sony and Ericsson that have pressed down the prices which has led to that firms hire consultants for a low hourly rate making it harder to find the demanded competence. This can be one factor making it harder for companies to calculate a fixed price. Traditionally for a FP contract a firm gets paid when the service has been delivered, this can work only if the projects time frame is one month. For larger projects the respondent thinks that you should divide the time frame in smaller parts where continuous dialogue should be held with the customer. When dividing a large project into small parts it will help companies to estimate how much cost that will be needed for one process. Another variant for smaller start – up companies is that you force them to pay an up – front cost directly. He also stated that Sigma Connectivity needs to be better on monitoring the projects especially for small projects, this will help the firm to attract the customer back in the future. For FP contracts, further investigations need to be made on how the firm can divide the departments into smaller parts, making it easier to visualise key activities and the key roles, he stated.

4.1.3 Development opportunities in FP contracts

For pricing a project, it is up to the Sales and Marketing department to determine a price that will increase the profit margin, the project managers have the task to collect information about what the project will mean, and which details that should be considered. If the customer will make approaches for new projects in the future it is important to have final reports and documents where the firm makes continuous documentation the respondent also stated. Sigma Connectivity needs to be better on having a dialogue with the customers and follow – up meetings. The respondent also said that the firm needs to implement routines for having conversations in different time intervals to define the scope in a perfect way when using FP contracts.

In a FP arrangement, the firm needs to be better on being more precise in communicating the values that can be provided when the scope has been determined. Experienced people, related to the developers, project managers and technical sales employees needs to be highly competent. FP contracts needs to be over priced in order to gain profits that will benefit the company involved. A risk margin also needs to be added, and this risk margin can be most profitable if firms will be able to divide large – scale projects into smaller parts.

4.1.4 T&M versus FP contracts

This director sales employee responded that in order to monitor customers back for future projects the firm must have weekly contact with the customer where feedback is given. For customers that are economical sensitive weekly documentation needs to be made.

Today T&M contracts gives the most profit, this depends on that it is easier to incorporate new ideas and where the customer often comes back with a change order. The second thing is that the risk lie on the customer. FP contract can be successful if it is clear what will be covered by the scope, clear project descriptions, a visualisation of key roles also needs to be clarified. Customers often prefer a FP contract this depends on that with this contracting form they have better control of the costs. In FP contracts the respondent stated that the firm should have "disclaimers". By "disclaimers" he meant that firms writing this contracting form should give the customers a possibility to regulate if they want to make changes during the project in this arrangement. Firms needs to require a start – up cost for FP project, to minimize risks and be sure that the customer will pay for the finalised solution.

4.1.5 Scope management and education

In this interview the focus only laid on determining how the firm can tackle the risks with FP contract to see potential development opportunities. The respondent started to clarify that the most important thing for a FP arrangement is to work with the customer jointly and define the scope and objectives early in the process. Sigma Connectivity should use a project schedule that involves each of the activities involved where the key roles are visualised in a clear and understandable way both internal for the firm and for the customers. The respondent also considered that Sigma Connectivity should balance the details to a level where it provides sufficient information and allows management control.

Education is also needed not only internal but also for the customers. Customers' needs to be informed in a way where they now their roles under the contract. This can be stated by better documentation where a good method also is to measure the progress early to its completion by controlling the scope with regular internal reviews. The contract acceptance criterions can be met when using review approaches for developing a service since it facilitates the ongoing assessments.

4.2 Survey

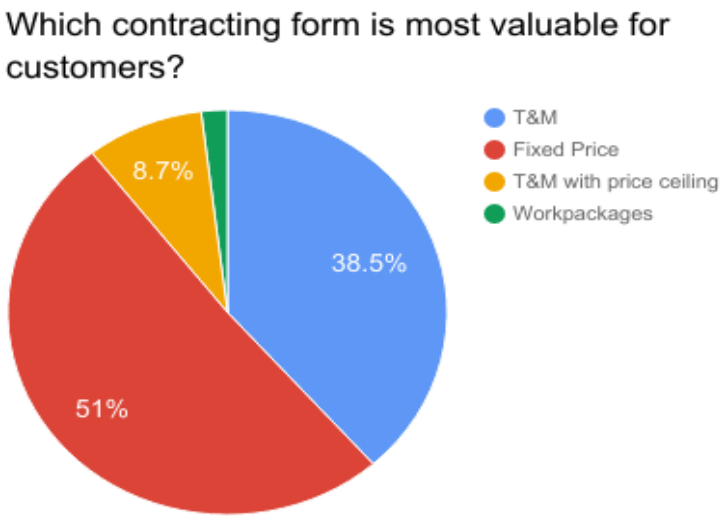


Figure 4.1 Shows the answers on which contracting form the 104 respondents finds most valuable.

The most valuable contracting form for customers is FP contracts, this takes us back to (Frick, 2013), where he stated that within this contracting form the risks lies on the company providing the contract, where firms provide a fixed price in the initation phase. Historically for firms more than 50 % of the FP arrangements results in a loss, but the results conducted here shows how important it is for firms to find strategies for a more secure pricing approach within this contracting type, and this depends on that the majority of the customers prefers this contract in the IT – industry. FDD and WBS is here implemented to find a strategic approach of dealing with current risks regarding pricing approaches and clear specifications.

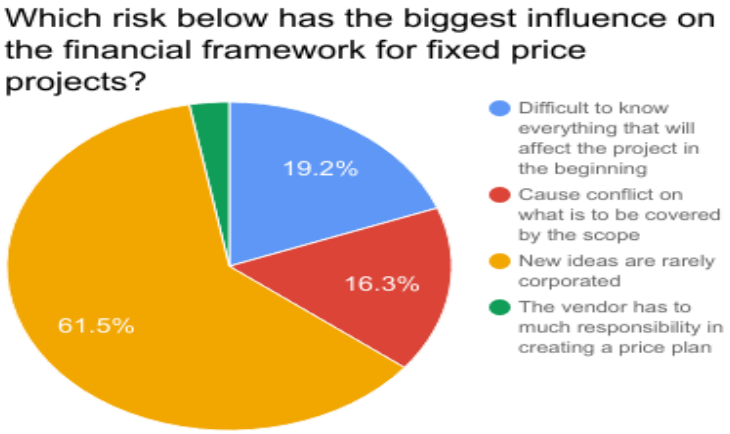


Figure 4.2 Risks with FP contracting strategies

The majority of the customers answered that the major risk within a FP – contract is to implement new ideas during the project process. In easy words, hard to regulate the set project scope when new information is available. The implementation of the FDD framework forces firms to divide the project process in two week intervals where communication between the company providing the contract and the customers is a must after each interval. This will increase the possibility of integrating new customer requests during the project process and still manage the scope costs.

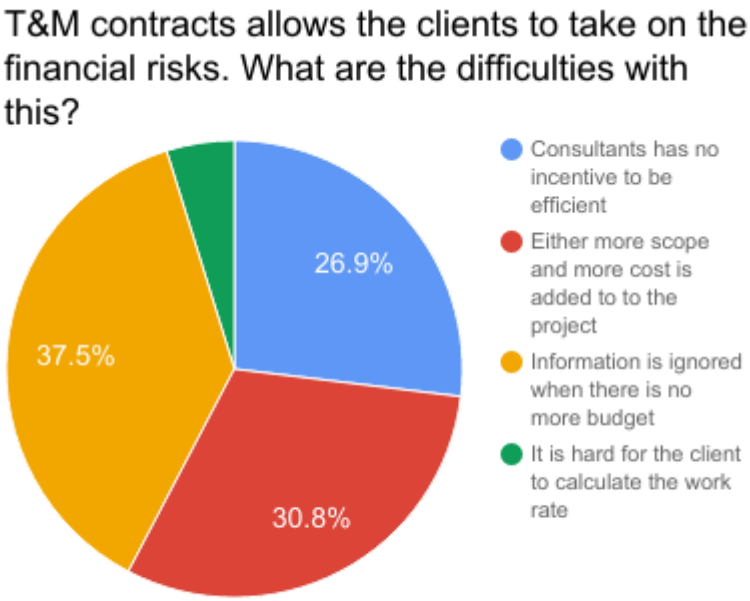


Figure 4.3 Risks with T&M projects

On the other side (figure 4.3) for T&M contracts research shows that information from the customers to the firm providing the contract is ignored when there is no more budget. For the customers the use of the WBS framework will help them to divide each activity in smaller mechanisms making it easier for them to control costs for the material used under a project. This chart shown in figure 4.16 will come to very well use when stating how much material that is left and how much time that will be used for developing a service/product.

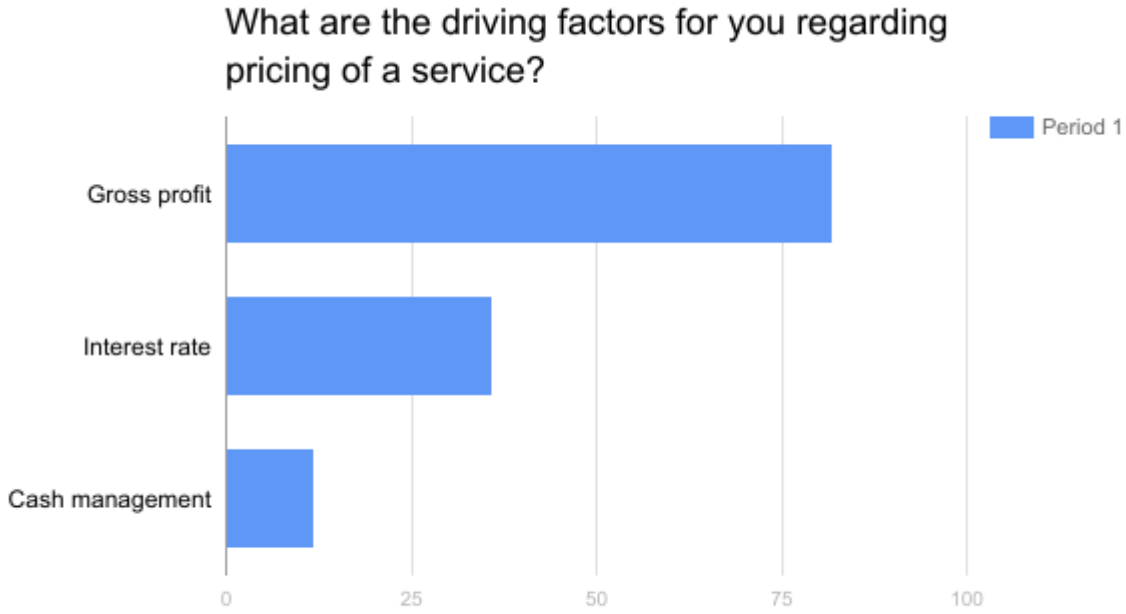


Figure 4.4 Driving factors for pricing a service.

