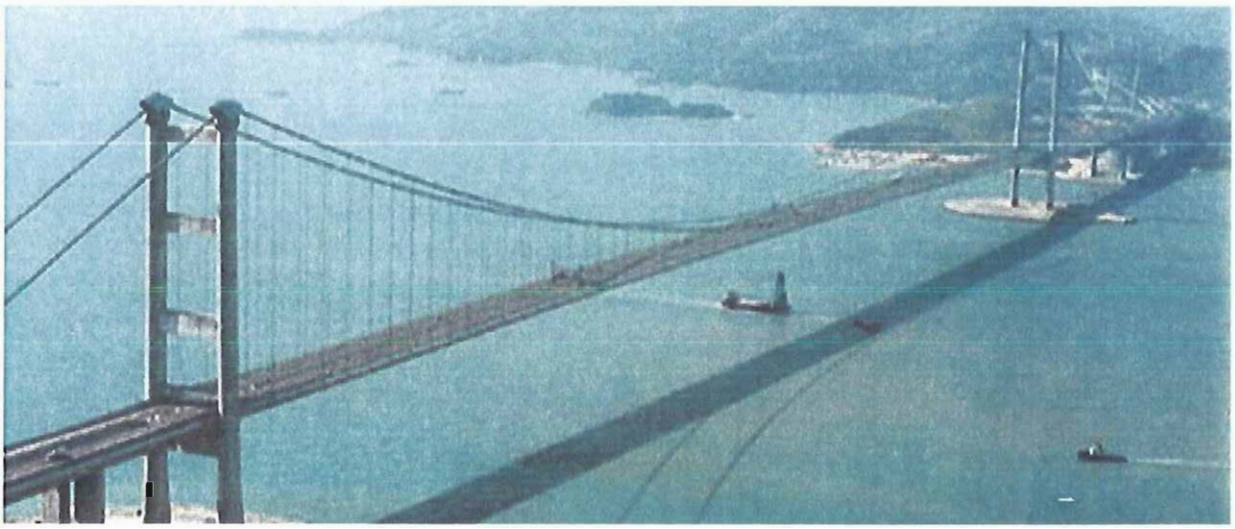
Master Thesis "Bridge to China"

Research in the management decision-making process between Dutch commercial principals and Chinese contractors in the realisation of an industrial construction project

GRADUATION REPORT



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Preface

To each beginning, there is an end, an end to this thesis, an end as a student. An end also indicates that there will be a new begin. The start of year 2006, the beginning of another phase in life. Although my written English have been improved during this graduation period, I prefer to write this part of the preface in my native language, Dutch. Chinese was also an option, but I think the audience of my thesis is more capable of reading Dutch than Chinese. My apologies for this inconvenience. In this occasion, I want to address the coming words to the people who have supported me and the people I love and care, especially my parents.

Na 8,5 jaar ingeschreven te zijn aan de Technische Universiteit te Delft is het moment dan eindelijk aangekomen. Het moment om te mogen afstuderen. Weliswaar betreft dit een uitzonderlijk langere periode dan gepland, echter een onderbreking van ca. 3 jaar met veel veranderingen, fluctuaties en ervaringen op verschillende gebieden hebben in het bijzonder bijgedragen aan dit werkstuk en onderzoek.

Een onderzoek over een fascinerend land met een rijke historie en totaal andere mentaliteiten dan we hier gewend zijn. Een onderzoek over belangrijke criteria in het realiseren van een industrieel project. Dit afstudeerwerk omvat nog vele andere invalshoeken en aspecten die de aandacht van de lezer keer op keer weer dient te prikkelen. Mijn grote dank gaat uit naar verschillende mensen die zowel direct als indirect, intern als extern betrokken zijn geweest bij het gehele proces.

Beginnend bij Tebodin wil ik graag dhr. Auke Piek bedanken. Niet alleen is hij manager van de afdeling Corporate Business Development, hij was ook mijn externe begeleider gezien vanuit de universiteit. Ondanks zijn bijzonder drukke internationale schema, heeft hij mij kennis laten vernemen van de basis facetten van de diensten die Tebodin internationaal aan haar klanten biedt. Hij heeft mij verteld over de inspanning en moeilijkheid die mensen ondervinden om met Chinese mensen zaken te doen. Hij laat me in mijn vrijheid en creativiteit in het creëren van toegevoegde waarde maar staat altijd klaar wanneer ik een beroep op hem wil doen.

Naast Auke Piek wil ik ook graag het dankwoord schenken aan mijn directe collega's, Suzanne Mol, Geert Kleisterlee en Dietrich Gondi die hebben bijgedragen aan de inhoudelijke context en evaluatie van mijn modellen. Mijn indirecte collega's; Michiel van Rij, Klaartje Mackenbach en Bart Lemmens in de opzet van de modellen; Gerard Streng, Jet Lasseur, Aria van der Gaag, Robert – Jan Smits van Oijen, Madelaine McInroy en Kristel Schiphorst in hun inhoudelijke bijdrage aan het onderzoek. En uiteraard niet te vergeten Tebodin Asia Pacific, dhr. Rong He betreffende de industriële bouwwereld in China.

Ten tweede wil ik het dankwoord schenken aan de verschillende heren van verschillende commerciële organisaties die tijd ter beschikking hebben gesteld in het afleggen van interviews betreffende hun ervaringen in het realiseren van internationale bouwprojecten al dan niet specifiek gericht op China. Ook commerciële organisaties die ervaring hebben in het strategisch adviseren in het zakendoen met China wil ik hierbij bedanken voor hun tijd en informatie.

Als laatst maar zeker niet onbelangrijk, mijn dankwoord aan dhr. Prof. Dr. Ir. H. de Ridder en mijn interne begeleiders, dhr. Karel Braat en dhr. Robert Verhaeghe, aan de Technische Universiteit te Delft, faculteit Civiele Techniek en Geowetenschappen. Prof. Dr. Ir. De Ridder specifiek voor zijn vaktechnische input en commentaar tijdens de verschillende vergaderingen. Dr. Ir. Robert Verhaeghe in zijn bijdrage in het ontwikkelen van de ondersteunende modellen en dhr. Karel Braat. Hij was mijn dagelijkse begeleider binnen de TU Delft die bijzonder veel heeft bijgedragen aan zowel de inhoud, structuur evenals de presentatie van het onderzoek.

Tot slot, in mijn afsluiting wil ik nog speciaal aandacht richten aan mijn ouders. Van jongs af aan is mij altijd verteld dat leren en studeren een investering is voor jezelf gericht op de toekomst. Studeren gaat niet vanzelf, het kost veel tijd en energie in het bijzonder in het laatste traject van je studie. Een ding wat ik wel zeker weet is de energie en tijd die zij hebben ingestoken in de afwachting tot dit bijzondere moment. Hoewel deze afronding een prestatie van mijzelf is, wil ik graag gebruik makend van deze gelegenheid, deze afronding voordragen als cadeau aan mijn ouders!!!

Kitting Lee
Delft, 26 January 2006

Executive summary

"A big and very hungry dragon", "Controlling the beast", "China key to US farm exports", "China, the world's 4th largest economy?", these slogans are just a few of the many daily appearing articles. The last years, enormous changes have taken place in the Chinese economy. Not only today, but in the coming years, or even decennia, China will be one of the fastest growing economies in the world. A lot of companies are trying to establish themselves in this country. In connection with China's joining of the WTO, it has become one of the largest and most powerful economic areas. More and more often business people are looking for opportunities to move or expand their business into China.

To all the positive aspects, unfortunately there are also some negative experiences in the negotiation with Chinese people. "Chinese people are strange", "They are just copying everything", "They are unpredictable" or "They always say yes, even if they mean no", here too, only a few of negative experiences are pointed out. But still, business people seek to enter in this market. If it is hardly impossible to avoid the relationship contact with the Chinese people, why one doesn't make use of this uncertainty and profit from this occasion in the open up of the wide variety of China's "**guanxi**" (social relationship) networks. Once involved in one of these networks, a range of possibilities is open to be used. Zooming into the core of this thesis, the consideration of Dutch principal's[1] possibility to collaborate with Chinese partners in the realisation of an industrial construction project is the basis of this research.

Each construction project can be characterised by a certain building contract form, such as: Turnkey and Design & Build. Within each form, one of the major aspects described are the relationships between the involved parties. What is the case, when a project is to be realised in China. In other words: ***how can Dutch principals logically and structurally establish a building contract form with a Chinese contractor?*** An answer to this question is also the objective of this thesis:

"To develop a systematic and logical decision-support tool for a principal in order to arrive at a collaborative group and building contract form concerning business, cultural and project related issues"

To be able to realise this objective, first an understanding of a management decision-making process towards a construction project is required. It appears that this process can logically and structurally be approached in a number of steps. At the start, the project characteristics should be defined, whereas in the second step a choice has to be made whether to create a business partnership or outsource the project activities. The next step considers the different outsourcing possibilities that finally result in the categorisation of collaborative groups. Together with financial models, a time planning and the possibilities of building contract forms, management decisions can be made and contractors can be selected in the execution of the project. (See Figure 0.1)

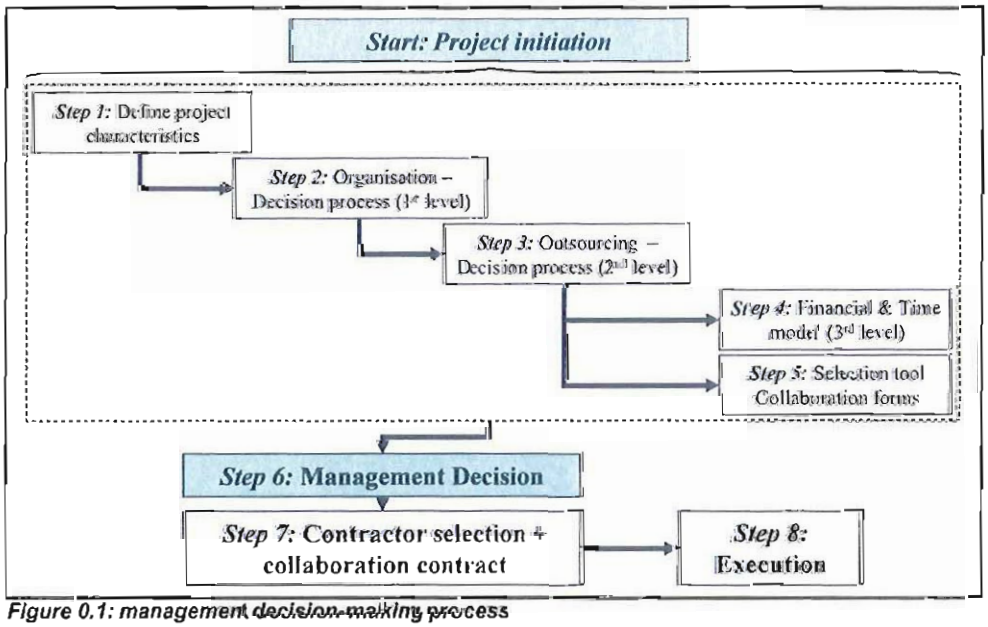


Figure 0.1: management decision-making process

1: The meaning of principal in the whole thesis can be denoted as client. The term principal is often used in the contex of the Civil Engineering sector.

A second fundamental topic which has to be understood, is the theoretical basis of each considered building contract form. Not only in The Netherlands, but also in China. Each form consists of a few main elements: description of the tasks to be agreed upon; responsibility, authority and liability of the involved parties; risk separations and allocations and finally a system of reimbursement. With this set of elements, building contract forms can be categorised in collaborative groups, such as strategic cooperation, forward or backward integrated outsourcing or the standard traditional bid-build forms. Although the construction industry itself can be often characterised as static, closed and not transparent, in recent years, lots of developments, translated to key performance indicators, can be considered in improving this industry and make it more dynamic and efficient. Development is ongoing on global level. Some of the key performance indicators include **trust**, **probity**, **predictability** and **transparency**. These are interesting abstract aspects in both personal as well as business relationships. Before the meaning and interpretation of these aspects in the point of view of Chinese people can be considered, a general understanding of Chinese philosophies and values is a must.

A comprehensive coverage of the roots of contemporary Chinese business thinking would take a thousand scholars a thousand days.[2] A general presentation of key determinative aspects are considered from five periods of philosophers. The first period indicated by the Pre-Confucian China and the **"Five Classics"**, Book of Changes, History, Odes, Rites and "The Spring and Autumn Annals". The second and third period laid down a pattern of thinking by Confucius and Mencius. Their thoughts of values are translated in virtues and expressed in **"Five Cardinal Relations"**, whereas four of them are vertical relations (top-down hierarchy) and one is of "horizontal" origin: the **friend-friend relationship**. The fourth period is based on the idea of one fundamental, universal principle: **the Way** or Tao of Taoism. In the last considered period, Mo Tzu's thinking was the belief that all human beings were fundamentally equal and should be loved equally, indicated as **universal love**. These five mentioned philosophical thoughts are nowadays of tremendous importance for the Chinese culture and business practices. How are these thoughts translated into concrete Chinese values and behavioural attitudes?