When pricing a customised service or product the most driving factor shown in the picture above is gross profit. Variable pricing or called valuable pricing is the pricing method that has become the most useful for product developing firms as Frick (2013) stated. The challenge for using this pricing method for a FP contract is that it is very hard to calculate the value that the company can earn when arranging this contracting form. FDD will help firms to learn more about the customers this depends on the close contact that is forced to be held twice a month.

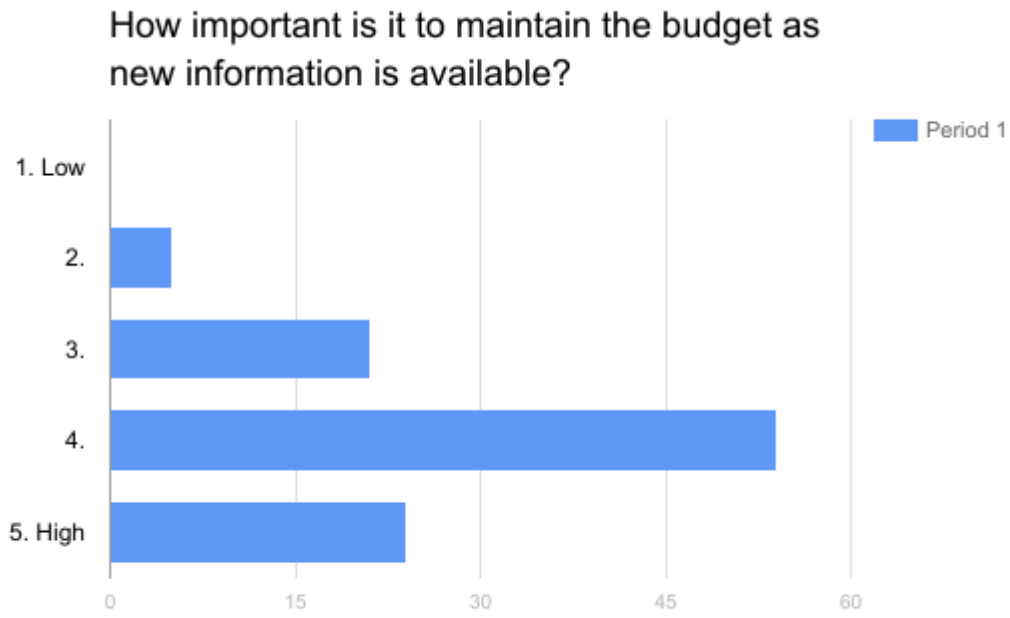


Figure 4.5 Maintaining the budget when new information is available.

Customer's response here shows that it is of high priority to maintain budget as new information is available. With the FDD and WBS framework firms will have the ability to easier control the actual costs, how they will be able to control costs depends on that with the five processes conducted in the FDD framework the visualisation of each key roles responsibility will be determined. Firms will be able to provide a cost for finalising a product and service for each two weeks. If new information will be integrated by the customers the WBS framework will provide a planning chart for each mechanism involved in the project.

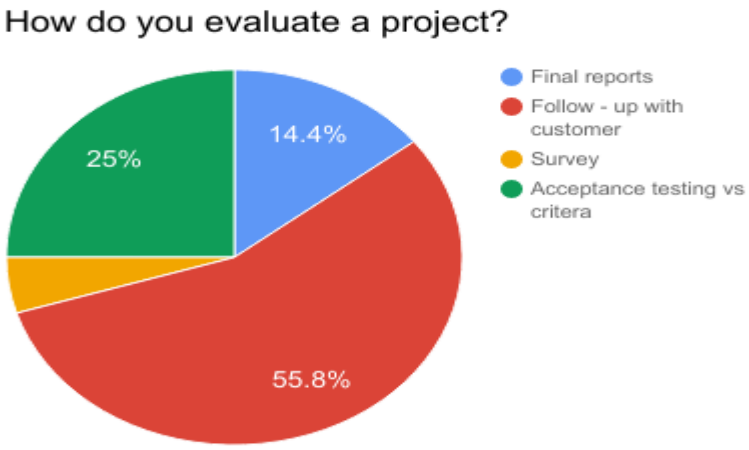


Figure 4.6 Evaluation of a project

After a project process figure 4.6 shows that customers prefer follow – up meetings with the customers, why this was important to investigate depends on that the FDD framework is consisted of having comprehensive dialogue with the customers continuously.

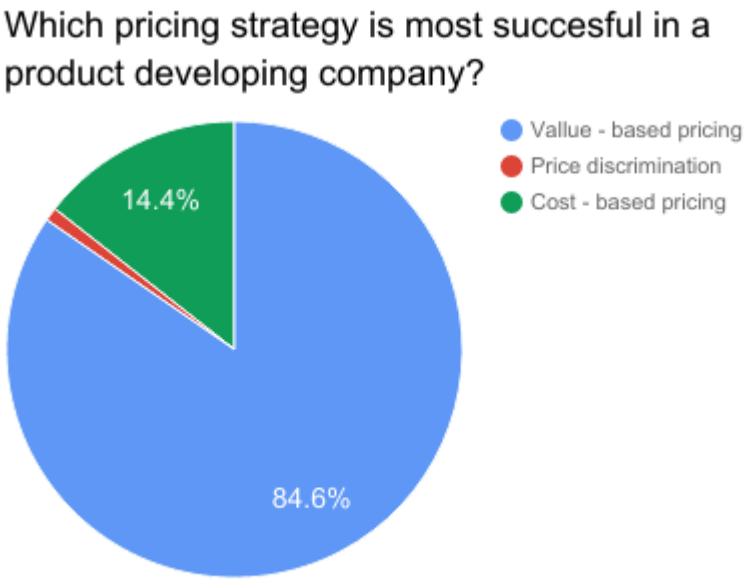
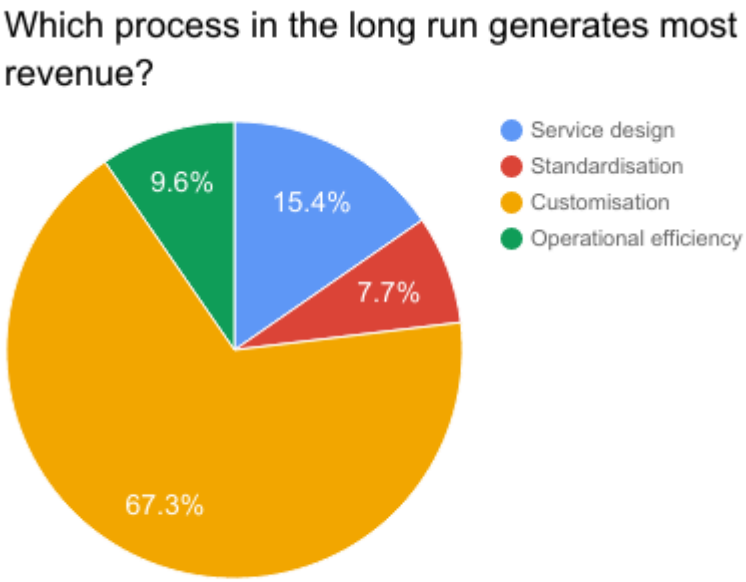


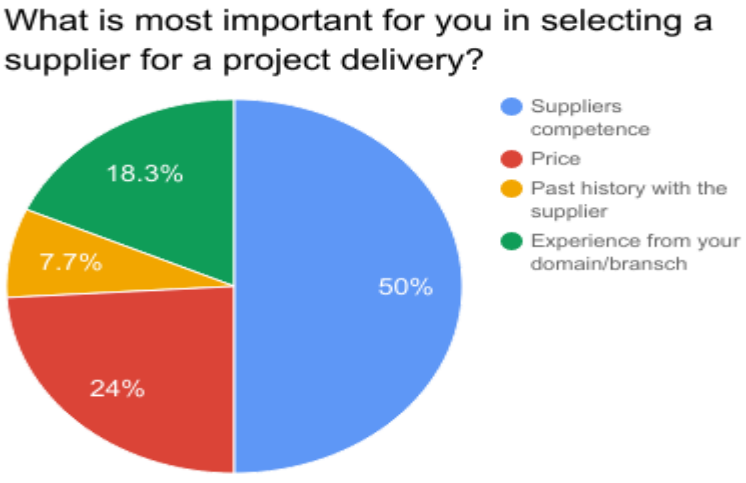
Figure 4.7 Pricing strategies in product development

Value – based pricing approaches is by far the most appreciated by customers, the FDD framework will help firms to add a risk margin on the solution that they are offering to develop. This was previously restricted dependent on that firms in previous years calculated a cost for developing a service in a FP arrangement in the initiation phase, by dividing the project process with clear key roles, firms will be able to add their own value on how much margin they can earn when going into this arrangement and this only depends on that there will be a possibility to break down the project process into smaller mechanisms with activities stated for each mechanism. This answers the research questions of providing FP contracts with clearer specifications and a more secure pricing approach.