Age, hierarchy and authority are the first one to be considered. Respect for tradition, ancestors and age, stemming from Confucius, were among the main values of people in old China. **Wealth**, the need for self-sufficiency which results traditionally in a savings mentality is the second value. As a derivation from "The Book of History and Rites", the third value is **face**. The pervasive Chinese concept of gaining, giving or losing **"face"** focuses on question of prestige and dignity, reflects surprising vulnerability in self-esteem.[2] The Chinese are acutely sensitive to the regard in which they are held by others or the light in which they appear. To lose face is the worst thing that can happen to a Chinese person. Therefore: never insult, embarrass, shame, yell at or otherwise demean a person, since all these actions would risk putting a Chinese in a situation that he might lose face.[2] Adjacent values to **"mianzi"** (face value) which are also important points are **"lianzi"** (confidence of society in a person's moral character) and **"keqi"** (polite, well mannered, modesty). The last value is related to social relations. These relations can be derived from the philosophical thoughts of Confucius and Mencius and can be typified by a reciprocal social network. The individual link within the social network is known by **"guanxi"** and the feeling within the link is known by the term **"ganqing"**. Social relations are often expressed by the exchange of gifts.

The Chinese philosophies and their values form the basis of the Chinese. History and culture are very important, but what still remains, is the aspect of business strategy as warfare. As the people who led the army during war and the government administration during peace were frequently the same people or drawn from the same circle, the same strategic management principles were applied in peace and war.[2] In competition either in politics or business, strategy should be aimed at disposing one's resources in such an overwhelming fashion that the outcome of the contest is determined before it gets started. After a short side-step, the main focus can be continued to the West considering the management decision criteria from the points of view of Dutch commercial principals.

Interviews were taken and literature study is done in order to be able to define important criteria towards business as well as towards projects. During the understanding of the management decision-making process, a separation was made between the business partnership and outsourcing level. Important aspects on the first level are related to the business relationship between cooperating parties. Aspects like trust, openness, flexibility, controllability and cultural fit are defined. Second level aspects (mostly project related) can be divided in Time, Money, Quality or Health and quantified in risks. It can be noticed that the characteristics of the building contract forms can be divided and separated in the same basic groups. Finally the last part of the fundamental survey is discussed and the analysis towards the achievement of the aim and practical support tools can be taken into account.

Three processes were researched in parallel. First, a Western project collaboration support tool requires a functional description. Again, a separation in several steps characterised the approach towards this description. The

2: Source: Ambler, T. & Witzel, M.; Doing business in China. London: Routledge, 2000

first step is to define the main project aspects. Often this is an activity initiated by the principal itself. As a result of a comparison between elements in the building contract forms and management decision-making criteria in step two, a set of four main criteria groups can be categorised; namely: **Risks**, **Flexibility**, **Influence** and **Complexity**. Within each group, a subset of criteria is deployed in order to be able to relatively judge each form. (Step three) In the consideration of relative judgement, often one has to deal with personal findings. To be able to represent this relative ness, in step four an extra dimension is added concerning the weight of each subset criteria.

The second research analysis is conducted in the fields of general management decision-making both for Dutch people in The Netherlands and in China. Decision-making in Western or Eastern context is often related to a company's or a person's strategy. No matter where a choice has to be made, managers will try to understand and verify the impact of a certain decision towards the short, middle and long term period. Another part that contributes to a founded Western decision is to carry out a risk analysis and the management of these risks. It doesn't matter a decision is based on impulsiveness, casualty, technical data, under social pressure, all ***good decision-making*** follows the same process[3] in both the West and the East:

- *Understand the problem and goals clearly*
- *Create many possible solutions to the problem*
- *Collect all the conveniently available information about the probable outcome of each course of action*
- *Weigh the positive and negative effect of each course of action (solution), and then decide on one that you can commit yourself to fully*

When an international (or interregional) dimension plays a part in the decision-making process, managers have to deal with other business and cultural issues, such as: language barrier, intellectual property, difference in communication, negotiation and management style. A technique in order to be able to bridge a cultural gap is **cross – cultural management**. Managers should be aware of cultural differences and often they play a far more important role than they will expect. After the awareness stage, one should also recognise the different cultural dimensions. The next step is to understand these dimensions and be able to predict several cultural profiles and create harmony in business processes by synthesizing those profiles within the local organisation. In the case of China, **five Chinese principles**[4] can be considered:

1. *Hierarchy – Who is the boss?*
2. *Collectivism – Them against me*
3. *Performance – Higher and higher*
4. *Flexibility – Planning is slower than change*
5. *Strategy – Long – term and pragmatic practices*

NOTE: SHORT-TERM SUCCESS IS LESS IMPORTANT THAN GOOD PREPARATIONS

The last part of the analysis concerns the cultural merging between Western and Chinese thinking. A list of business related aspects summarised according to taken interviews and literature study can generally be merged together into six relationship aspects: **learning**, **adaptation**, **trust**, **commitment**, **social interaction** and **social bonds**.[5] Learning takes on a central importance in business relationship between The Netherlands and China. Dutch companies are organised in an inter-organisational network, whereas the Chinese ones are in inter-personal network. Learning is the process by which companies reduce (or increase) their uncertainties. It is also a process of learning how to live with some uncertainties that cannot be reduced.[6]

Business based on guanxi is very different from Dutch business principles, and since guanxi principles is the prevailing business more in the Chinese context, Dutch companies most likely need to adapt to them. Adaptations make firms more similar and therefore strengthen the bonds between them.[7] Trust in the Dutch context exists foremost between organisations, while trust in the Chinese context exists between persons. Trust is the company's belief that another company will perform actions that will result in a positive outcome for the company.[8] Commitment is the intention to continue the relationship in the future and the willingness on the part of both partners to make short-term sacrifices to realise long-term benefits in the relationship. Both firms make an effort to ensure that the long-term relationship remains. [9]

3: Source: Tucker – Ladd, C.E., Psychological. http://www.mhnet.org/psyhelp/
4: Source: Amber, T. & Witzel, M.; Doing business in China. London: Routledge, 2000
5: Source: Ramström, J.; West Meest East. Finland: Akademi University Press, 2005
6: Source: Ford, et. Al, 1998
7: Source: Johansson and Mattsson, 1987
8: Source: Anderson & Narus, 1990
9: Source: Anderson & Narus, 1984

In China business relationships are built on social relationships, and personal relationships are often a prerequisite for the development of other types of business activities. The goal of social interaction is to foster friendship and personal relationships between actors from each company in order to increase openness and communication frequency. Social bonds are important for the development of business relationship in the Chinese context. Social bonds require the partners to invest time and energy, which is hoped to create positive personal relationships between the partners.[10] Western companies use systems to control relationships. Chinese organisations use relationships to control systems.

A list of differences between Western and Eastern thinking patterns is included in this report. Five of them are highlighted as being the main cultural dimension between the Netherlands and China. (See Table 0.1)

Cultural dimensions	Cultural values	The Netherlands	China
Motivation and consequence	Thinking orientation	More rule based or based on application of abstract principles such as regulations or laws	Tends to take context and the specific situation into account into rule interpretation
Unity and diversity	The individual	Has to have rights and greater need for autonomy and individual achievement	Group duty, preservation of harmony
Circle and sequence	Type of logic	Linear	Spiral
Harmony and self-interest	Expression of self	I – orientated	We – orientated
Certainty and uncertainty	Nature of business relationship	Less important, tend to substitute relationship for written agreement, superficial	Most important business cannot occur until relationship is sound, written agreement secondary to guanxi

Table 0.1: main cultural dimensions between The Netherlands and China

One of the keys to success in global business lies in learning global lessons and then in applying them locally. There is no one "model" for doing business in China. Because events in China are happening so rapidly, it is better to describe a method in approaching Chinese people as a framework for anyone doing business in the area. This framework can be a guiding principle supporting for the Dutch managers to be able to negotiate with Chinese people. (See Figure 0.2)

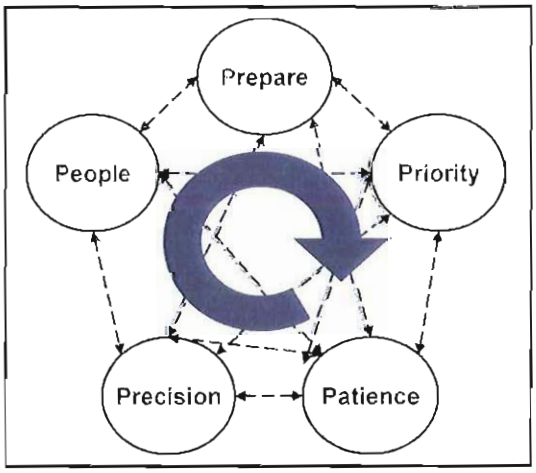


Figure 0.2: framework for negotiation with Chinese people

A last link has to be connected to close the circle of this research. A link between all considered aspects towards Dutch construction projects in China. (See figure 0.3) With this theoretical framework, a conceptual model of the two practical support tools is realised: **Quick TEB Toolkit** and **Quick TEB ROAT**. The first support tool considers the logical choice of a contract group and building contract form. A top-down and bottom-up approach is used to realise it. The second support tool supports the analysis of the decision-making process towards business as well as cultural aspects. The theoretical basis of this tool is based on the "Real Options approach". An approach which allows managers to consider and expand their set of strategic alternatives in identifying and valuing opportunities to contract in the financial and product market. Also an

10: Source: Granovetter, 1973

approach to create a link between project level analyses of strategic investments and the corporate strategic vision.[11]

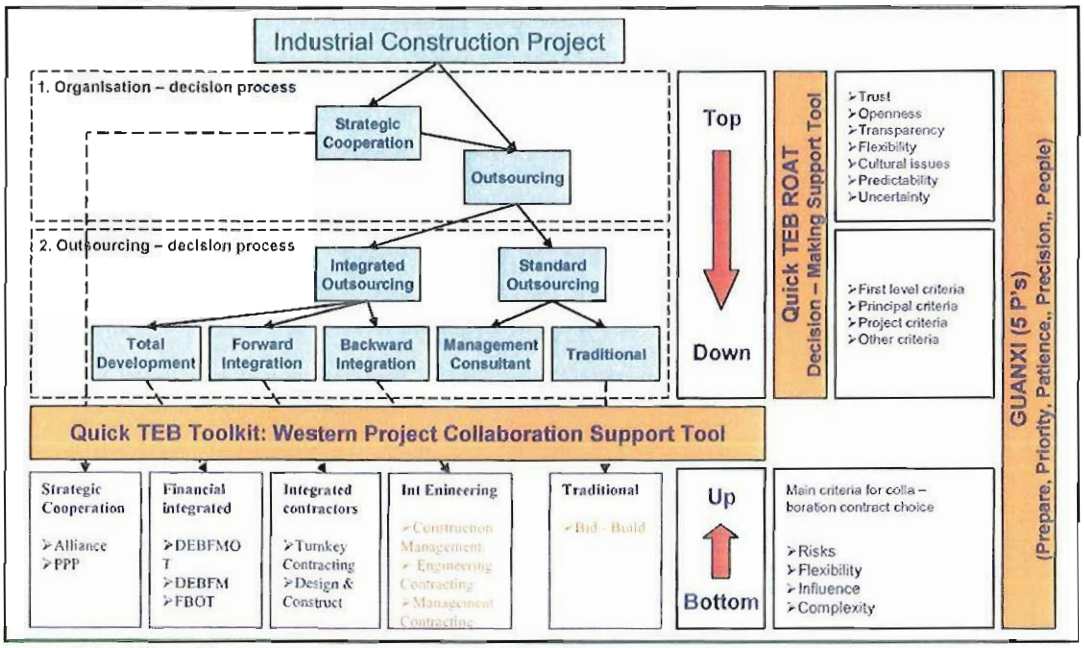


Figure 0.3: deliverables master thesis: "Bridge to China"

Key conclusions which can be drawn from this research:

- The Western project collaboration support tool towards building contract forms can also be used in relation to Chinese contractors. Building contract forms are more or less the same between The Netherlands and China. This is confirmed by The Chinese government announcing that it will follow the international standards and regulations in several directions.

- There is no one "model" of doing business in China. A sound method in approaching Chinese people is to describe a framework and not a rigid model. A framework which has the function to guide and support Dutch principals in the negotiation with the Chinese people. This framework can be drawn up out of five P's: **preparation**, **priority**, **patience**, **precision** and **people**, in which the last one is of fundamental importance.

- In China, the basic attitudes (**mianzi**, **lianzi**, **ganqing**, etc.) and thoughts (**Confucius**, **Mencius**, **Taoism** etc.) are derived from the rich Chinese history and philosophy. Each of them represents a special characteristic which describe the behaviour of the Chinese people and all of them are related to the most important concept: **guanxi**, social personal relationship. Western people often make the mistake to underestimate the power and "real" influence of this concept.

- When considering Dutch industrial construction projects, often the time span of each particular project is only a couple of years. The business and internal processes involved, including the process of creating a (personal) relationship, are far more important than the actual realisation of an industrial plant. Dutch principals or managers are assessed on their managerial skills towards **Time**, **Money**, **Quality**, **Organisation** etc. in a project, whereas the Chinese business people will be thinking of other matters: **guanxi**, **long-term strategy**, **performance** and **success**, all together in terms of **harmony**. Dutch principals or managers should continuously be aware not only of their own interest, but also that of their Chinese partners or contractors. Keeping this in mind is a prerequisite to enable Dutch principals to bridge these gaps and possibly prevent unexpected circumstances.

- Both supporting tools, **Quick TEB Toolkit** and **Quick TEB ROAT**, are literally tools to support Dutch principals in order to arrive at a collaborative form with their future Chinese partners or contractors. Personal and business relationships are issues which can not be strictly modelled, a certain common sense is a must in these kinds of management decision-making.

11: Source: Amram, M. & Kulatilaka, N., Real Options – managing strategic investment in an uncertain world. Boston, Massachusetts, Harvard Business School Press, 1999

Terminologies

Advisor: the advisor is an advisory party which is on the side of the principal and does not carry any project related risks, often the advisor is an architect or a consulting party.

Alliance: a building contract form whereas parties have the intention to work together on the basis of equality, in order to reach a single, common result. The essence of this collaboration is that detailed procedures are agreed upon with respect to mutual consultations. Another important aspect is the "open book" determination of costs and the formulation of a detailed declaration of intention.

Backward Integration → Principal / Engineering Contractor: a collaboration group whereas the principal has an engineering contract agreement with the engineer; the engineer will be responsible for managerial activities within the project.

BOT: a building contract form with the characteristics of extensive integration in the building processes. The development of the project consists of design and construction but also maintenance and operation with a final transfer. Parties work together in a consortium. A condition is that a project is suitable for integration of all the processes from the start until and including operation.

Construction Management: a building contract form close to Management contracting. A construction manager managed the design and construction stage. The principal is directly in contact with all his suppliers and subcontractors.

Contractor: the contractor is an engineering and / or construction contractor capable of realising a project

Cooperation process: several parties in the cooperation process have the same intention and purpose when it comes to realising a construction project. At first the project is the property of all the cooperating parties, although somewhere in the middle or towards the end, the structure itself can be handed over to one main party. The main focus in the cooperation process is on partnership.

Design & Build: a building contract form whereas design (Engineering) and construction are in one hand. Forward integration in the construction industry chain. With this type of procurement there is no traditional form of supervision from the side of the principal, although the contractor shall allow him a general authorisation for inspection to make sure of compliance with the contract.

Engineering Contracting (EPCM): a building contract form. In this form the Engineering Contractor is responsible for the total design and coordination. (General contracting or Total engineering)

Forward Integration → Principal / Contractor: a collaboration group whereas the principal will let the contracting party develop a total solution on the basis of an integrated design and construction method. An extensive description of the functional requirements is given by the principal.

Ganqing → Feelings: ganqing is an important concept in Chinese social relations which is loosely translated as "feeling" and is related to the concept of guanxi. Ganqing reflects the tenor of a social relationship between two people or two organisations.

Guanxi → Relationship with people: guanxi describes the basic force that holds the personalised networks of influence together. It has always been a central concept in Chinese society and describes a personal connection between two people in which one is able to prevail upon the other to perform a favor or service.

Integrated Outsourcing: the principal has the choice to decide in which part of the construction project external parties will be involved. The possibilities may involve everything from a simple engineering task move to the total development of a construction project. Further a sub decision can be made as to whether the principal wants to work in a principal / consultant, principal / contractor or principal / total supplier collaboration group.

Lianzi → Confidence of society in a person's moral character: lian is the confidence of society in a person's moral character, while mianzi represents social perceptions of a person's prestige.

Management → Principal / Management – Consultant: a collaboration group. This part of the outsourcing – decision process represents the collaboration group between the principal and the consultants, but also architects and management companies who acts as an advisor to the principal.

Management Contracting: a building contract form whereas involvement of a construction manager in an early phase make it possible to consult the design team by the construction manager. A more efficient and better tuning will take place which result in fast tracking, efficient coordination and cost control.

Mianzi → Face value: the idea of shame, usually expressed as 'face' could be loosely defined as the 'status' or 'self-respect' in Chinese people and is by no means alien to foreigners. To lose face is the worst thing that can happen to a Chinese person.

Organisational - Decision process (1st level): first level phase in the decision-making process. The principal will compare the requirements for the initiated project and the capacities and expertise in-house.

Outsourcing - Decision process (2nd level): second level phase decision-making process. The principal not only has to deal with project-related requirements such as Time, Money and Quality, but also with the organisational and environmental aspects of the project.

Principal: the principal is the owner and often also the user of a commercial construction project. In commercial terms, it is often indicated by client.

Principal aspects: a list of important aspects from the principal's point of view. These aspects are related to the managerial skills, capabilities of the company and their willingness to take risks.

Project aspects: on the level of a construction project, five fundamental basic aspects can be considered; Time, Money, Quality, Information and Organisation. Besides of these five, other aspects may also be taken into account and are grouped together as general.

Quick TEB ROAT: the Real Options Analysis Toolkit gives analysts and their managers the ability to determine the value of investing in an uncertain future.

Quick TEB Toolkit: a practical support tool focussed on project collaboration selection that combines two approaches. With this tool, it is possible to compare several building contract forms all together or within each collaboration group and finally arrive at a building contract form.

Standard Outsourcing: this part forms the traditional historical well known part of tendering, both with contractors and consultants.

Traditional → Principal / Contractor: a collaboration group which can be characterised as a collaboration with strict separation of responsibilities and orders in the different project phases.

Tebodin: Tebodin, Consultants and Engineers, is an independent, international firm that serves its Clients by developing and realising their projects and investments worldwide.

Total Development → Principal / Total supplier: a collaboration group whereas the principal has a construction contract with the total supplier which can provide finance, design, realisation, operation and maintenance in the project chain.

Traditional Construct: a building contract form. The principal is responsible for the design and the provision of the tender package and during the construction phase, the principal also supervises the works. The contractor "designs' the method of construction, makes a planning schedule for the works and executes the works in accordance with the contractual obligations, i.e. the technical and administrative conditions.

Turnkey: a building contract form. The principal will let the contracting party develop a total solution on the basis of an integrated design and construction method. An extensive description of the functional requirements is given by the principal. One party is responsible for design and construction --> consultation will take place, but detail engineering and construction is full responsible by the contractor.

Table of contents

1. Introduction thesis approach

For a long time, the construction industry has been a market that is characterised as being: traditional, unwieldy, static, closed and not transparent. It is traditional, mainly in its way of tendering and regarding the construction methods used. It is unwieldy & static due to the fact that different kinds of parties work together in a complex situation involving several project phases. The fact that it is closed and not transparent has become one of the latest issues to be criticised in the construction world. The principal does not have a clear view of how a project is to be realised.

Large complex construction projects are continuously postponed and / or delayed. Exceeded budgets are more the rule than the exception. In the last decade, changes have been made and will continue to be made on the existing "ways of working", particularly within the western construction sector. This sector is "slowly" changing in comparison with other sectors. By contrast, the whole economy of China is going at full throttle. In just a couple of years, China has seen tremendous development in all kinds of sectors. How has this affected the construction industry? How is it possible that every half a year or every quarter a new building is realised? How can the cultural differences be dealt with? What are the regulations and procedures underlying local principals as well as foreign principals? And finally how will the changes and developments which are taking place in western countries be interpreted by the Chinese construction industry?

In this report some of the above-mentioned issues will be discussed. The aim is to create a "bridge" in the construction industry between western countries and China (specifically focussing on principals and how they can collaborate with local contractors). The structure and relations between several research fields are shown in Figure 1.1, 1.2 and Figure 1.3. The reader may use these Figures as a guiding principle (see appendix A). Also a list of abbreviations and terminologies can be found in the same appendix. Throughout the report, some comparisons are made within the different research fields between the Netherlands and China.

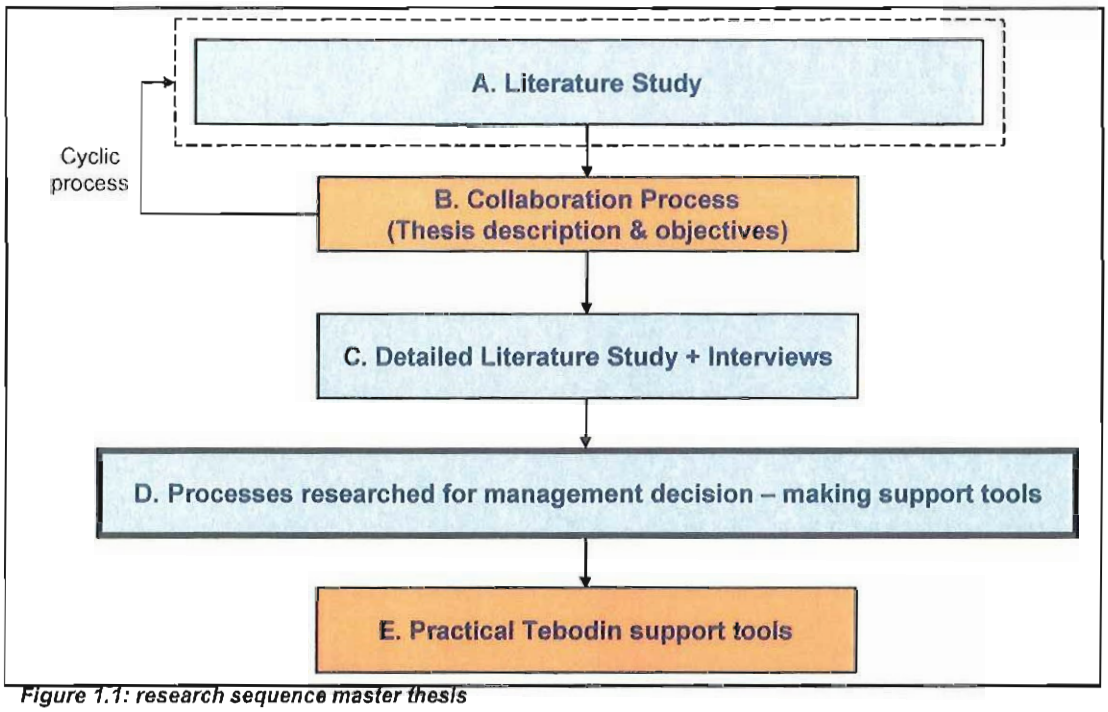


Figure 1.1: research sequence master thesis

In Figure 1.1 steps B and E are in a different colour, step D also has a thicker boundary. Step B forms the fundamental basis of the thesis, whereas in step D the research area will take place and the final result in practical tools will be delivered in step E. Figures 1.2 and 1.3 give further details of Figure 1.1.