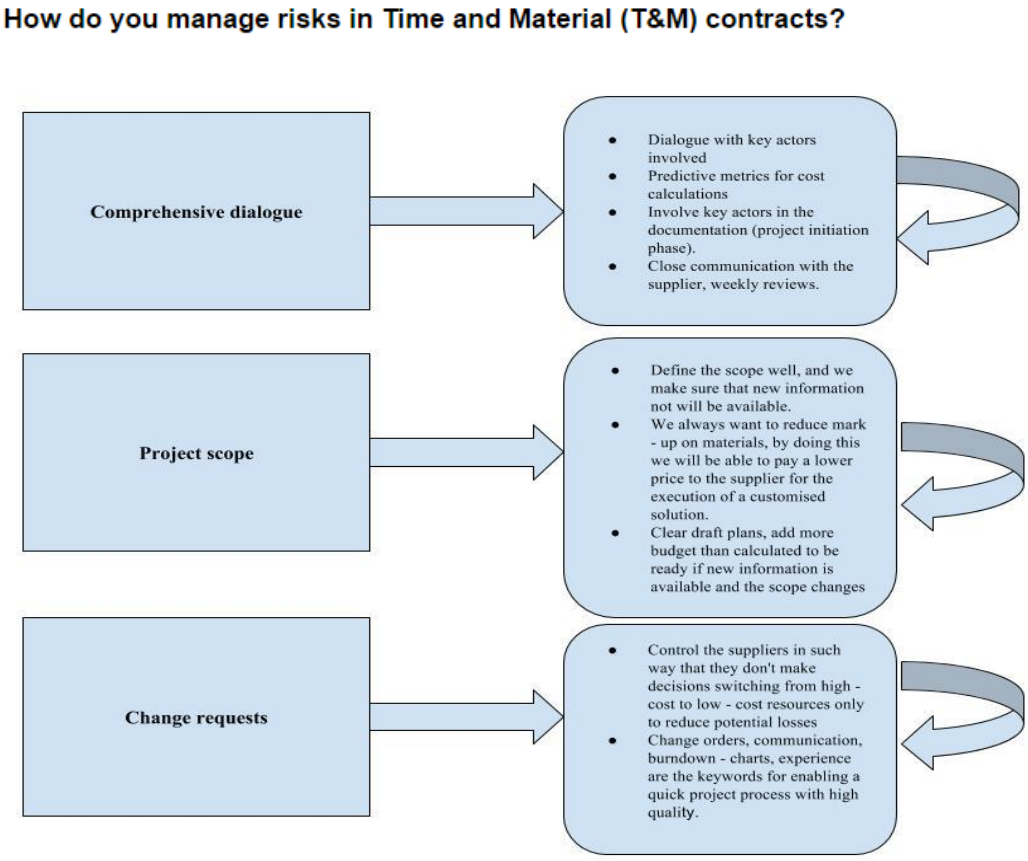
4.8 Processes that generates most revenue in the IT – industry.

Figure 4.8 clarifies that customised solutions are the most appreciated by customers. Why this was interesting to investigate depends on that as Richly and Tichla (2008) stated for agile software methods such as FDD the most profit can be extracted in projects where firms develops products after customers' requirements, this depends on that it will be easier to manage the scope when new information is available because the product developing company then will be able to coordinate the project process and time frame after their own competences and actions.



4.9 Selecting a supplier for a project delivery.

In the first two processes conducted by the FDD framework (initiation phase) firms are forced to have internal reviews, where clear definition of the key roles interacting under a FP contract is a must to identify. This will make it easier for project managers to find the right competence for the right mechanisms and activities visualised. Figure 4.9 shows that the majority of the customers chooses a supplier after his/hers competence for a project delivery. As Frick (2013) stated, firms have had difficulties in determining which role each employee has when interacting under a FP arrangement.



4.10 Customers perspective on which keywords that are vital for managing risks in T&M contracts (Appendix A).

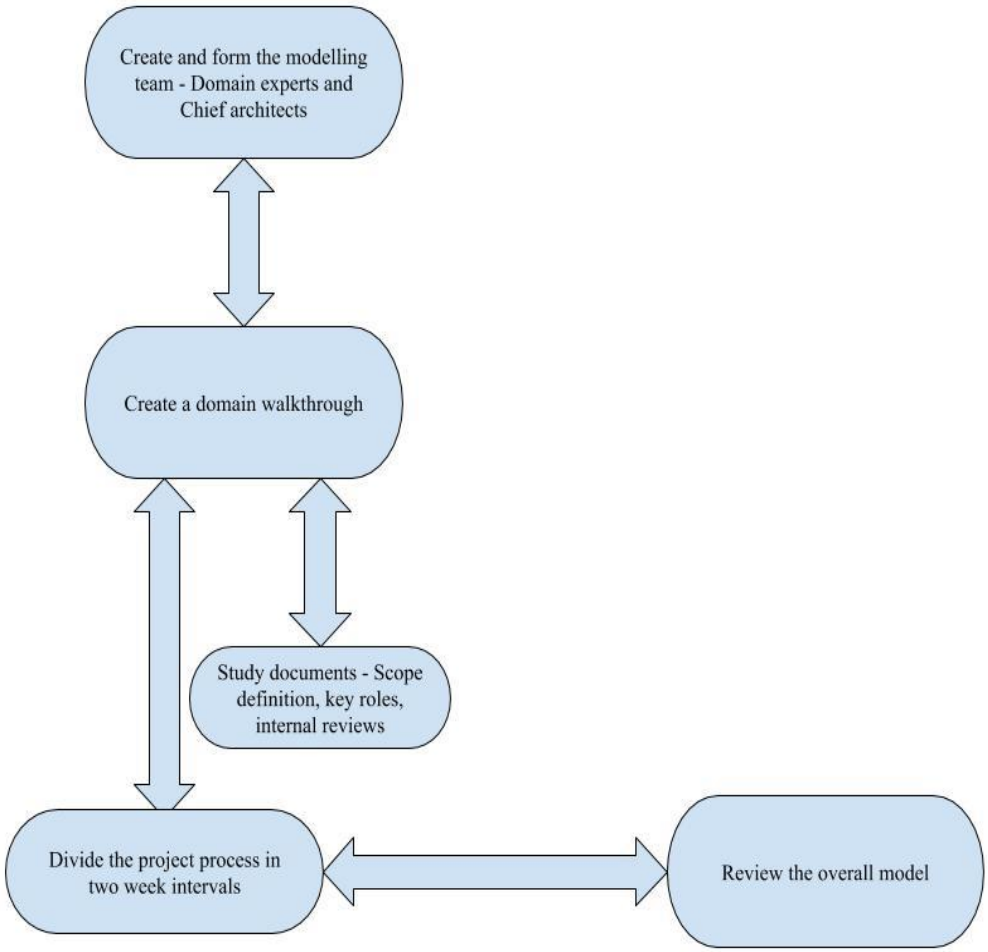
In the bullet points below the three major tasks for dealing with both FP and T&M contracts according to customers are stated under which process the issues can be solved and determined.

- Comprehensive dialogue → key actors (FDD step 2) → metrics for cost calculations (WBS) → Close communication (FDD step 1 to step 5).
- Project scope → Scope definition (FDD step 1 and step 2) → clear draft plans (WBS)
- Change requests → Supplier control (FDD step 1 to step 5) → Change orders (held twice a week).

4.3 Feature Driven Development

The five processes presented by Richly and Tichla (2008) in this agile method is presented below. After conducting the data and results from the interviews and the survey, the process started to create charts for each process in the FDD framework and the WBS. The most significant issues that the majority of the customers responded on in the survey is here clarified. Each process contains of a strategic way of dealing with FP contracts in different environments and for different projects. The Marketing Mix concept and the price equation shown in figure 4.3 laid ground for the work approach of making the FDD to a visualise tool and work chart for firms within the IT – industry.

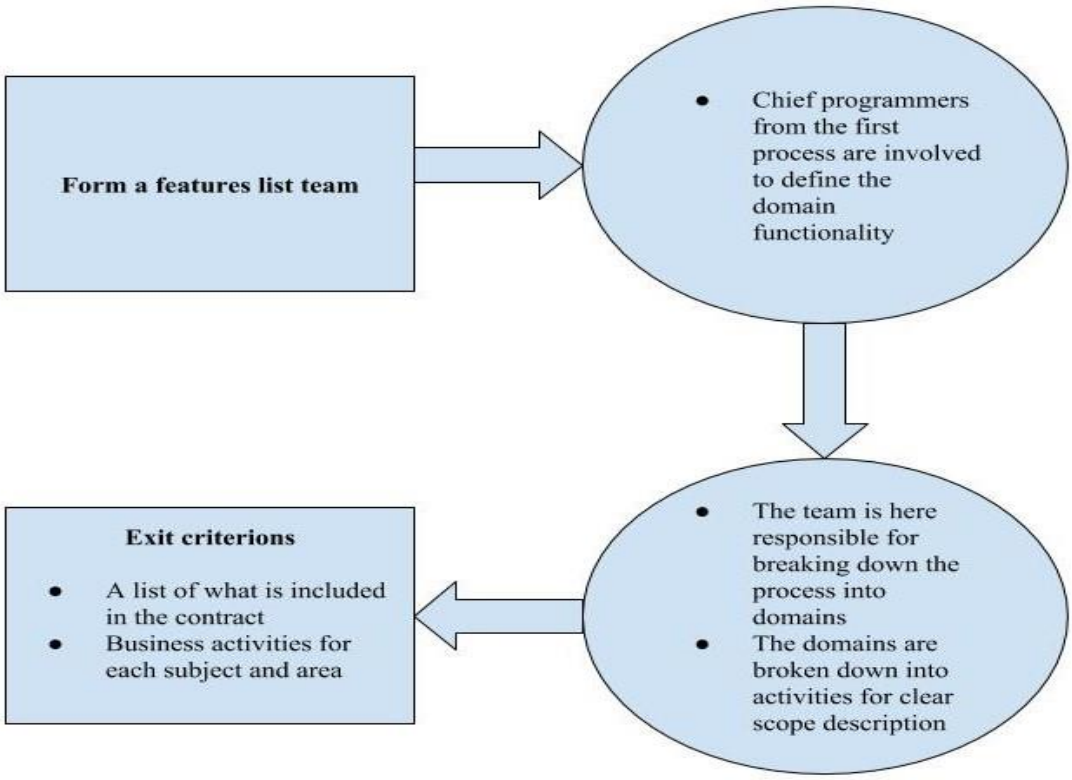
4.3.1 Develop an overall model



4.11 The develop an overall model process which is constructed as a part of the project initiation phase for clear scope descriptions and key role identifications.

In the first process shown in the figure above (figure 4.11) an overall model was created for how firms in the initiation phase step to step should direct their issues in the initiation phase. In a FP arrangement firms should start to form the modelling team, here the key roles of which persons that interacts in the contracting form should be stated. A domain walkthrough created of testers and programmers should be created where all test cases of the current service should be tested and executed. Here the project manager's responsibility is to divide the project process in two week intervals for clearer project scope definition.

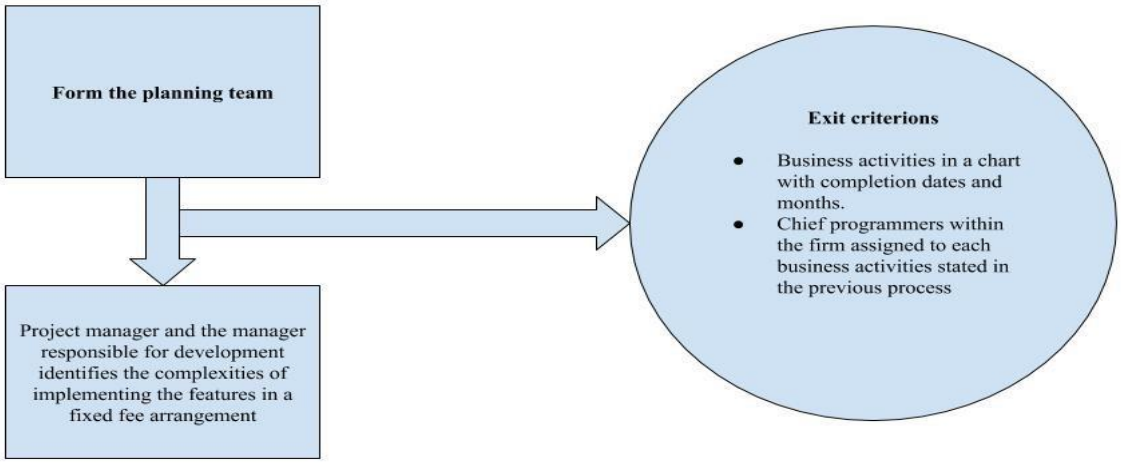
4.3.2 Build a features list



4.12 Activities within the build a features list process that needs to be implemented in order to get a more efficient overview of the activities stated in the FP contract.