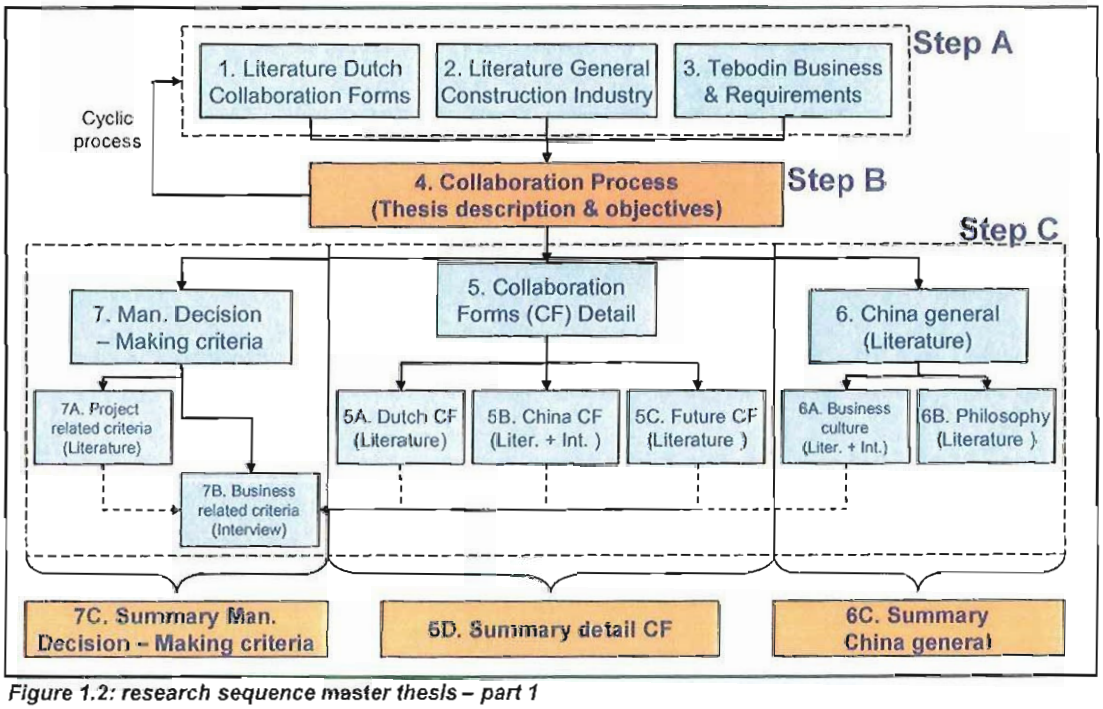


Figure 1.2: research sequence master thesis – part 1

Figure 1.2 shows the first part of the thesis: the basic literature study, the thesis description & detail literature study. A thorough basic analysis has been made (step A) to understand and to be able to define the project scope to be surveyed. As indicated in Figure 1.2, the literature study is done in relation to building contract forms[1] in the construction industry, general construction industry facts and Tebodin core business activities and future expectations towards China.

These three studies made it possible to set up the first concept problem statement and define the aim of this thesis. (Step B) To fine tune the final problem statement and to research the objectives, a cyclic process is needed. When finalising the three studies, the collaboration process of a construction project can be described. Due to the collaboration process, three parallel ways are defined for the further detailed survey (step C):

- **Detailed knowledge of the different collaboration forms:** first of all, existing collaboration forms in the Netherlands and China together with their characteristics, advantages & disadvantages will be considered. Second, what will be the future developments and expectations of the construction industry? Information is gathered on the basis of the literature and interview carried out with a Chinese contractor. (SMEIC, joint venture partner of Tebodin in China)

- **General study of China:** what are the Chinese business cultures one should be aware of and how have they arisen from the Chinese philosophy? Information is gathered from various literature sources.

- **Management decision-making criteria:** what are important criteria for a Dutch principal in order to arrive at a collaborative group[2] from the point of view of a project as well as from the point of view of the company being considered? The criteria will be defined according to the literature and interviews to be taken with Dutch principals. Please note that this interview questionnaire has only been made possible by combining of the three parallel fields.

1: collaboration contract form in the context of this thesis is defined as: the concrete project contract form a principal chose to collaborate with a contractor, like e.g. turnkey or design and build.
2: a collaborative group represents a group of concrete project contract forms (collaboration contract forms) which have at least one common characteristic together.

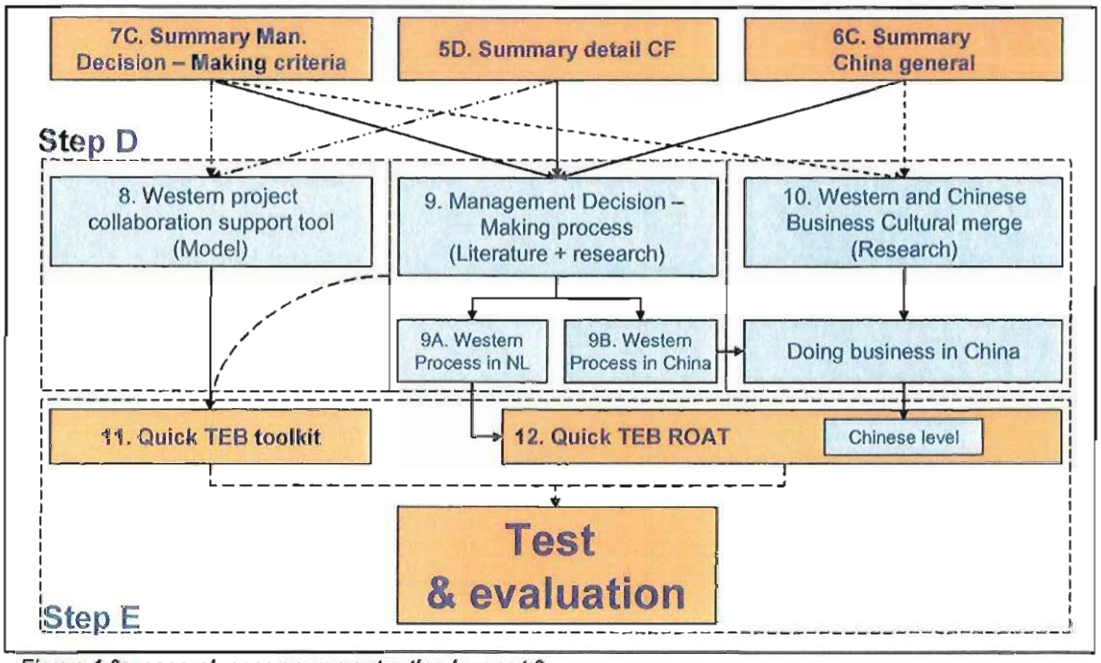


Figure 1.3: research sequence master thesis - part 2

Figure 1.3 shows the second part of the thesis: the research, modelling & testing part. Again three research areas can be defined from the three parallel surveys:

- **Western project collaboration support tool:** this tool makes it possible for a Dutch principal to logically arrive at a collaborative contract form regarding the initiated project. Information acquired from Chapter 5 and 7 will be used as the basic for this support tool.

- **Management decision-making process:** how do western managers deal with decision-making issues both in The Netherlands and in China? And what is the link in management perspective to overcome cultural differences? A common Dutch decision-making process in The Netherlands will be compared with a Dutch decision-making process in China. This Chapter has its basic origin from all three surveys.

- **Western & Chinese cultural merging:** how will the Chinese business culture influence the way of collaboration in a construction project, what are the differences and how can these "soft" issues be merged and managed? Results from this Chapter are a combination of research and gathered information from the Chapters 6, 7 and 9.

Finally these three research areas will be converted into two practical support tools. The first one, the ***Quick TEB toolkit***, is a support tool which creates the opportunity to make a comparison between project building contract forms **due to the given project criteria**. The second one, ***Quick TEB ROAT***, is a support tool which will give an overview of the basic decision-making process on business level with an extra dimension **towards Chinese partners**. Both support tools still have to be tested and evaluated for internal and external purposes.

Report sequence

The report sequence is more or less the same as that presented in the figures above. The next chapter will give a short introduction to the development of the western construction industry. A short overview will also be given of the general developments in China. As this report is also written on behalf of Tebodin, the last part of chapter one will briefly describe Tebodin's core business and the link it has with this research. (Boxes 2 & 3)

Chapter 3 will describe the scope of the graduation project, with its problem statement, aim and also requirements terms. A description of the collaboration process within a construction project is given. (Box 4) A description of the market segments examined, the economic markets as well as the civil engineering focus, will be given in Chapter 4.

Chapter 5 is one of the basic elements of the study, addressing the question: **what are the existing and future collaboration forms in the construction industry?** These characteristics, advantages and disadvantages are presented in detail. (Box 5)

Chapter 6 will deal with Chinese philosophical and cultural aspects. On the one hand, business issues like **guanxi**, **mianzi** and pride will be dealt with, while on the other hand, philosophical issues like hierarchy and collectivism will be considered. (Box 6) The second basic element of this research thesis will be to define **the important criteria at the different principal levels**. These will be done in Chapter 7. (Box 7)

Chapters 8, 9 and 10 will describe the three research area and will be the basic platform for the practical support tools developed hereafter. (Boxes 8, 9 and 10) When everything has been combined and translated into a set of practical and useful support tools: ***Quick TEB Toolkit*** and ***Quick TEB ROAT***, this will be presented in Chapter 11 and 12 (Box 11 and 12). These support tools will be evaluated and tested in the same Chapter. Finally the conclusions and recommendations will be given in Chapter 13. At the end an overview of abbreviations and terminologies used is listed together with the source indication and list of figures and tables.

2. General introduction (Boxes 2 & 3)

The activities going on in China are enormous. What are we actually talking about? What are the general differences between the Netherlands and China specifically in relation to the construction industry? What makes this country so attractive to commercial as well as public parties? From the point of view of Tebodin, the question is why is it interesting to do this research and how can the results of this research be implemented in practical useful tools? First, this Chapter will provide a general overview to compare the two countries being considered, whereas in paragraph 2 the need and future expectations of Tebodin will be discussed. The final paragraph will present the committee which is involved during the whole master thesis period.

2.1. General information

It is a common occurrence to consider China as one country. Although geographically that is correct, China actually consists of different states with their own characteristics, cultures and even languages. The first paragraph will give a general overview, whereas the following paragraph will be about the construction industry and its developments.

2.1.1. Factual Overview

Description	Netherlands	People's Republic of China
General		
Surface	41,526 km2	9,561,000 km2
Capital	Amsterdam	Beijing
Provinces	12	22 (+ 5 auton. areas & 4 SAR)
Population (june 2005)	16.3 M	1,306.3 M
Language	Dutch	Mandarin (Putonghua)
Religions	e.g. Roman Catholic, Dutch Reformed	e.g. Taoism, Buddism
Developments		
GDP	481.1 Billion USD	7,262 Billion USD
Yearly growth GDP	1.2%	9.1%
Investments (% of GDP)	19.9%	46.0%
Export	293.1 Billion USD	583.1 Billion USD
Import	252.7 Billion USD	552.4 Billion USD
Market sectors:		
Agriculture	2.4%	13.8%
Industry	24.5%	52.9%
Services	73.1%	33.3%

Table 2.1: facts overview general (2004) - Netherlands vs. China[1]

FIVE - YEAR PLAN[2,3]

In 1949 Mao Zedong came to power in China. Until then, China had been the world's most heavily populated communist nation. Not only was China many years behind international industrialized nations, but communism was also feared throughout the western world. Due to this, Mao launched a first Five - Year Plan to boost China's industry and make it a world class player with power. The intention of the Five - Year Plan was intended to stimulate and control growth in different fields in China, whereas economic growth and the amount of investments remained one of the main issues.

1. Source: http://www.cia.gov/cia/publications/factbook/geos/ch.html
2: Source: China, landenoriëntatie, The Hague: EVD (Economische Voorlichtingen Dienst), November 2003
3: Source: http://china.org.cn

Meanwhile, the 10th Five - Year Plan (2001 – 2005) is now being effectuated. In this plan, the main objective of the Chinese government is the following:

> *"To enforce the law and management and to concentrate efforts on macro regulation and control while creating a **sound market environment** and not directly intervening in enterprises"*

China has again opened more of her boundaries to foreign companies and investors to enter. The important issues in this plan are these:

- **To stress infrastructure construction**
- **To outline agriculture and industrial goals**
- To improve socialist market economic system, speed up western type of development
- To strengthen the democratic legal system
- To promote science and technology
- To strengthen information technology is an important point

The Figure shown below gives an impression of the development regions in China for the year 2004. The darker colour denotes greater economic activity.