The second process in the FDD initiation phase framework shows the activities (figure 4.12) which needs to be implemented when arranging a FP contract. The programmers defined in the first process (figure 4.11) defines the domain functionality and the quality of the software/hardware for the product that the responsible company is developing. In the first process the project managers divides the project process into smaller mechanisms in this phase each key role that has been identified is responsible for determining what should be included and excluded under each business activities. These activities determined are then presented in the WBS framework (figure 4.16).

4.3.3 Plan by feature

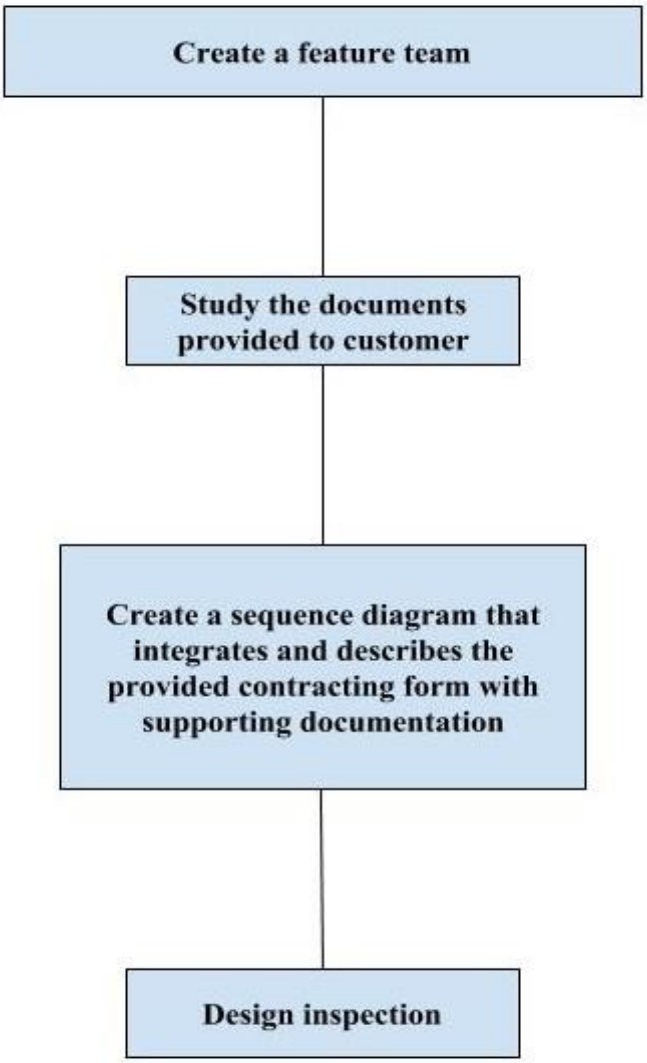


4.13 Shows the planning phase of a team activity enabling self – assessments by the active participants (project manager and developers).

The third process (figure 4.13) in the FDD framework is a part of the project construction phase where the contracting form under a products development is executed and built. In this phase the results shows that a company interacting in a FP arrangement must form a planning team, this is created by the project manager where his responsibility is to identify the complexities of the code created by the programmers and testers.

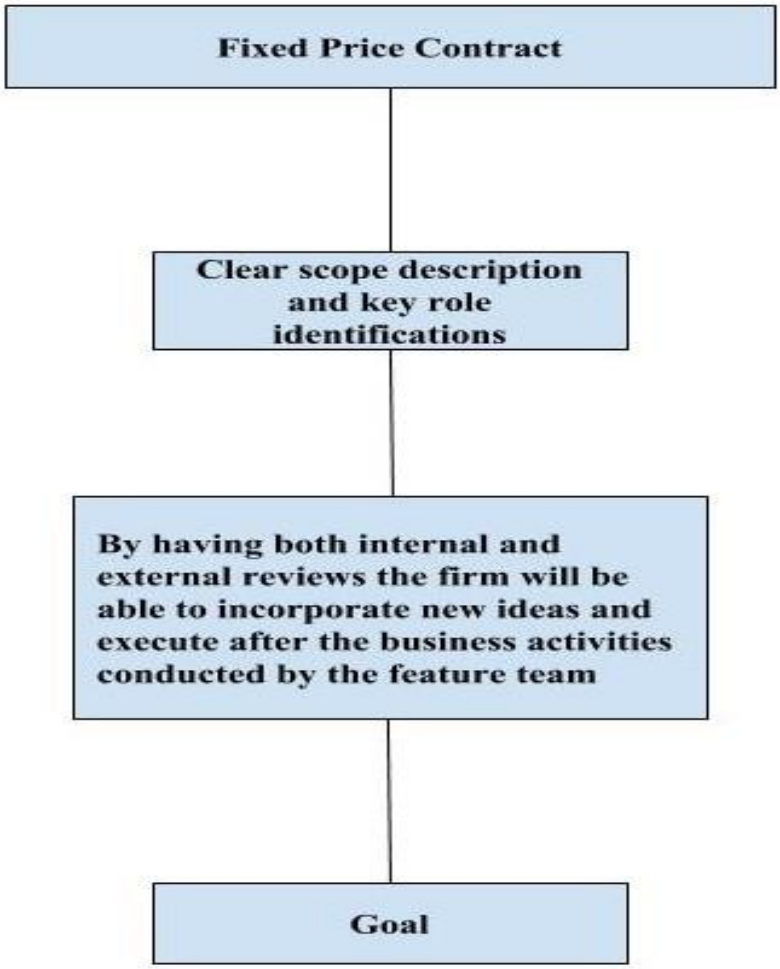
4.3.4 Design by feature

FDD process four (figure 4.14), is also a part of the project construction phase the project feature team created in the first process has all the responsibility here. The internal reviews held at the company providing the FP contracts is here continuously documenting to be prepared for new information. The results of this chart shows that companies within the IT – industry presents the supported documentations for the project manager before finishing the project process. In this phase the feature team has the responsibility to document everything that should be involved in the FP contract, which is business activities, change orders, new customer requests, and each business activity held during the two week sprints. Here the feature team's responsibility as shown in the result is to create a sequence diagram that should be implemented in the WBS structure. The results conducted from process four shows how the feature team should act during a FP contract and which main tasks they have.



4.14 Design by feature process enables the possibility for the companies to provide FP contracts to customers after the features and business activities have been set.

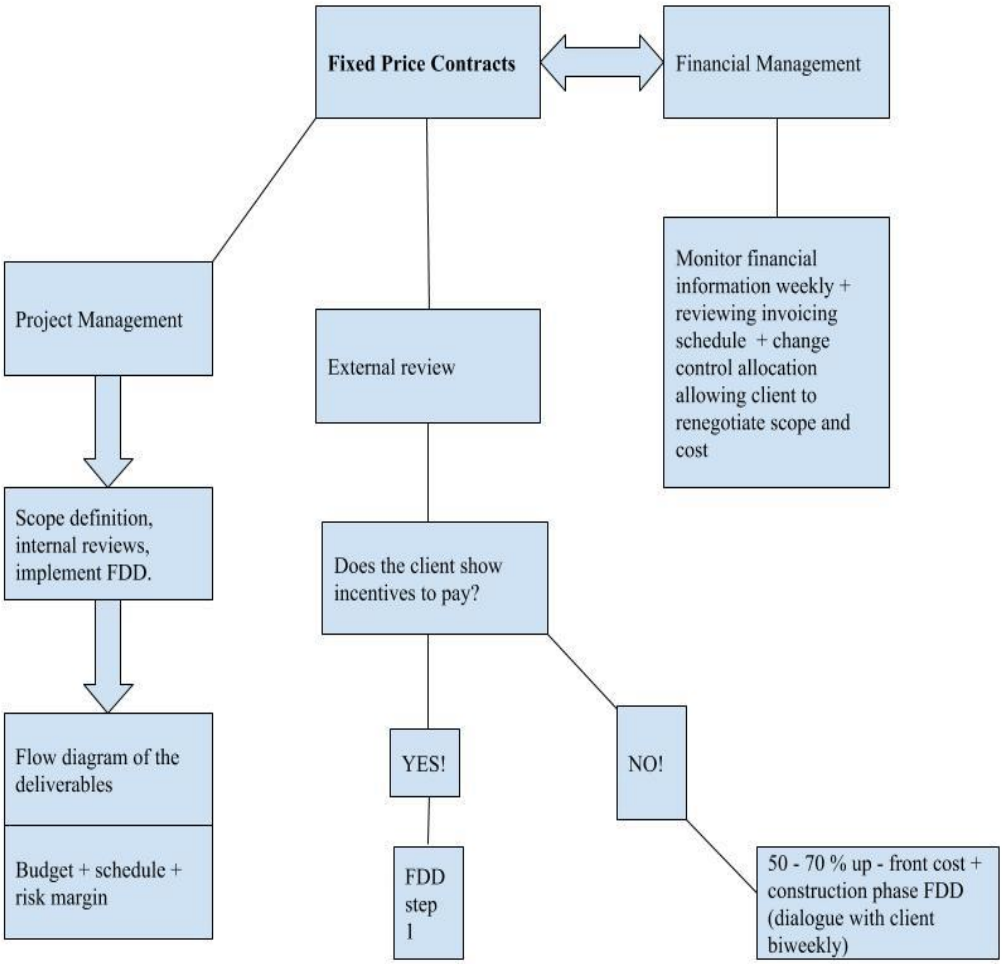
4.3.5 Build by feature



4.15 Design by feature process helps firms to provide FP contracts with less risk aversion.

In this process shown above in figure 4.15 the first four conducted processes leads to that the project management team can provide a fixed price contract with correct system requirements. This process is finished with a follow – up meeting with the customer to review the whole project process (initiation phase + construction phase). As a short summary the results from these five processes is composed by internal reviews, weekly supported documentation, clear code construction, and visualisation of business activities. Firms can now provide this contracting form with clear specification about what should be included in the scope and also with a secure pricing strategy.