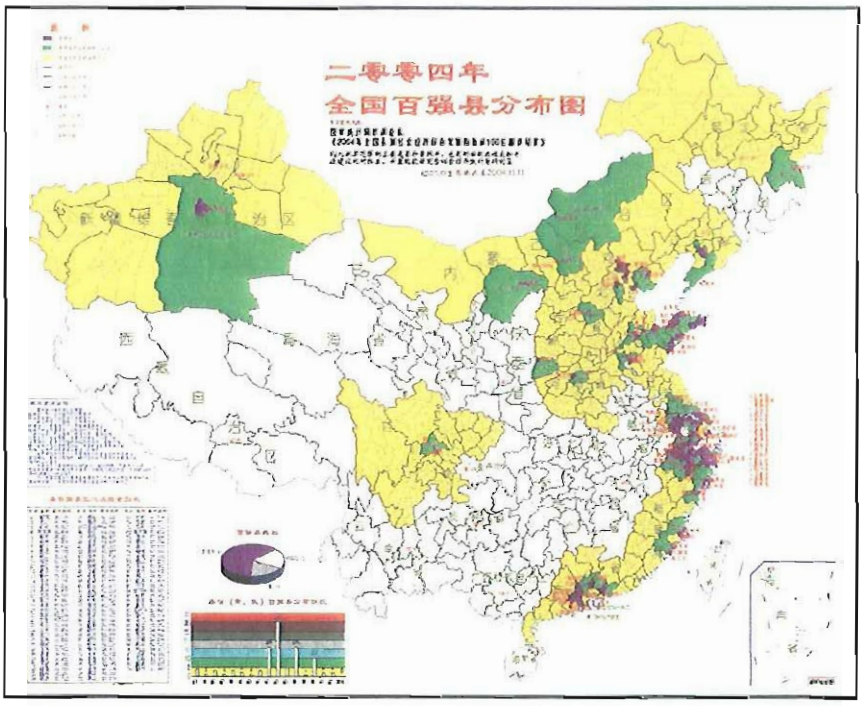


Figure 2.1: China hundred fast growing municipalities in 2004 [4]

If one has a quick look at the 11th Five - Year Plan[5] for social and economic development, the major issues which are to be considered are: the economic growth pattern, industrial structure, balancing development between urban areas, rural areas and different regions, resources, eco-environment protection promoting, talents and sci-tech education, thus giving way to the building of a **harmonious society**. The aim is to enhance economic strength, change growth patterns, optimize industrial structure, improve the public service system, strengthen the capability for **sustainable development**, and to accelerate reform and the opening up of society so as to bring about sustained, fast and sound development of the national economy whilst safeguarding the overall progress of society.

A general overview is given between the Netherlands and China in which the development in China seen during the last five years and in the coming years is outlined. The recurrent terms in these plans are **sustainability** and **fast**

4: Source: http://www.xzqh.org

5: Source: http://english.people.com.cn/200505/11/eng20050511_184577.html

and sound development. What will be the implications for the developments in the construction industry? And how does this fit in with cultural issues?

2.1.2. Overview and characteristics of the construction industry

In the table below, a comparison is made between the two countries, in which the construction industry remains the main point of interest.

Description	Netherlands	People's Republic of China
Turnover	48 Billion Euro	122 Billion USD
Sustainable constructions in:	All CE constructions	Beijing, Shanghai, Chengdu, Shenzhen
Guidelines	New collaborations forms	International within 5 years

Table 2.2: facts overview construction industry (2004) - Netherlands[6,7] vs. China[8]

The construction industry can be divided into a couple of industries: Civil Engineering, mass – production, house building and the manufacturing sector. This Master's thesis is written from two points of view; on the one hand of the point of view of the Delft University of Technology (TU Delft), faculty Civil Engineering & Geosciences and on the other hand Tebodin[9] (constructions for manufacturing industries). Because of this division, the basic setup and concept of the thesis is written with both fields in mind, while the basic approach to dealing with several problems in the thesis will be to adopt the point of view of Tebodin. Later on, specific demarcations will be defined.

Some characteristics[10] and focus points[11] of the Civil Engineering industry, which also represent construction for manufacturing industry are given below:

Characteristics	Focus Points
Product for one specific customer	Static control of product
One - of - a - kind structure	Project orientation
Constructed on site	Parties involved
Tendering to the lowest bidder	Fragmented value chain
Long performance lifetime	Separation of costs and risks
A Multi - disciplinary character	Fixed price
Sustainable systems for use	Original price
Collaboration is a necessity	Initial investment

Table 2.3: characteristics and focus points for civil engineering and the construction industry

These characteristics and focus points often create a dilemma for the principal as well as for the contractor's. Collaboration with different kinds of parties at different stages is what makes a project complex and difficult to oversee and control. Primarily, the principal also wants the best balance between the quality which the project should deliver, within a certain time span and the lowest price. For the contractor, it is important to create continuity and profit to justify the amount of effort which is put into a project. This contradiction plays a part in the contribution to the existence of the "construction scandal".

2.1.3. Main focus points after the "construction scandal"

What was the main cause of the "construction scandal"? What does this scandal have to do with the Chinese construction world and what are the focus points that correspond with the Chinese business culture? This report does not consider in detail such questions, but it is interesting to consider some similarities between the developments in the Netherlands and the situation in China.

6: Economisch Instituut voor de bouwnijverheid: De bouwarbeidsmarkt in de periode 2005 - 2010
7: Source: www.bouwendnederland.nl
8: Source: http://www.cia.gov/cia/publications/factbook/geos/ch.html
9: Description of Tebodin is given in paragraph 1.2
10: Source: Ridder, H.A.J. de: Collaboration and procurement procedures in the civil engineering industry. Delft: TU Delft, lecture reader CT5981, 2004
11: Source: Bakens, W.; Project – Benchmarking 1: International review of benchmarking in construction. PSI Bouw, 2005

First of all, the main factors which led to the "construction scandal" are (a more detailed explanation of the "construction scandal" is given in appendix B):

- Contractors are more and more in competition for the lowest bid
- Profits drop → compensation is sought by reducing quality
- Less margin for unforeseen risks → a miscalculation can potentially be disastrous

Due to these unpleasant situations, several Dutch contractors came up with a system, a system which enables contractors to create price stability, reduce their risks, improve company continuity and establish mutual reimbursement. Briefly said, an amount of money was added to the original bidding price of all tendering parties beforehand but it remained unseen in the bid to the principal.

Eventually this system was publicly exposed and a Dutch parliamentary enquiry came up with the following recommendations to solve this lowest bid problem[12]:

- To search for new forms of tendering
- To request for alternative bids, not only for construction, but also regarding the method, time, flexible execution, price quality & chain integration
- ***To create transparency & openness***
- To be able to provide price guarantee
- To encourage innovative solutions
- ***To stimulate on partnership & collaboration***

How about the situation in China? To reveal a little bit, Chinese contractors win projects not only by competition on the lowest bid but on one of the major aspects, the relationship (**guanxi**) that they have with the principals. Of course, money, time and quality play a certain role during the tendering procedure, but overall the Chinese community is a relationship based community with a lot of hierarchy and collectivism.

The Dutch construction industry is going to change, partnerships and collaboration, trust and transparency will become more and more important. These aspects are more or less related to building up a relationship between collaborating parties. What will be the impact when dealing with a relationship based community? How can Tebodin interact between a Dutch principal and a Chinese contractor? Before trying to get an answer to these questions, the next paragraph will present Tebodin's view and its research needs.

2.2. General information on Tebodin

As was mentioned earlier, this thesis has been written on behalf of Delft University of Technology, Delft's Faculty Civil Engineering & Geosciences and the commercial company Tebodin. This paragraph will give an introduction of Tebodin, what kind of services it delivers and what their future expectations are in relation to China and this thesis. (A detailed description of Tebodin can be found in appendix C)

2.2.1. Company Profile Tebodin Consultants and Engineers[13]

Tebodin, Consultants and Engineers, is an independent, international firm that serves its Clients by developing and realising their projects and investments worldwide. Tebodin's extensive office network, allows it to offer Clients the best of both worlds: integrated engineering and consultancy expertise combined with local knowledge.

Tebodin acts as a strategic partner for the principal in decision – making processes with practical and sustainable solutions. Tebodin offers the following services from project inception through to completion:

- Consultancy
- Project management
- Design and engineering
- Procurement
- Construction management

12: Source: Ridder, H.A.J.; Collaboration and procurement procedures in the civil engineering industry. Delft: Delft University of Technology, lecture reader CT5981, 2004

13: Source: Kleisterlee, G.J. & Gondi D.G.; Company presentation. The Hague: Tebodin B.V. 2006

Tebodin also undertakes Engineering, Procurement and Construction Management (EPCM) projects over a wide range of industrial sectors based on various commercial lines up to Turnkey.

2.2.2. Tebodin Asia Pacific (Future expectations)

Strategically located across China, Tebodin Asia Pacific offers clients Western expertise combined with local knowledge in a wide range of industrial and technological areas. Although their presence in China and business collaboration with local contractors is fine, there still remain some business-cultural issues which are not really clear in relation to project collaboration.

Tebodin Asia Pacific is a 50 - 50% joint venture between Tebodin, Consultants and Engineers and the Chinese contractor SMEIC (Shanghai Mechanical and Electrical Installation Company). This joint venture partnership adds huge added value to the existing services Tebodin provides to their international clients. Not only is there a geographical expansion along the east coast of China in the realisation of projects due to SMEIC, there is also a trustful and open relationship in which SMEIC positively contributes to the commercial activities of Tebodin towards their (potential) clients.

Unfortunately, there are also some less positive aspects attached to such collaboration. Because of this trustful and open joint venture partnership, there was no immediate need to link and translate the Chinese business culture with Western criteria. From the point of view of the consultancy department within Tebodin, it was not clear in which way to present an objective and well-founded advice to the (potential) clients in order to directly arrive in a collaborative contract form with Chinese contractors.

From the point of view of the joint venture partner SMEIC, SMEIC do not understand why one of the major aspects in the tender phase is continuously bidding for a competitive (lowest) price. Furthermore, another disadvantage is an obligation in the engineering phase for the detailed engineering to be done by a Design Institute which has a Chinese license. A more detail description will be given in Chapter five.

For the future, some questions and issues still remain to bridge the gap between Western countries and China in the creation of a sound and open working procedure.

- How can Tebodin collaborate with (other) Chinese contractors on behalf of the principal?
- How can Tebodin advise principals and support their decision – making process in order to arrive at a good collaborative practice?
- How can Tebodin create added value and become a niche player for principals with respect to projects in China?

2.3. Committee Delft University of Technology

Resulting from the many questions mentioned above, the main problems which have to be considered dealt with, on the one hand, building contract forms in the construction industry and on the other hand management decision – making aspects and methods. Due to these two issues and the specialisation within the faculty Civil Engineering at Delft University of Technology, the following master's thesis committee was created:

- Prof. Dr. Ir. H.A.J. de Ridder, chairman and head of section Design and Building Processes
- K. B. Braat, MSc. internal supervisor section Design and Building Processes
- Dr. Ir. R. Verhaeghe, internal supervisor section Infrastructure Planning
- Ir. A. Piek, external supervisor Tebodin, Consultants & Engineers, Manager Corporate Business Development and Commercial Director Tebodin Asia Pacific

3. Thesis description (Box 4)

This Chapter will describe the approach adopted in the whole thesis in detail. How can the questions and requirements of Tebodin be translated into a problem statement? What is generally the process adopted in order to arrive at a collaborative form and what are the specific survey areas and how will these areas contribute to the final research and support tools. (See Figure 3.1) Before looking at the parties involved in a construction project, the demarcations of Tebodin are presented in Paragraph 3.1 accompanied with an introductory description of the present situation.

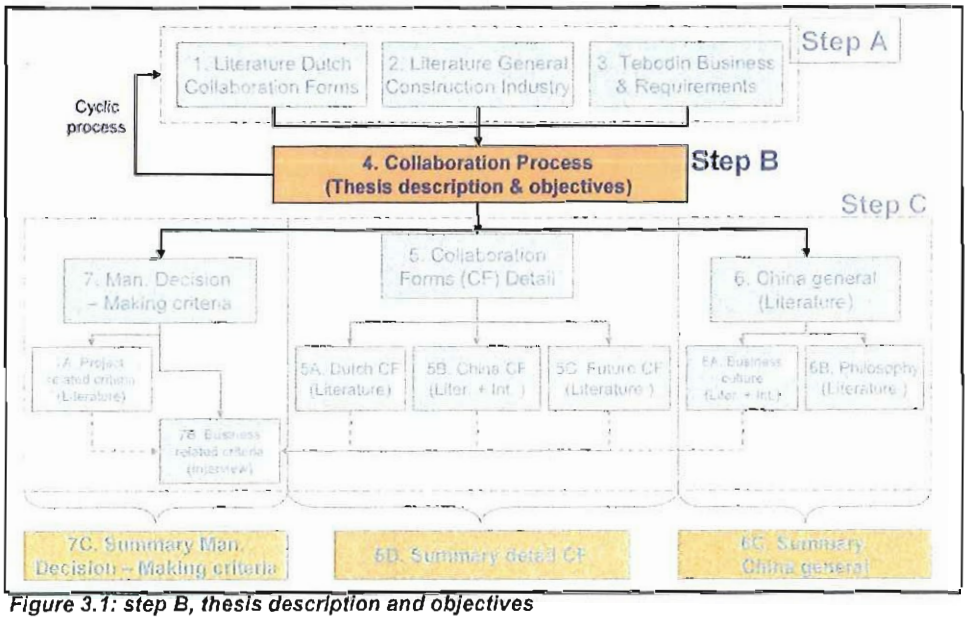


Figure 3.1: step B, thesis description and objectives

3.1. Present situation

In the last years, the Chinese economy has seen great changes. Almost every day there is some news about developments in China. Not only today, but in the coming years, or even decennia, China will be one of the fastest growing economies in the world. A lot of companies are trying to establish themselves in this country. Some want to export their products to China, others want to expand their business, and there are also a lot of investors and financial institutions looking for opportunities within China.