4.4 Work Breakdown Structure



4.16 WBS helping the firms to accurately estimate development durations in a FP contract.

The results conducted in the chart for the WBS structure tool is conducted above in figure 4.16, this tool presents the steps for how the project management team step to step should deal with the financial information regarding the scope of the project for a FP contract. This tool therefore visualises the tasks that should be done by the project managers internal in a company. The external review contains of a financial analysis of the company that wants to go into a FP arrangement. If the client then shows incentive to pay for the process, companies can start the FDD process beginning with step 1 (figure 4.11). Going into a FP arrangement with start – up companies, will be solved with less risk aversion where they have to pay an up – front cost before the project even starts. The results strengthens the research questions answer on how firm can provide this contracting form with clearer specifications, this depends on that the WBS structure is a step to step tool for how companies can go into this arrangement with more securements regarding their pricing approach.

5. DISCUSSION

This chapter presents analysis and own thoughts from the author regarding the results conducted during the execution process.

5.1 Interviews

To determine which key variables that are vital in order to price FP contracts in an efficient way the respondents stated that a risk margin needs to be added when making bottom up calculations for these kinds of projects. As Conell and Zanell (2011) stated for management consultancy deciding in fixed fee environments it is important to have continuous comprehensive dialogue with the customer to define the scope of work in the planning process. This comprehensive dialogue will be increased when implementing the FDD framework where customers will be able to introduce new requirements during the project process (Samireh, 2012). The ability to price FP contracts to increase the profit margin and to control the variables included in this arrangement will be better if firms clarifies the key roles in the documentation. When facing the problem of deciding a FP contract with a large firm that are trying to break down the work into hourly rates to put pressure on the price, it is important for the seller to provide the contract reducing the risks of making the customer to take clear advantage in the planning process (Jia, 2012).

It is important for large projects to divide the process in small parts, because it will help the firms to easier estimate how much cost that will be needed for each process, and this will lead to more detailed execution approaches for each phase. For project management firms that delivers larges services needs to break it down in phases to visualise what needs to be executed within each area (Desmond, 2014).. This tool will result in that the firm will be able to visualise the most important key variables to get predictive cost forecasts before going into an arrangement (Baar et al, 2004). The estimation of costs after the scope has been defined will be clarified in a way where the information conducted from the customer will be added at a level where both external and internal information flows will be forced to be implemented. (Desmond, 2014).

Why customers choose FP contracts depends on that the risks lies on the vendor, they are responsible for setting a price that will result in increased profit margins. As the respondents stated FP contracts has shown incentives to be successful, the challenge is for a firm providing this contract to define the scope, and to visualise the key roles to easier identify upcoming issues during the project phase. Firms should write this contracting form enabling customers the possibility to regulate if they want to make changes during the project process. The integration of both the FDD framework and WBS will help firms to support contract packages that they provide. The project teams will be able to quickly review bids and upcoming issues which will help the firm to control the scope determined in the initiation phase in the FDD framework (Stosic et al, 2017). Sigma Connectivity will also be able to easier classify the mechanism in the project elements into levels that are easy and manageable (Jung, Woo, 2014). In order to determine which key variables that must be determined to increase the profit when pricing FP contracts firms must categorise the risks that may occur after the scope has been defined. The WBS will result in that the firm will be able to expose internal risks and the root causes enabling these risks. This tool will create generic responses for tackling risks in FP arrangements (Hillson, 2003).

The respondents also stated that firms that wants to provide FP contracts with clearer specifications about what is covered by the scope the firm needs to work jointly with the customers. This means that the firm providing this contract needs to have constant reviews, meetings, and discussions with the customer. The second process conducted by Richy and Ticha (2008), called *"Build a Features List",* will lead to detailed valuable descriptions about what is covered by the scope. This depends on that these features that are broken down into smaller areas will lead to questions from the customer, this will force the seller to describe what each area means and its objectives. Continuous dialogue will be forced to be held so that the customer understands the specifications of purchasing the FP contract and to see which value it will give them in the future. As the respondents stated education is very important not only internal but also for the customers sometimes smaller firms with limited budget will come to the vendor for a development of a service. In these cases, the firm arranging a FP contract needs to take an up – front cost to get the security of that the payment for the finalised service will be paid. Increasing the educational knowledge will be done when analysing the results conducted from the survey, FDD and WBS. Increased documentation, follow – up meetings. Internal reviews will help the firm to control the project scope within the time – frame (Desmond, 2014).

These presented tools support bottom – up calculations estimated when the feature lists have been created, the challenge with implementing these tools in the management segments was to visualise which key roles that must be included when defining the project scope for a FP arrangement. If firms educate their employees and customers in what needs to be determined when writing this contracting form, it will be easier to define the project scope and get pricing arrangements in FP contracts. The FDD framework consists of a predictive metric shown in figure 4.11 at it describes the managerial roles that needs to be included when writing this contract. As Desmond (2014), stated the FDD framework results in a low – cost entry for the project and this depends on that for large – scale projects these tools breaks down every interaction into small mechanisms where the key roles included has the responsibility to define the execution time relative to the cost.

For smaller start – up companies Sigma Connectivity needs to be better on documenting and having follow – up meeting with the customers. A small company can grow and become bigger, making professional arrangements with companies with limited budget will attract other companies for the development of services. FDD and WBS will force start – up companies to pay an up – front in the imitation phase and with collaboration with these tools firms will be able to work with each significantly interesting mechanism that has been visualised during the project process. If firms want to tackle changes in the project scope when pricing for a software solution two key processes needs to be implemented and this can be done by using the FDD framework and WBS. If Sigma Connectivity sets a clear pricing policy which includes both documentation and standardisation of rules related to providing back feedback after a project it will generate in a strategy where Sigma Connectivity will be able to manage different pricing lists under a policy statement (Kima et al, 2004).

As (Madhuri et al, 2016) stated firms that have asserted quality software development approaches internally lead to the highest level of customer satisfaction. In order to achieve goals that have been set early in the project process firms needs to use tasks that monitors services and controlling variables. Request for Proposal (RFP) as (Joyce, 2002) presented has it similarities with the FDD framework and it is a strategy for development projects where the scope is not fully defined, where customers can create new requirements during the project. This is more attractive when using T&M contracts, but for fixed fee arrangements where new ideas

rarely are incorporated the use of FDD is more beneficial because it leads to the determination of key variables enabling price engagements that are more profitable.

To answer the respondent's difficulties of pricing FP contracts and to increase the communication in a buyer and seller arrangement the implementation of the FDD framework will force firms to communicate with their clients, especially in the construction phase where reviews and feedback needs to be provided biweekly as Marek and Ticha (2008) presented.

5.2 Survey

When asking customers about which contracting form they found most valuable shown in figure 4.1, a realisation was made where customers prefer FP contracts. This depends on that as Simister and Turnera (2001) mentioned, the contractor then takes the responsibility for determining the best strategy for the finalisation of a product or service. Companies know that customers will show the incentives of going into fixed fee arrangements. For T&M contracts the responsibility lies on the buyers where the sellers can take advantage showing no incentive of being efficient. The risks with the financial framework of going into fixed fee arrangements shown in figure 4.2 clarifies that the majority of the customers thinks the disadvantages with this contracting form is that new ideas rarely are incorporated. This can be both a benefit and a disadvantage for the seller providing the contract. Change is a constant phenomenon that can occur in the business and sometime a scope change is vital for making profitable decisions gaining value to both parts involved in the arrangement.

In T&M contracts the customers answered in figure 4.3 that one major disadvantage is that when there is no more budget for the buyer the seller ignores the information. This depends on that for a T&M contract the responsibility lies on the customers where they pay for the material and resources needed for developing a service or a product. In this contracting form scope changes occur constantly, and this can be highly beneficial for the firm developing the service. If a change occurs, more time, money, and resources needs to be spent on defining a new scope description by the customer. This leads us to the same question in figure 4.3 where many of the respondents answered that the financial risk for them arranging in this contracting form is that more cost and information often is added which leads to that more budget is needed. For Sigma Connectivity, historically T&M contracts generates most revenue but every respondent in the interviews held believed in that when making the calculations right for FP contracts with correct strategies, scope management firms can make more profit than for T&M contracts, and this leads to figure 4.4 making it very easy to understand why customers prefer gross profit margins when pricing a service. Most of the respondent answered in figure 4.5 that it is important to hold the budget as new information is available, this can be further discussed. In T&M contracts the risk lies as mentioned before in this section on the customers. For them arranging in a T&M contract comes with risks regarding the calculated budget before the project start. Maintaining the budget for them can be hard when writing T&M contracts because for every project, new ideas always will be incorporated with improved solutions to current issues.

The problem when talking about FP contracts that leads to uncertainties between the buyer and seller when defining the scope during the initiation and construction phase is the lack of communication about what needs to be included and excluded in the contracting form. In figure 4.6 when asking customers about how they evaluate projects the majority answered that their preferences lied in having follow – up meetings with the customer. This leads us to fur-

ther discussions where the respondents in the interviews clarified that one of the most significant mechanism for failing in FP arrangements is dependent on the lack of communication between the involved parties. In the construction phase in the FDD framework the buyer and seller of a contracting form will be forced to have biweekly meetings in the construction phase also shown in figure 4.15. With internal reviews a better scope control will be integrated leaving the firm arranging a FP contract to set a price with the certainty of profitable outcomes.

Figure 4.7 clearly shows that Sigma Connectivitys customers finds the most valuable pricing strategy to be value – based pricing. As Calabrese and De Francesco (2014) stated this pricing strategy only is valuable if the firm has awareness of its own value. This own value can according to (Kima et al, 2004) as stated in the theoretical framework be integrated if the firm implements own pricing policies containing predictive metrics both for FP contract and T&M contracts. The advantage that firms can take when pricing services with value – based pricing is that if they find themselves highly competitive in the market, and know their own value the added risk margin for these projects can be raised. The current problem with firms within the it industry takes us back to the statement that Calabrese and De Francesco (2014) presented and it is that research shows that even if firms find this pricing strategy profitable due to its benefits only 17 percent of firms implements it in their pricing policies. The challenge with this pricing strategy for FP contracts is that the firm arranging the contracting form needs to know the customers value and how much they can pay. The implementation of the FDD framework and WBS will lead to that firm will be able to understand the customer's perception to pay for a service. How this perception can be visualised is with the FDD framework and the WBS structure which are tools implemented for clearer scope descriptions and also with forced increased communication.