In connection with China's joining of the WTO, it has become one of the largest and most powerful economic areas. More and more often business people are looking for opportunities to move or expand their business into China.

Also in the civil engineering world, certain major changes can be observed. The ways of collaborating, designing, and of constructing, rules and regulations will change due to internationalisation and globalisation, as well as political, social and ethical circumstances. One of the interesting aspects of civil engineering is the complexity of working with different kinds of parties. Every country has its particular systems and procedures. It would be interesting to look at the possibilities and opportunities open to a European client wishing to realise a project in China. What kind of building contract form is needed, what might be the interesting criteria for both parties? How can added value be created to make an engineering project internationally innovative. For this graduation thesis, some main lines of demarcation have been created to clarify the project:

- From the Civil Engineering point of view, interesting fields would be to look at the different Dutch building contract forms and at the differences between the two countries
- Tebodin opened their office in China in July 2004. This office is located in Shanghai, the research area to be considered, is the Shanghai Delta
- The focus on the Civil Engineering sector is mostly based on commercial buildings and industrial plants

- The markets which are at the moment of Interest to Tebodin are the Chemicals & Pharmaceuticals, Food & Beverages and Industrial products markets
- The focus on parties from the point of view of Tebodin are commercially international clients
- In this thesis Tebodin is seen as an advisory party of the principals

NOTE: A total overview of all demarcations and requirements is given in Paragraph 3.6

3.2. Direct parties in the construction industry

To realise a construction project, three main parties in the Western countries are involved in a collaboration. The three parties which are definitely inseparable are:

1. ***The principal:*** the principal is the owner and often also the user of a commercial construction project
2. ***The advisor:*** the advisor is an advisory party which is on the side of the principal and does not carry any project related risks, often the advisor is an architect or a consulting party
3. ***The contractor:*** the contractor is an engineering and / or construction contractor capable of realising a project

When looking at international collaboration, an extra dimension exists between the collaborating parties. In this case, three parties in the Netherlands and three parties in China can collaborate with each other. See Figure 3.2)

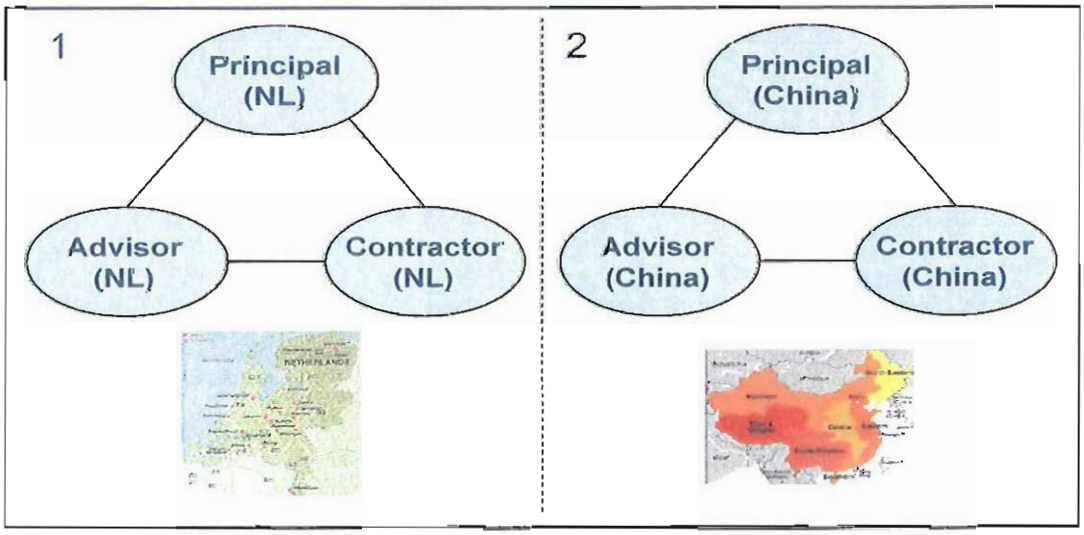


Figure 3.2: potential parties in an international collaboration

When a project is to be implemented, there are eight possible ways of arriving at a collaborative form. (See Figure 3.3 to Figure 3.6)

A. **Red** - Principal (NL) + Advisor (NL) + Contractor (NL)
B. **Blue** - Principal (CHINA) + Advisor (CHINA) + Contractor (CHINA)

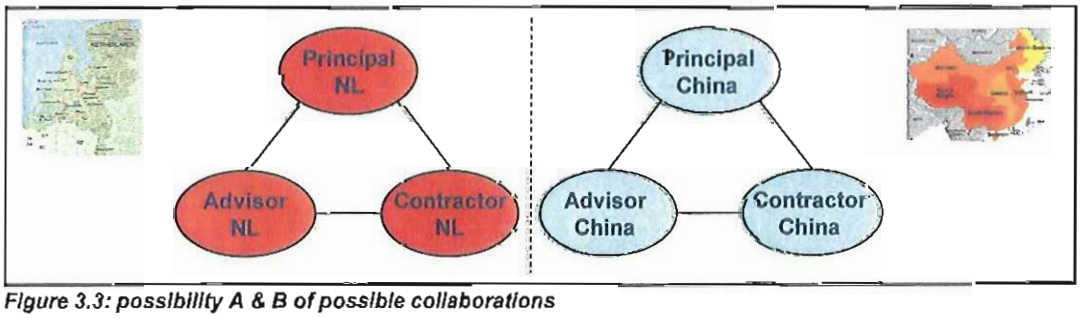


Figure 3.3: possibility A & B of possible collaborations

C. **Red** - Principal (NL) + Advisor (NL) + Contractor (China)
D. **Blue** - Principal (CHINA) + Advisor (CHINA) + Contractor (NL)

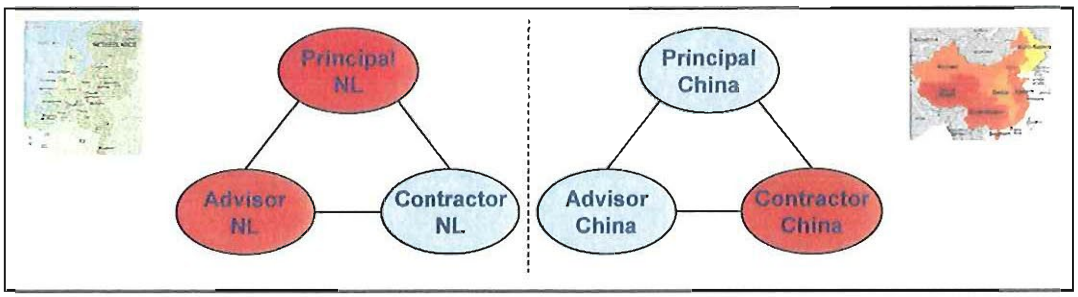


Figure 3.4: possibility C & D of possible collaborations

E. **Red** - Principal (NL) + Advisor (CHINA) + Contractor (NL)
F. **Blue** - Principal (CHINA) + Advisor (NL) + Contractor (CHINA)

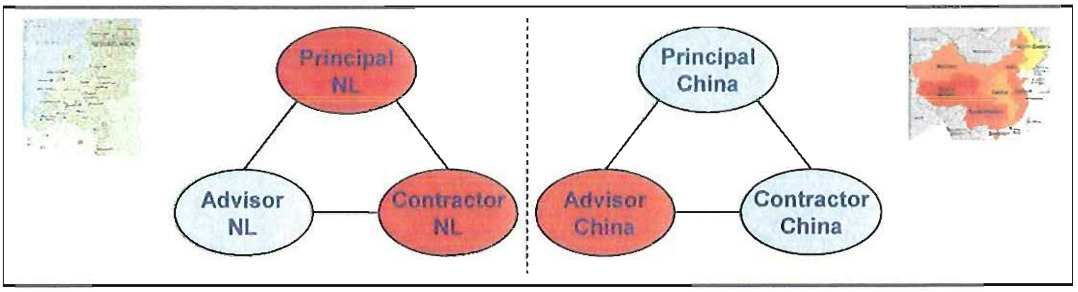


Figure 3.5: possibility E & F of possible collaborations

G. **Red** - Principal (NL) + Advisor (China) + Contractor (China)
H. **Blue** - Principal (China) + Advisor (NL) + Contractor (NL)

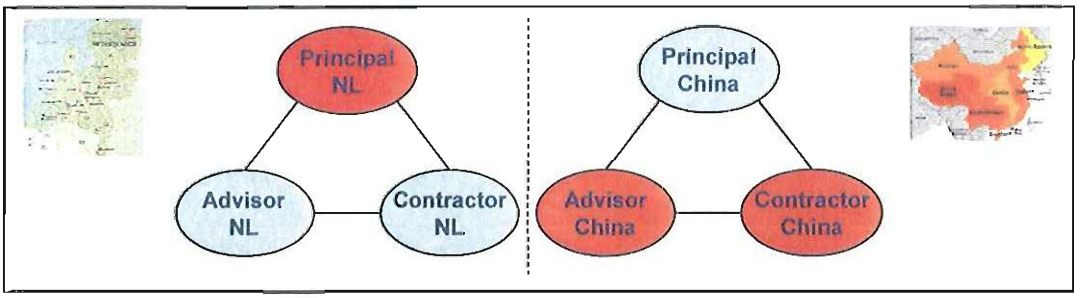


Figure 3.6: possibility G & H of possible collaborations

Besides of these eight possibilities, one can also imagine a project that can be realised in two different locations, namely within The Netherlands or within China. Eventually in such a case, the possible collaboration between the two countries and three parties per country will amount to sixteen. For the survey area of this thesis, only one possibility will be considered, and that is possibility C in China. (See Figure 3.7)

The choice of possibility C lies in the existing market situation where Tebodin is involved. A lot of international commercial clients are moving their production plants to China or are expanding plants that are already there. It is in Tebodin's interest to have a clear understanding what kind of problems existing principals face, how management decisions are made in relation to a project and where added value can be created to support Tebodin's commercial activities.

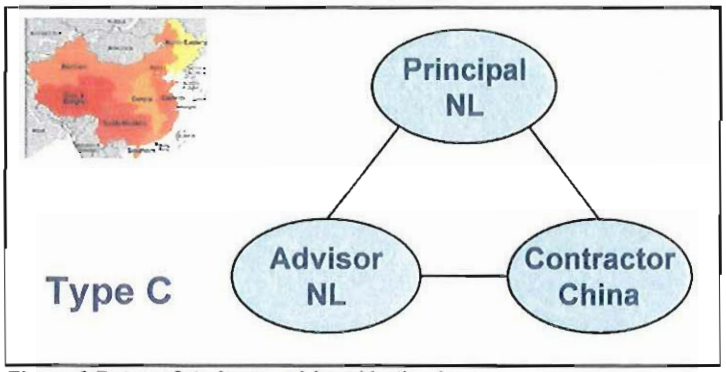


Figure 3.7: type C to be considered in thesis

Although one possibility has been selected, this possibility can be broken down into a number of alternatives. Three important collaborative forms can be distinguished between these three parties:

- Dutch Principal directly collaborates with Chinese contractor
- Dutch advisor (on behalf of the Dutch principal), collaborates with Chinese contractor, the reason for this is related to the main focus on the scope of a project collaboration as opposed to a business collaboration which is like setting up a Joint Venture or Representative Office
- Dutch Principal collaborates with Dutch consultant, on the basis of services, but that will not be considered in this thesis

After the introduction and a brief description of the parties involved in a construction project, the next paragraphs will define the whole scope of the project. Starting with the problem statement & the objective of this thesis, that will be followed by the management decision-making process[1] and the different survey fields. And finally the terms of requirements (TOR) will be considered in this thesis.

3.3. Problem statement

At this point, it is more of less clear what the scope of this thesis is from the point of view of Tebodin as well as from the point of view of Delft University of Technology. The next problem statement can be defined:

"How can Dutch principals and / or consultancy & engineering companies logically and structurally establish a building contract form with a Chinese contractor in the realisation of an industrial construction project?"