Customisation is what Sigma Connectivity works with, customers come to them for the finalisation of a product or service. Their strategy of not being product owners has shown to be successful during the last years. When owning the rights for a product, huge investments needs to be made on developing the product, and if it is shown that the demand for that product is low the company that owns the product makes huge losses. In figure 4.8 we can clearly see that customers thinks that customisation is the phenomena which leads to the highest profits. Therefore, Sigma Connectivity should provide contracting forms with the implementation of FDD and WBS, they will at the first understand the perceived value of how much the customers wants to pay for their customised solution.

In figure 4.9 customers preferers choosing supplier for a project delivery after their competences. As the respondents stated in the interviews by looking at the consultancy market in Denmark firms can make their employees to quit on the day. In Sweden, we have different regulation regarding termination of a work. This has led to a price pressed market where firms pay for their consultants at a low hourly rate. Sigma Connectivity will take competitive advantage when implementing FDD and WBS in their segments for FP contracts. Customers will find them serious and that they are highly dedicated for the mission. Firms will therefore want to pay a higher price with a clear scope description than a lower price where the scope changes constantly making it hard for the buyer to assess the right budget estimations. How customers manage the risk with T&M is shown in figure 4.10, may of the customer's states that it is important to be ready to tackle change orders and having comprehensive dialogue with the key actors involved. They have created predictive metrics which help them to visualise which factors that affects the cost and time plan. It is also important according to the customers to be specify draft plans that can be reviewed and were request changes can be made.

The major hinder that the customers feel about going into a T&M arrangement is that it is very hard for them to calculate the work rate on their suppliers, and from experience they feel that sometimes the supplier doesn't show any incentives of being efficient, and this depends on that if a project takes more time during this arrangement the more money the supplier gets.

After conducting the results from the survey three statements can be made and it is that the customer feel that in FP arrangements it can be hard to integrate new ideas, more internal and external reviews needs to be made and firms needs to better on showing incentives of doing their work in the right way when arranging in FP and T&M contracts.

5.3 Feature Driven Development

The FDD framework presented by Richly and Ticha (2008) contains of a list of features that contains of objects and its methods, this feature lists should be implemented within two weeks in order to increase the communication in a buyer and seller arrangement. The *Develop an overall model* chart in figure 4.11 is where the identification of key roles is determined, this is vital in order to get a clear documentation process both in the initiation phase and construction phase. The challenge here is to determine which key actors that can create efficient strategies of handling FP contract arrangements in different type of project sizes. The problem that Sigma Connectivity faced when arranging FP contracts was that for smaller start – up their incentives of having close internal communication with the customer was low. With this model presented in figure 4.11 firms will be forced to divide the process into two week intervals. This will lead to that the key roles stated will be able to break down the work into smaller mechanisms which will engage in better pricing strategies and scope control.

The *Build a features list* process shown in figure 4.12 is where the feature lists are created in these processes the chief programmers from the first process is involved in order to define the domain functionality. In this section, the problem that Sigma Connectivity faced with vague project scope descriptions will be determined. Firms must here make internal reviews about what is included in the scope. From the first process *Develop an overall model,* the reviews held in every second week will lead to that the firms will be able to visualise how the domain functionality can be stated. In the *build a features list* process the feature team consistent of the key roles determined by the management section is responsible for dividing the domain functionality in a FP contract into smaller activities. The business activities stated from these smaller domain functionalities should be included in the contract. This will help the buyer and seller in the arrangement to understand every process during the time - frame set in a FP arrangement. Sigma Connectivity will be able to provide this contracting form with clear project descriptions, the strategies of breaking down the domain functionalities into smaller business activities will lead to more controlled cost calculations, where the risk margin added for these projects will result in profitable actions.

Further, as (Crawford et al, 2015) stated these software methods are used to identify the level of creativity by making easy measurements to see where the firm can make the most profitable decisions. Richly and Pavlina (2008) made investigations on the *Plan by feature* process where they determined that in this section the feature – sets conducted from the previous two processes are assigned. Here a predictive metric can be established in order to get pricing policies which (Joyce, 2012) find vital for firms arranging in contracts. After that the business activities have been visualised and stated the management department must form a planning team, that has the ability to deliver after the established requirements. In figure 4.13, the project managers task is to erase the complexities of implementing the activities presented in the

Plan by feature process. Their task here is to create a chart with completion dates to enable a more stabilised planning process. The integration of this will provide information about how the process goes and if the time - frame is held. If firms can visualise the business activities, making internal review every second week, and having close comprehensive dialogue with the customers, it will be much easier to incorporate new ideas if the customers during the process wants to make a change request.
The three processes described are the processes involved in the project initiation phase. This phase is very important because it helps a to firm get an overview of the current key variables that should be determined when providing the contract to the customers. Breaking down the domain functionalities, and determining the key roles for each business activities, result in methodologies integrated internally in the firm that for future projects will enable secure pricing approaches.

When talking about the construction phase two main processes are vital in providing FP contract with clear project descriptions. The process called *Design by feature* shown in figure 4.13 is the process that according to Richly and Ticha (2008) is vital because it helps the members of the feature team to collaborate to make a sequence diagram and also designing interfaces. After these theories conducted from Richly and Ticha (2008), figure 4.14 describes the process where a feature team needs to be created. The documentation made in the project initiation phase is here studied in advance to make sure that the business activities implemented will generate increased profit margins. This process is all about making sure that the decisions made in the earlier processes in the project initiation phase will lead to a high level of satisfaction between the buyer and seller.

The process *Build by feature* describes the final stage in the project process before providing the contract to the customers, according to Richly and Ticha (2008), the ones who investigated on the possibility of having these two processes focusing on the integration and on building individual features. The chief programmers here have the responsibility to develop software solutions with customised approaches.

Sigma Connectivity faced the problem of not having good project scope descriptions when going into FP arrangements, historically almost all FP project resulted in major losses. The structure of payment varies across different type of contracts, where most contracts at the moment prices the software development licenses (Whang, 1992). As Whang (1992) also stated early in the 90s a contract should be designed in two stages, enabling the possibility for the user and developer to have the options to determining different level of efforts. This statement can be defined and clarified with the use of the FDD framework. The five processes, comprises and tackle all negative aspects that the employees at Sigma Connectivity found with FP contracts. The challenge with this framework lie on educating the firm internally so that every employee in the process understands their roles and responsibilities.

Richly and Ticha (2008) investigated on how firms can implement this agile software method in their market segments for different contract forms. The research question presented in this report will be answered with the implementation of this tool, where an improved scope control will be determined. The key variables that have been visualised during this study was the disability that firms to price the FP contract as it was very hard to define what should be covered by the scope in the planning phase. The feature team, the identification of key roles will enable that firms will be able to get a better overview on the current business activities going on biweekly. Close internal communication will be established through the documentation

processes where the firm providing the contracting form will be forced to enhance the customer's incentives if they want to integrate new information. As shown in figure 4.1 FP contract are the most valuable, and will in the future always be. Therefore, this study is vital in determining how growing companies can tackle the risks by implementing both agile software methods and other research approaches. In the next section the results conducted from the WBS will be visualised where both theoretical aspects and thoughts will be discussed.

5.4 Work Breakdown Structure

The implementation of the WBS will require support from the software engineering departments. Figure 4.14 presents and visualises how firms in a FP contracting environment can establish their own strategies for making this contracting arrangement profitable. This method and this tool has been shown to be successful in large projects where firms have had the problem to define the project scope. If change occurs during a project as Sharon and Dori (2013) stated this tool helps firms to quickly tackle possible threats during a project. This depends on that the sequences under a FP contract is divided into smaller execution phases. To build this WBS, the independent variables determined by the marketing mix concept and the interviews held, resulted in key words where further investigations needed to be made. When arranging a FP contract firms will in the future have the possibility to take advantage when using this tool, this depends on that the WBS increases the dialogue in a buyer and seller arrangement. How the communication between the involved parties will be increased depends on that for every sequence shown in figure 4.14 firms must communicate the value that it will give to the customers. The thought behind this tool is that by first implementing the FDD framework, managed by the project departments, the integration will lead to that firms will be able to incorporate fundamental resources for each department in the WBS.

The problem firms have faced in the project scope definition will be reduced with this tool, that presents every sequence that after the FDD framework implementation needs to be decomposed in order to provide a FP contract with secure pricing calculations. The idea when this tool was established and implemented was to help the project team to capture and decompose all efforts that are necessary for the finalisation of a project. The challenge that according to research can occur when integrating the WBS in the organisational structure is that the information sub – divided over the WBS structure must be really defined. According to Makarfi et al (2009), this will help companies to support their change management approaches in different contracting environments. By dividing the project scope in different sequences and mechanisms this will increase the possibility of customers making change requests.

The possibility of integrating new ideas not covered by the scope in the beginning will optimised. Firms must start by making internal and external reviews with the customers after the implementation of the five processes conducted in the FDD framework. In this stage, a preliminary project scope assessment is made. After the preliminary established project scope definition, firms must make flow diagrams of the deliverables in the project, this will help them to identify strategies if issues come up regarding what is covered by the scope. The FDD framework will compose strategies with precise cost calculations, therefore firms will be able to add a risk margin on their projects that will lead to secure pricing approaches. If a FP contracting arrangement is made with start – up companies they will be forced to pay an upfront cost for the finalisation of the project.

The problem with start – up companies is that there always is a risk that they can go in bankruptcy during a project. Therefore, firms must force them to pay a cost in the beginning under a FP contract where the risk lie on the seller. Under the financial management section shown in the WBS structure in figure 4.14 according to Baar and Jacobson (2004) the WBS increases value and helps companies to establish predictive metrics and forecast researches.

The idea of implementing the FDD framework and the WBS was found after the interviews held internally at the company. These tools will help Sigma Connectivity for more precise cost allocations and will lead to a certain pattern when offering FP contracts to customers. Secure pricing engagements will be established, implementing the possibility for making changes during the project phase will lead to increased customer satisfaction.

5.5 Further discussion

In this report, the focus only lie on how firms can tackle the risks when going into FP arrangements the marketing mix concept presented in the theoretical framework describes the seven processes that are integrated in project management. In the delimitation section investigations were made on which of these processes that could establish a price equation involving both independent and dependent variables shown in figure 3.1. Here considerations led to that sustainable aspects not were integrated this depends on that the need of going into making research of this aspect not would lead to any benefits in how firms can increase their profit in FP contracts.