3.4. Objective

"To develop a systematic and logical decision-support tool for a principal / consultancy & engineering company in order to arrive at a collaborative group and building contract form concerning business, cultural and project related issues"

3.5. Overview Management Decision-Making process of a construction project

Once the problem statement and objectives are known, it is also important to establish how and when decisions are made by managers in the construction industry. The representative model which is presented below is more or less the one used by decision makers within industrial construction projects. Basically the management decision-making process can be split up into two parallel influencing processes. On the one hand, the formal one where risks and decisions can be logically and structurally defined in direct relation to a project and on the other hand the informal one based on "business and cultural issues" that are related to the parties involved (e.g. abstract aspects like trust,

1: The reason for specific mentioning management decision-making instead of decision-making is considered in Chapter 9.

predictability) When dealing with industrial construction projects where only Dutch parties are involved, there is no big gap in the business and cultural issues. Disregarding this, the first setup of this model is based on the theoretical background (construction industry & business administration) and the experience of management decision makers (Chapter 7). (See Figure 3.8)

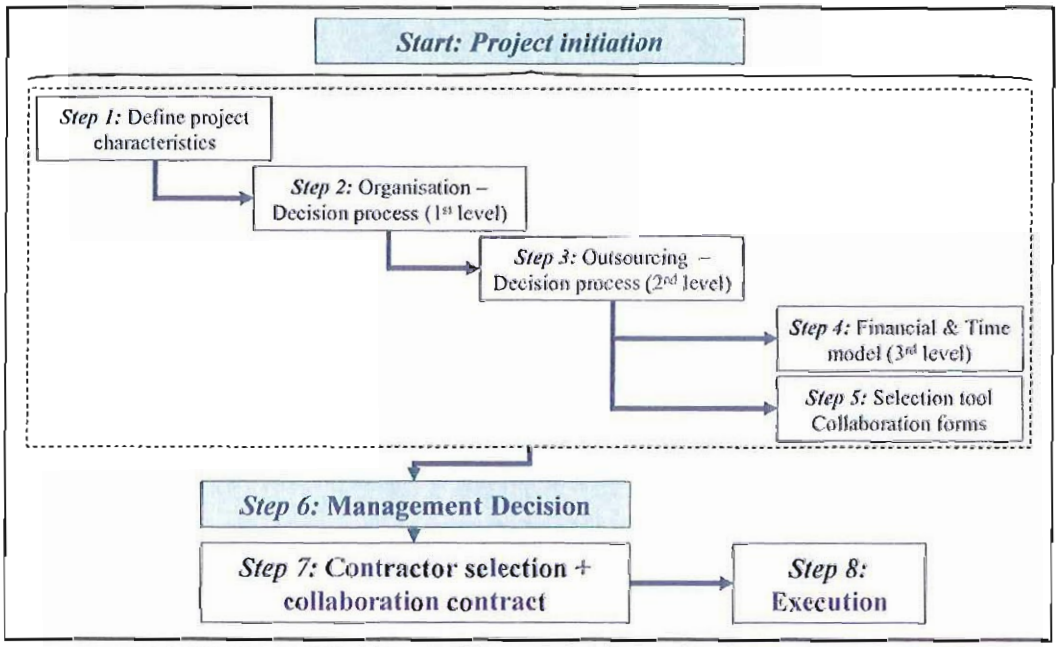


Figure 3.8: Dutch management decision – making process for construction project

Every construction project begins with a problem, which is often translated into the needs of certain parties initiating a project. After the initiation phase and after defining who the parties are, steps 1 to 5 have to be considered before a management decision can be made. Step 1 to 5 describes the logical formal approach adopted to arrive at a project form. A well-founded management decision can be made and after the management decision step has been taken, a contractor will be selected and a building contract will be signed.

First of all a detailed explanation of the different steps in Figure 3.8 will be given in the paragraphs to come, the intention is to give a detailed description of the collaboration process in the Netherlands as it is nowadays in theory. Later on, an international dimension will be added which considers the part disregarded by the business and cultural issues.

NOTE: Often it is the case that decisions are not thoroughly made by following the proper decision-making process. This is because of, for instance lack of time, lack of information. Decisions are then mostly based on feelings, experience and past performance within a part of the management decision-making process.

3.5.1. Step 1: Define project characteristics

In step 1, where more or less only the principal itself is involved, the characteristics of the initiated project will be defined. Before defining the project, some crucial questions have to be answered; the questions can be summarised as follows: (see Figure 3.9)

GENERAL

- Where will the initiated project be realised? **(Geographical focus)**
- What are the macro economic developments (Political, Environmental, Social, Technological, Legal, and Economical aspects) in relation to the country / location of the initiated project? **(Macro economic focus)**
- What are the internal business expectations and strategy of the company / business units towards this project? **(Business focus)**
- What kind of construction project is it to be, within which market? **(Project focus)**
- Will it be or is it a repetitive construction project? **(Project focus)**

- What are the future expectations concerning the constructed asset itself? **(Project focus)**

SPECIFIC

- What kind of expertise do we have in-house?
- How much experience do we have with the initiated projects?
- What are the project risks, how can they be allocated and who will be the most suitable parties to carry those allocated risks?

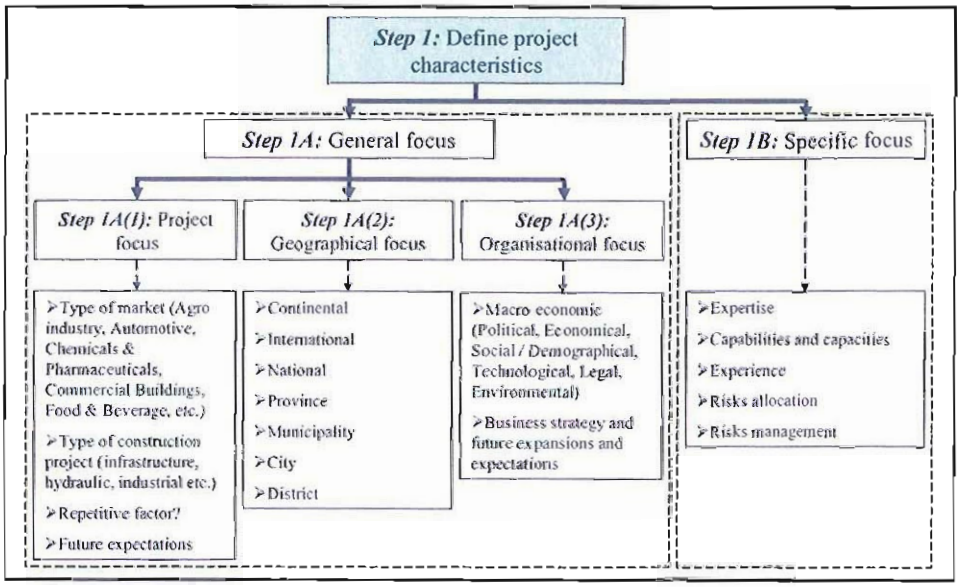


Figure 3.9: define project characteristics

The answers to these questions will constitute the fundamental basis for a collaborative group form.

3.5.2. Step 2: Organisational - Decision process (1st level)

During this phase, the principal will compare the requirements for the initiated project and the capacities and expertise in-house. After this comparison, it will be clear to the principal what is still missing regarding the realisation of the initiated construction project. One can think of substantive project related aspects like capabilities in design, engineering, construction, procurement etc., but also of general project-related aspects like organisation, flow of information, control and management, finance etc.

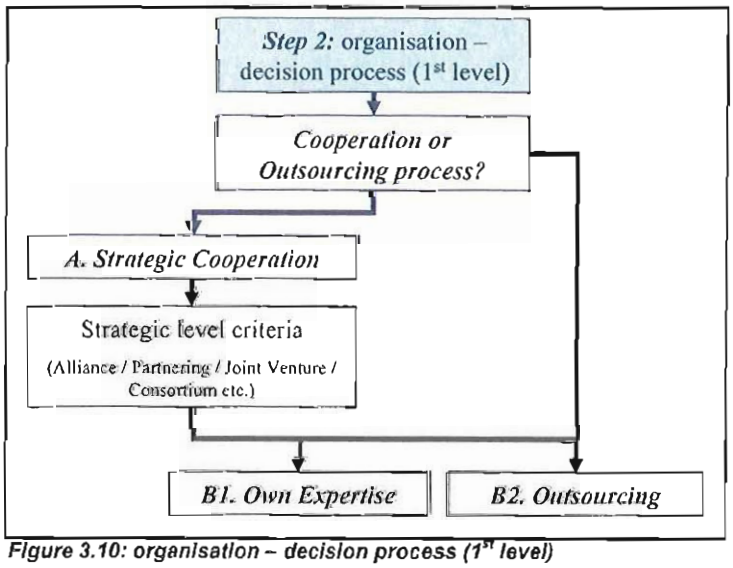


Figure 3.10: organisation – decision process (1st level)

As that is presented in Figure 3.10, the first choice in relation to the organisation – decision process the principal has to make is whether it is going to be cooperation or an outsourcing process. Before considering the main difference between these two models, the basic principles of a collaboration process are given in Figure 3.11.

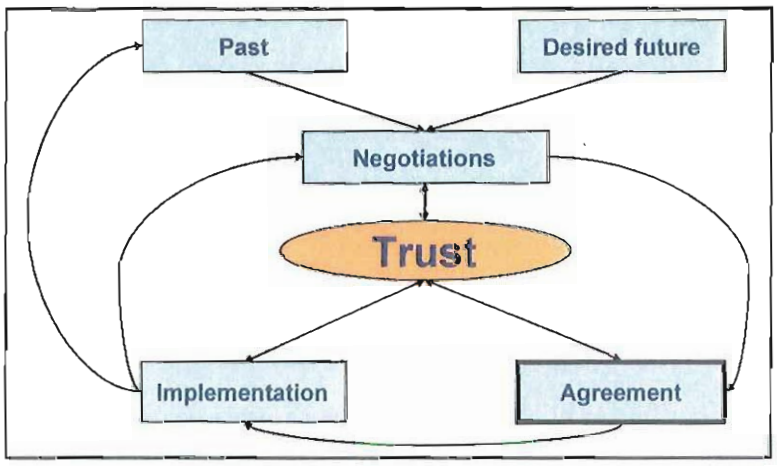


Figure 3.11: collaboration process[2]

With information about the past and the desired future, the scope of a certain project can be defined. In the whole collaboration process, (gaining) trust is one of the main fundamental pillars. Without trust it is hardly possible to have a fruitful collaboration with expected results. The more complex factors and changes that are expected within a project, the more time and energy will be needed to invest in gaining each other's trust, and in maintaining it. (See for more detail paragraph 3.5.9 and Chapter 7) With the basic of trust, negotiations will follow which finally will result in an agreement and implementation. Another fundamental aspect of a collaboration is an agreement. In its simplest form, three characteristics can be considered in an agreement (thus making it similar to a sales agreement, see Figure 3.12):

- Value
- Price
- Cost

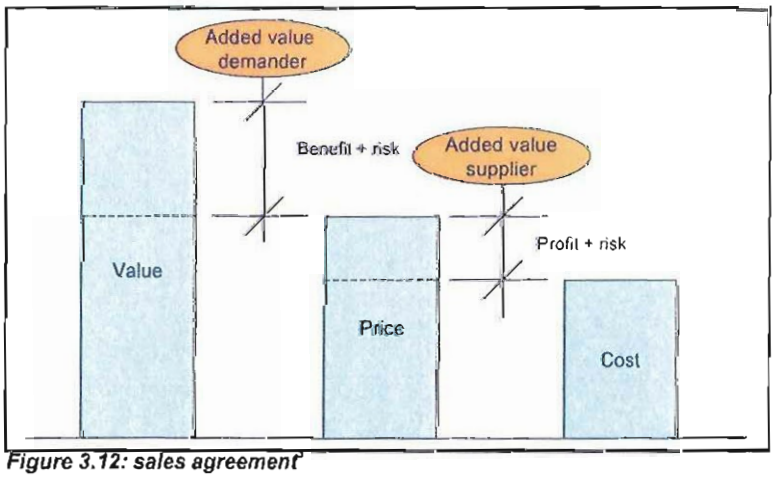


Figure 3.12: sales agreement[3]

A collaboration agreement is more complicated than a sales agreement. The purpose of a collaboration agreement is:

> *"The Contractor incurs costs in order to develop a concept, which has enough value for the Principal to justify him paying the price asked for it"*

2: Source: Ridder, H.A.J. de: Collaboration and procurement procedures in the civil engineering industry. Delft: TU Delft, lecture reader CT5931, 2004
3: Source: Ridder, H.A.J. de: Collaboration and procurement procedures in the civil engineering industry. Delft: TU Delft, lecture reader CT5931, 2004

To successfully arrive at a collaboration group, formal aspects (agreement / contract) as well as informal aspects (trust, transparency etc.) are important. When the collaboration process takes place in an international context, the balance between formal and informal aspects definitely will shift.