The results conducted from the survey and the interviews led to beneficial approaches regarding which tools that would lead to relevance in FP contractual risks. During the study, the semi – structured and qualitative direct interviews were of high relevance in order to determine the survey questions. 104 respondents, were reached which lays ground for further research for this study. During the process, the thought was first to only base the report on a study as an investigation on the customer's perspective on how they would reduce the risks in FP arrangements. Research regarding agile software methods during this process led to that the implementation of the FDD framework and WBS could give value in FP arrangements. The five processes in the FDD framework presented by Marek and Tichly (2008) were shown to be of high relevance in how product developing firms can divide a FP process in smaller mechanisms that can be executed for better cost allocation. The FDD frameworks is all about executing after the five processes were the WBS just visualises how firms internally can break down the process in different options for more precise pricing engagements. The challenge was to understand and visualise each key roles responsibilities during these processes and also which value each key role can give in this arrangement. The results conducted from the survey also laid ground for how Sigma Connectivity can compose the five processes in the FDD framework to increase the dialogue in a buyer and seller environment. The majority of the customers which engaged in the survey investigation found it very hard to integrate new ideas in FP contracts. With the WBS firms will be able to make cost change allocations, where the internal and external reviews, documentation processes and flow deliverables will result in that firms will provide this contracting form with clear project specifications.

The challenge with these tools is that after the key roles have been identified it is down to the management section to make sure that every employee has the incentive to deliver. The disadvantage with the FDD framework can be that it is not fully valuable for smaller processes and can be to complex. Therefore, investigations were made during the process where the WBS

will decompose the challenge with start – up companies wanting to develop a service during a FP contracting arrangements.

6. CONCLUSIONS

In this chapter, the author presents the most important conclusions related to the objectives stated under the introduction chapter. Advantages and disadvantages with the choice of methods will also be evaluated and discussed.

6.1 Feature Driven Development

The FDD framework will compose the issues stated in the objectives in this report. The five processes conducted by Richly and Ticha (2008) will help firms to make accurate estimations of development durations when providing FP contracts to customers. The first process shown in figure 4.11, contains of the necessary build – up actions that should be considered in the project initiation phase. The risks that customers have experienced in this contracting assessment will be able to be reduced. If firms start, by constructing the modelling team which includes chief architects, projects managers and domain experts responsible for the documentation early in the project process the internal and external reviews forced to be held in the *Develop an overall model* process with customers will provide correct information about what is covered by the scope. Sigma Connectivity has lacked incentives regarding the willingness to document every process involved in a FP contracting arrangement. Without clear documentation, it will be hard to increase the control variable of the set scope, and the customers will therefore have it very hard to integrate new ideas during the project process. Determining the business activities shown in figure 4.12 within each subject area will help firms to provide clearer specifications in this buyer and seller arrangement and this depends on that for every business activity visualised firms must provide correct scope information to their customers with clear documentation including the most relevant flow deliverables.

The exit criterions stated in figure 4.13 has massive importance when providing correct scope information to the customers. Here the business activities should be integrated in a business chart with completion dates for the finalisation of every activity during the project process. Providing this to the customers will increase their knowledge regarding the processes involved during both the project initiation phase and construction phase. Firms have earlier lacked in the way they have been communicating the values in a FP contracting arrangement. In the construction phase, shown in figure 4.14 a feature team is created, that has the responsibility for making a design inspection of business activities stated in the previous process.

The results conducted from this agile software method tool will help Sigma Connectivity to follow each of the five processes, establishing clear project scope descriptions before the project start. The internal reviews will increase the comprehensive dialogue between the buyer and seller in these arrangements, enabling the customers to make change requests in certain business activities. This will help Sigma Connectivity to take advantage when pricing this contracting form, dividing the process into smaller business activities and mechanisms will force the customers to pay for the execution of each activity. Sigma Connectivity will therefore be able to add a risk margin for each divided process involved during the project and will be able to extract more profit in a secure way. The idea of using this tool for tackling the risks in FP arrangements was founded after the interviews, where the visualisation of current key

variables that affects FP projects negatively from the respondents led to further research in agile software contracting methods. The five processes conducted by Marek and Tichly (2008) helped to build charts for each process shown in the result section (figure 4.11 – figure 4.15). Where now Sigma Connectivity has a flowchart that they can follow when providing this contracting form to customers requiring a development for a service or a product.

As mentioned in the discussion section the disadvantage with this tool can be its complexity for small – scale projects going on under just a few weeks. This information was also conducted the interviews where Sigma Connectivity also wanted to find a strategy for firms going into this arrangement with start – up companies where the risk of them going into bankruptcy was possible. Therefore, an amount of time lied on researching on approved scientific methods that could be vital forcing start – up companies to pay a fixed price before the project start, and it was shown that WBS can tackle the risks with both small – scale and large – scale projects. FDD is an approved tool for medium sized and large – scale projects, and the implementation of this tool will help the firm to have repeatable success when providing FP contracts to customers. By frequently and accurately making progress reporting at different levels both internal and external in the project, managers will have it easier to steer a project in a correct and secure way.

6.2 Work Breakdown Structure

The WBS shown in figure 3.1 by Sharon and Dori (2013), helps as mentioned in the theoretical framework in this picture, firms to visualise all the activities and mechanisms necessary for the finalisation of a project. Adapting this to FP contracts will help Sigma Connectivity to deal with well-established firms and start – up organisations. Shown in figure 4.14 this tool comprises the implementation of project management, exactly as for the FDD framework. Where project manager's responsibility is to have both internal and external reviews with the key roles involved and customers. In this structure, the implementation of the FDD framework will be concretized after that firms have make a credit check on the customer confronting them for a development of a service. If the firm show incentives and interest for payment this structure takes the process back to FDD framework process one shown in figure 4.11. For start – up companies going into monthly arrangements where the process will take time, firms as Sigma Connectivity needs to take an up – front cost of 50 – 70 % before the project even has started.

With the WBS monitoring financial information weekly will result in both a better scope control and economical safety. This depends on that executing the processes in two week intervals it will be easier to determine how much each business activity will cost. This tool will also help Sigma Connectivitys key roles in the process to educate its employees regarding this contracting form in product developing firms. Increasing the level of dialogue in a buyer and seller arrangement will force the employees to make valid researches regarding their customers. When building this flow chart the thought was to adapt it to all sizes of firms. The interviews and the survey laid ground for researching in this structure and how it could increase the profitable aspects in FP contracts. The idea of implementing this structure in Sigma Connectivitys segments was to make the team members and key roles to understand the relationships between each steps and deliverables in FP contracts. Due to its ability to break down all processes it will lead to that Sigma Connectivity will be able to take advantage when risks and threats occurs.

Answering the thesis questions and objectives, this tool comprises the beneficial activities within a FP contract for Sigma Connectivity where the internal reviews, and the monitoring of weekly financial information will lead to that Sigma Connectivity will be able to provide this contracting form with a clear scope description. This will help them to take advantage in a significant way when making pricing engagements, the risks of losing money with start – up companies will be reduced. The integration of the FDD framework in the WBS structure will now help the firm to understand each significant important activity that needs to be confronted and tackled during the project process. The WBS is all about identifying risks, even if they not are full reduced project managers will have the ability to log the risks with continuous and ongoing reviews. The disadvantage with this tool can be that for some project members the ability to express themselves with their own ideas and innovation can be demarcated. This depends that when making a list as visualised in figure 4.14 for every process the risk can be that the project managers are too busy checking of each process instead of integrating new ideas suggested by other members.

7. RECOMMENDATIONS AND FUTURE WORK

Future work is related to integrating the human factor into the tool, during this study time was spent on finding scientific proven tools that could be implemented in an organisation working with multiple contracting forms. Charts were made giving Sigma Connectivity a method for dealing with the risks in FP contracting arrangements. The FDD framework and the WBS in this study only gives guidance on which methods that are appropriate when pricing FP contracts. For future work organisations within the IT – industry should focus more on educating their employees in agile software methods and also which benefits that could be exhaled from them. This depends on that using agile software methods is built on having close internal customer partnership.

This study contributes to how firms can use systematic methodologies to increase their profit when pricing FP contracts. As a recommendation for firms using FP contracts in their business segments more time needs to be spent with the customer deciding strategies and making priorities together. Further investigations need to be made on how firms can increase their incentives and willingness on having close partnership based on strong communication channels with their customers. Therefore, research is required on how each scenario in the FDD framework and WBS can increase the employee's personal motivation when working under specified implemented methodologies. Firms should in the future after the implementation of these tools research more on how they can take competitive advantage when pricing FP contracts in small – scale projects. WBS composes a strategy that makes it possible for firms to extract profit by taking a start – up cost in the planning process. Further work needs to be made when investigating on how firms can go into this arrangement with start – up companies without forcing them to pay for a service that hasn't been developed.

Given the steps in the FDD framework where under each process guidelines have been established for firms going into FP arrangements, project managers should evolve strategies for dividing the teams efficiently without time consuming approaches. Value – based pricing approaches which according to the customers would lead to most profitable actions is based on knowing the customer's perception to pay for a product or service. When using FDD and WBS for FP contracts, in order to take competitive advantage and be a step above the competitors, it is vital to know which business areas the competitors spends most investments on. Firms should in the future make precise benchmarking investigations, this will help them to communicate the value that the customer will get when approaching them for a development of a service.

FDD and WBS requires highly competent individuals, where each key role should understand its importance and their role for developing a service under a FP contract. According to customers choosing a supplier for a project delivery depends on the supplier's competence. Future work lies on finding a strategy for pricing consultants to a level where firms can have employees with the demanded competence for a project delivery.

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Appendix A – How customers manage risks in T&M contracts

Be ready to tackle change orders even though this contract form does not specify any deliverables it is important to make change estimates of the current budget. For example, if more consultants is needed and more labour.

Comprehensive dialogue between key actors involved in the contracting form. A predictive metric helps the company to visualise which factors that affects the costs and time plan.

Due to its cost sensitiveness it is important for us as customers to find consultants with demanded competence.

Specify draft plans that can be reviewed and were requested changes can be made

Be very careful with which consultants you hire, also make good review processes and document responsibilities.

Be specific as customers and make research on the product developing company to see if their employees provide solutions at a high work rate and for a low price

Add a margin (%) of more costs than the expected for the project. Be ready to get new information.

We make a great review analysis of our supplier, to see if they are are trustworthy company with great experience

Documentation of key roles within the company, for this it is needed to have highly competitive employees. Our aim is to always hold budget and therefore it is important to be precise in what is exchanged with the supplier.

Comprehensive dialogue within the company, were we build predictive metrics used for the cost calculations.

Add a margin of more budget than expected when calculations is made in the project initiation phase

Select the supplier carefully we prefer to look at past history, if we know the supplier well it helps us to hold the budget constraint.

We have highly experienced employees and we make careful decisions in taking in new personnel.

Investigate the supplier make sure that they don’t uses market changes for their benefits, if so discuss about a fixed - price contract.

Negotiate on which mark - up the supplier provides on the materials.

Our experience helps us to calculate the suppliers work - rate and therefore we restrict their incentive of being inefficient.

We chose our suppliers carefully based on their previous histories our aim is to always hold budget and therefore it is important that the information exchanged is precise and predictive.

Make suggestions for the supplier about experienced time frame for the project, if the supplier agrees he/her will be very efficient.

Sometimes we are ready to exceed our budget in a Time and Material contract this depends on that if we get a great solution from our suppliers services we will tend to price - press them for upcoming projects.

Extra management will be required for us as customers this depends on that if new information is available it is important to define the new scope lying under the expected budget outcome.

In the project initiation - phase involve the key actors in the documentation, set up clear specifications on how the budget not will be exceeded.

We have metrics where we define each actors responsibilities within the management sector

The start - up phase before we ask for a supplier is the most important, we always want to have good communication with the supplier, with continuous meetings.

Define the scope well, and we make sure that new information not will be available. When we present to the supplier what needs to developed the work before most be specific.

We define the scope, document key roles, responsibilities, add margin on the scope to be ready to take in new information

Clear scope definition, the challenge is to calculate the costs when new information is available.

As a start - up company it is important for us to make clear specifications about what is covered by the scope. Documentation of key roles is important to understand the incentives of every actor.

Document key roles, responsibilities, calculate the cost (expected work - rate).

It is important that the supplier has good knowledge about mark - up and margins, therefore an analysis is made were we look at the suppliers previous projects and their current revenue

We always make reviews and documentation to reduce the risk of having to take quick decisions under cash flow stress.

By having highly competent employees we will be able to reduce the risks of having inexperienced people in our branch

We always want to reduce mark - ups on materials, by doing this we will be able to pay a lower price to the supplier for the execution of a customised solution.

The challenge that we are facing now is to find new business opportunities therefore we are talking about to engage in more fixed - price projects.

Experience about your branch, competitive market, competent employees, clear documentation and clear project descriptions

It is important for the supplier that they their T&M contract is built in such way that they cover all fixed costs

Clear draft plans, add more budget than calculated to be ready if new information is available and the scope changes

Documentation of key roles enables the visualisation of each actors performances within the contract value chain

Clear scope definition, make sure that the supplier is ready for new information if changes needs to be made.

Make sure the Statement of Work (SOW) is clearly specified and that the vendor does not take advantage due to that the customer bares the risk. Personally I think that this contracting form is most valuable when the scope NOT is fully defined.

Press the supplier and make sure that they have high incentive of finishing the work. Also make sure that the supplier is trustworthy and that they write SOW specifications in the contract that enables a win - win for both parties.

By knowing how much material that will be needed for the project, our aim is to always buy the material on our own so that the supplier does not take advantage by adding a mark - up (10 - 15 %) on their materials.

Keep close communication with the supplier, make sure you get weekly burn reports. Make sure that the supplier provides correct information of the time spent vs cost.

In the start - up document everything in a change order if it is so that new information will be available (add more hours, buy more materials).

Since that Time and Material SOW:s does not have any fixed deliverables, we can be flexible and make change orders if we want. The most important is that we have clear requirements presented to the supplier.

Review invoices, be clear of how much time is spent from each role in the project.

Close communication with the supplier, they most provide correct weekly information about the hours spent on the project and also provide weekly status and how far the project lies in the process.

Buy own materials, be clear on how much is needed, also document possible change order.

Communication with the supplier at weekly basis, burn down charts of the process (time spent and actual cost)

Documentation of key roles, chart of every actors responsibilities. Close communication with the vendor.

Review invoices make sure how many hours is spent for each key actor in the project.

Communication with the vendors managers, flexible scope (not clear), make sure the suppliers incentive is efficient by requiring information on a weekly basis.

Documentation of separate key roles, communication with supplier, burn down charts (weekly)

Ensure that the supplier has the experience to deliver in a efficient way, keep pressure on the supplier (burn down charts, communication).

We agree in a T&M - contract only if we are clear what needs to be delivered and developed. Our experience helps us to estimate how much time that will be needed, in this way we tend to take advantage on our supplier which generates that their efficiency rate increases.

We want to avoid surprises and therefore it is important to keep close contact with the supplier.

1. Documentation 2. Budget scope, how do we manage new information? 3. Communication with the supplier (time vs material/monthly progress).

Internal communication with actors involved within the company. Meetings every week to define the scope in such manner that the supplier doesn't need to make further suggestions of changes.

We tend to reach out for suppliers known for delivering in an efficient manner, suppliers that are known for their reputation. We are keen to pay a higher price for a project if the supplier delivers what's included in the scope with clear project descriptions, close communication.

By having a niched supplier - market. If a supplier delivers and makes us satisfied we tend to go back to that supplier for future projects.

Control the suppliers in such way that they don't make decisions switching from high - cost to low - cost resources only to reduce potential losses.

- Specify the change order, ready to get new information for further improved developments - Document key roles - Make sure that the suppliers aim is to deliver high quality services with a precise work - rate.

Document key roles, internal activities performed by employees, add a margin on the budget to be ready if new information is available.

Key roles, make a statement to the supplier regarding his/hers efficiency rate and why the project is important to finish under budget.

- Make sure the vendor doesn't shift high from high - value to low - value resources - We can pay a higher price for the execution of a project if the supplier has the required competence

The major risks that we are facing is the extraction of handling new information, our T&M projects has not led to great profit margins and we are working on the factors distracting us from this.

Experience is the most vital thing in managing T&M - contracts, if the management section in the company has the ability to visualise the time frame of the project, the suppliers incentive of being efficient will increase.

Comprehensive dialogue with the supplier, make sure they provide correct information (weekly), about the ongoing process in the project.

Change orders, communication, burndown - charts, experience are the key words for enabling a quick project process with high quality.

Internal meetings, daily scrum meetings, asking the supplier to provide process - charts every month to see if new information will be available or the calculated cost in the project start is correct.

We have a clear supplier target for our projects based on earlier experience, in this case we are forcing the provider to be efficient by paying them good money for the execution.

In the project initiation phase it is important to clearly define what is supposed to be included in the T&M - form. Build a change order based on calculations about the upcoming project.

This contracting form helps us to reduce risks if we want to create new products or develop a design. The hard thing is to see calculate the total cost at the project start. Therefore suppliers does not have any incentives of being efficient. To get better control of the total cost our aim is to have both internal (management) and external (supplier) communication.

Software development is unpredictable and it is hard to estimate the time for developing a software solution, we try to put pressure on the supplier with our experience where we force them to be efficient in their work with high quality standards.

The biggest risk with this contracting form is that during a software project, our needs always changes and new issues arises, therefore we establish changer orders in the beginning so that we can tackle new upcoming costs.

Close communication, burn - down charts, predictive metric of issues that can arise for the development of a customised software solution.

Document every role, their actions and how they can estimate a strategy for holding the time - frame.

To get a clear overview of the total contract cost at the project start we have internal meeting to define the possible issues that can arise in the development.

The deliverables under this contract form are always known but time and effort to achieve the deliverables are often unknown. We tackle the risk by making a process chart were we define the issues that can come up. This helps us to estimate our budget calculations in a great manner by also using change orders.

Pay a higher price for the projects with suppliers that have the reputation of being effective and distinctive in their work.

Specify the key variables in the contract form that will reduce the possibility of extracting new information which will lead to new costs when new issues is exploited.

Constant internal reviews, trainee programs to develop the expertise regarding SW/HW development procedures

Process plans with bulletproof extracting all possible complications that can arise when new information is available. Offering a higher price for quicker and more efficient execution.

Document key roles and what should be included in the contract also make calculations, set a price roof with a margin if new information or key issues should be exploited

Make sure that the supplier hold close communication with the company, make him/her present the possible outcome for the project weekly and how many hours that has been spent in the construction phase. We have highly experienced employees which can determine the issues and complications that can come up, therefore we can control our budget in excellent manner.

1. Documentation 2. Cost calculation with change orders ready 3. Close internal and external communication with the vendor 4. Predictive metrics of possible issues that can be exploited

It is hard to manage risks in this contracting form this depends on that the vendor has all the responsibility for being efficient.

Calculating the total cost for these kind of projects is always very hard because in the software industry issues will always arise in one form or another, therefore I personally think that

you have to require from the vendor that he present what he has done on a weekly basis by using burn - down charts.

Ask the supplier to provide burndown charts at a weekly basis with bullet-proofs presenting what has been done and if the process is going as planned.

We document roles and creates change orders to get a clearer overview of the true scope of work.

By making clear statements to the supplier on what must be included, this is important to get a sense of the scope and also helps us to make estimations if issues arise.

Planning processes, documentation of key activities, change orders if new information is available, internal and external communication.

In order to increase the vendors efficiency rate, the most important thing is to have constant communication.

Good review processes and documentation regarding every internal and external actor communicating to finalise a solution.

Make a credit inspection on the vendors company make sure that their past history shows that they have been involved in high profitable projects.

Clear specifications and deliverables to the supplier, define the scope by adding possible affecting outcomes if new information that changes the scope will be available

Due to that time and effort are variables unknown in the project scope early it is relevant to be provided weekly information from the supplier to see if the time spent is equal to the bottom calculations estimated when documenting key roles in the project start - up phase.

The Statement of Work (SOW) needs to be defined in such way where the suppliers incentive to take profitable advantages is zero. I think the most relevant approach for this is to require information of the process at least twice in the month.

If we have past history with the supplier it is easier to define the scope of work, where we rely on the suppliers ability to be efficient.

Sit down with those specifying key activities (project managers), make sure that if new information will be available and if the scope changes that the budget calculations involves this.

- Key role documentation internal in the company - Provide correct information to the vendor about what needs to be delivered (define the scope like an overview) - Experienced employees tend to pressure the vendor when making decisions and estimating time

Our cost calculations are always massively important if we pay the vendor a higher price for the project, they tend to be more efficient. This has been shown in earlier projects.

Make sure the suppliers effort to use high cost labour is high, and if there is no more budget for the vendor, make suggestions regarding new price alternatives

Clear specifications on what needs to be included for a development of a software solution, the SOW needs to be defined in a way where it forces the supplier to be efficient.

Documentation of key roles, involve PM and sales and marketing in the initiation process. Make sure the SoW is described in a way where internal communication will be enabled.

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