Only two aspects of the collaboration process will be discussed here. The other aspects that have to be considered will be in the chapters to come. A detailed description of the whole collaboration process can be seen in Appendix D. What is then the main difference between the cooperation model and outsourcing process? First a description will be given in order to define the two processes more clearly:

- **Cooperation process:** several parties in the cooperation process have the same intention and purpose when it comes to realising a construction project. At first the project is the property of all the cooperating parties, although somewhere in the middle or towards the end, the structure itself can be handed over to one main party. The main focus in the cooperation process is on partnership.
- **Outsourcing process:** a principal who outsources some or all of the project-related activities in order to realise a construction project. The initiated construction project is the principal's property whereas the outsourcing parties contribute to the realisation of the project within a principal – contractor relationship.

The difference between the two above mentioned processes lies in the focus towards a project. This has a huge influence on the tasks, responsibilities, liabilities and risks for the parties involved. It rarely happens that several parties have the same idea when it is coming to initiating a certain project. Generally at first, there will still be one principal who initiates the project. The main difference for the principal is that he will have to opt for a cooperation process or an outsourcing process all of which will depend on the business and financial aspects.

If it is the intention to generate commercial activities after the construction project has been finished, cooperation can be a trigger for the principal as well as for the future partner to cooperate with each other. When the commercial expectations and growth are of great interest, parties will combine their power and create more added values to the cooperation. (See Figure 3.13)

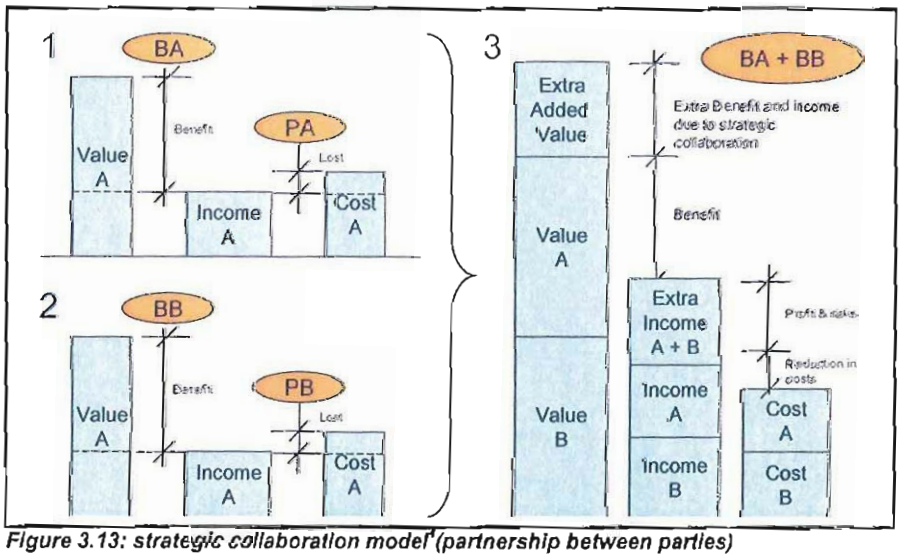


Figure 3.13: strategic collaboration model[4] (partnership between parties)

The second aspect is related to finance. When the principal doesn't have a high enough budget or if the budget has a certain limit, while the value of the project can be improved a lot with a relatively small budget rise in terms of money and percentage, the principal can decide to cooperate with other parties. In most cases it will be particularly commercial parties who will be interested in the return of investments and in opposing the risks to take.

In the outsourcing phase the principal will basically bear all the risks. During step 1, risks will be mapped out and allocated to the party best equipped. But still, the principal will be the final responsible party in relation to the whole

4: Source: Ridder, H.A.J. de; Collaboration and procurement procedures in the civil engineering industry. Delft: TU Delft, lecture reader CT6981, 2004

project. The criteria which are of relevance at this level will be considered in Chapter 7: management decision-making criteria.

The choice between outsourcing and "own expertise" speaks for themselves; a principal will look at the capabilities and capacities within its own company before looking at the outsourcing process. The next paragraph gives a detailed overview of the outsourcing-decision process which will result in what is currently known as the collaboration groups in the construction industry.

3.5.3. Step 3: Outsourcing - Decision process (2nd level)

To gain a better understanding of the outsourcing – decision process, one should be familiar with the different phases involved in a project that is to say with the construction project chain in Figure 3.14.

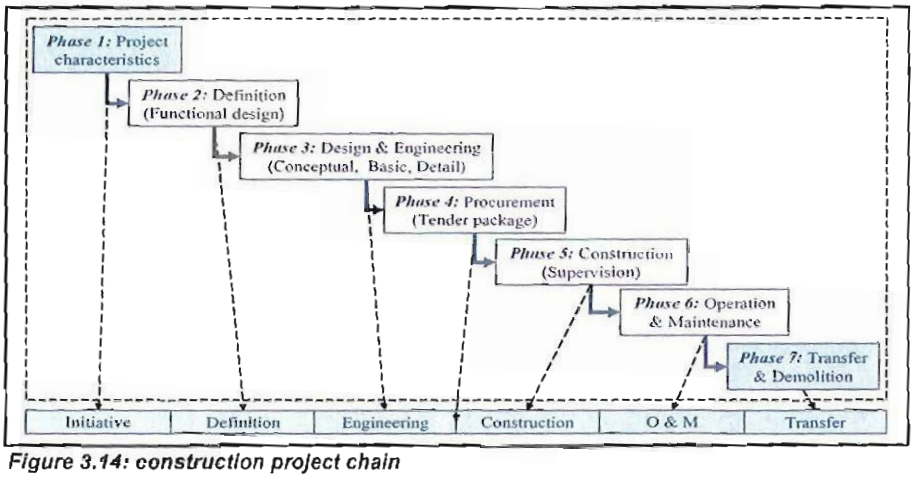


Figure 3.14: construction project chain

In the outsourcing – decision process, the principal not only has to deal with project-related requirements such as Time, Money and Quality, but also with the organisational and environmental aspects of the project. In Chapter 7 requirements will be translated into criteria, these criteria make it possible to structurally and logically arrive at a collaborative group form, whereas with the Tebodin knowledge the final step to a building contract form can be considered and is discussed in Chapter 8. What kinds of decisions are made in the outsourcing – decision process? Figure 3.15 indicates the possible choices that can be made between a principal and a contracting party.

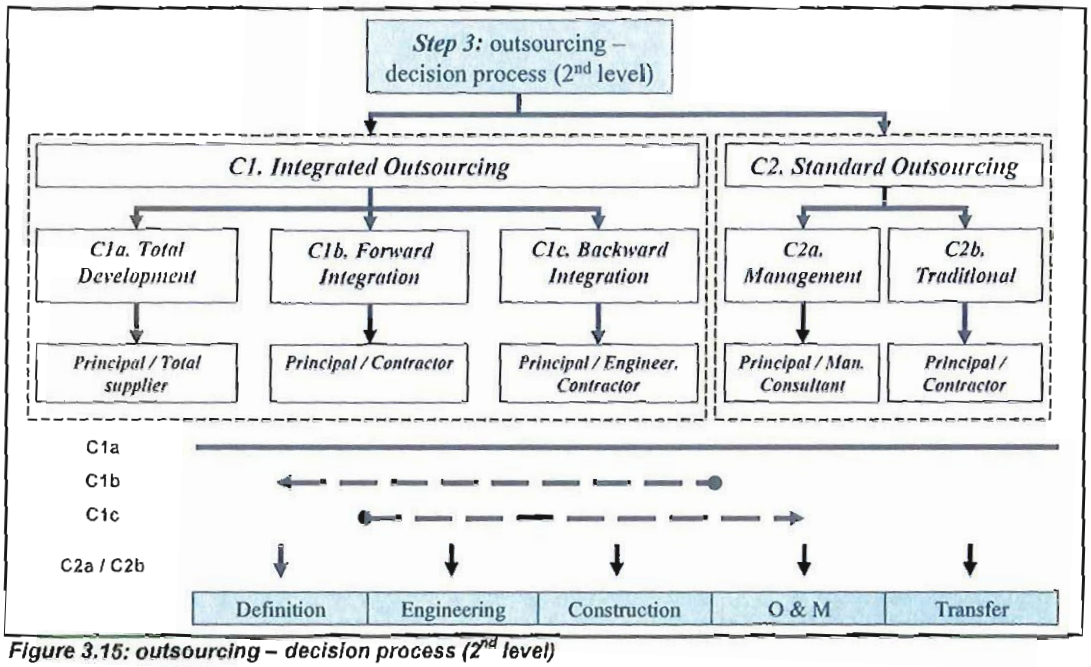


Figure 3.15: outsourcing – decision process (2nd level)

First of all a brief description is given of the possible choices. Hereafter each part will be illustrated with its relation towards the project chain. The collaboration group is a strategic vision in the process of organising and contracting involved parties.[5] The building contract forms itself will be discussed in Chapter 5: Building contract forms:

- **C1. Integrated Outsourcing:** the principal has the choice to decide in which part of the construction project external parties will be involved. The possibilities may involve everything from a simple engineering task move to the total development of a construction project. Further a sub decision can be made as to whether the principal wants to work in a principal / consultant, principal / contractor or principal / total supplier collaboration group.
  - **C1a. Total Development → Principal / Total supplier:** the principal has a construction contract with the total supplier which can provide finance, design, realisation, operation and maintenance in the project chain. Another main characteristic is often the involvement of a contractor together with a financing party. Parties are more equal to each other than in other building contract forms
  - **C1b. Forward Integration → Principal / Contractor:** the principal will let the contracting party develop a total solution on the basis of an integrated design and construction method. An extensive description of the functional requirements is given by the principal.
  - **C1c. Backward Integration → Principal / Engineering Contractor:** the principal has an engineering contract agreement with the engineer; the engineer will be responsible for managerial activities within the project. Often processes within the construction project will be integrated, also known as forward and backward integration

- **C2. Standard Outsourcing:** this part forms the traditional historical well known part of tendering, both with contractors and consultants.
  - **C2a. Management → Principal / Management – Consultant:** Figure 3.2 already presents that mainly three parties are involved in a construction project. (Principal, Consultant and Contractor) This part of the outsourcing – decision process represents the collaboration group between the principal and the consultants, but also architects and management companies who acts as an advisor to the principal
  - **C2b. Traditional → Principal / Contractor:** a strict separation of responsibilities and orders in the different project phases

As indicated in Figure 3.8: Dutch management decision-making process for construction project, steps 4 and 5 can be completed in parallel processes.

3.5.4. Steps 4 and 5: Financial and Time model (3rd level) + Selection tool building contract forms

For step 4, financial and time planning is required in order to be able to manage and control the project's execution. This part of the activities is omitted from this thesis and no further attention will be paid anymore to it in the coming chapters. Finally the principal arrives at the point that he / she has to choose a building contract form. How can that be done and on the basis of what kind of criteria are questions that will be surveyed in Chapter 8: Research area.

3.5.5. Steps 6 to 8: Management Decision → Contractor selection + building contract → Execution

Finally the management decision in relation to the building contract form can be taken in step 6. With this building contract form, a contractor selection procedure will take place in step 7. Depending on the requirements and needs of the principal, the selection procedure can take in several forms like open tendering, pre- qualifications, closed tendering etc. After the selection of the contractor, the execution of the initiated construction project can take place. Here too, steps 7 and 8 will not be considered anymore in the chapters to come.

5: Source: Roelofs, L.A.; Ordening, standaardisering en toepassing van bouworganisatievormen en contractvormen. Hoofddorp: BM Managers van het bouwproces, 2005

3.5.6. Step 0: Business and Cultural Decision Process

When international collaboration is considered, an extra dimension is added to the management decision-making process (step 0). Step 0 will deal with ambulatory issues between people and parties. Steps 1 to 5 describe the logical formal way adopted to arrive at a collaboration group. Combining the business and cultural issues with the collaboration group, a sound management decision can be made in order to arrive at a general collaborative form.

In the organisation – decision process, the issue of trust in the collaboration process was already mentioned. In the business and cultural collaboration process, it is not only trust that is important, also the difference in meaning and interpretation of different cultures should also be considered. Trust and predictability and openness are some of the abstract aspects which can be of great influence in an international collaboration. The Chapters 9 and 10 will deal with these issues.

To make the whole management decision-making process complete, Figure 3.16 shows the business and cultural dimension within the described process. Not only will step 0 influence steps 1 to 5 thus resulting in the management decision it selves (step 6). Step 0 will also have influences in the execution phase (step 8). Later on in Chapter 9, specific attention will be paid on the topic of cross – cultural management.

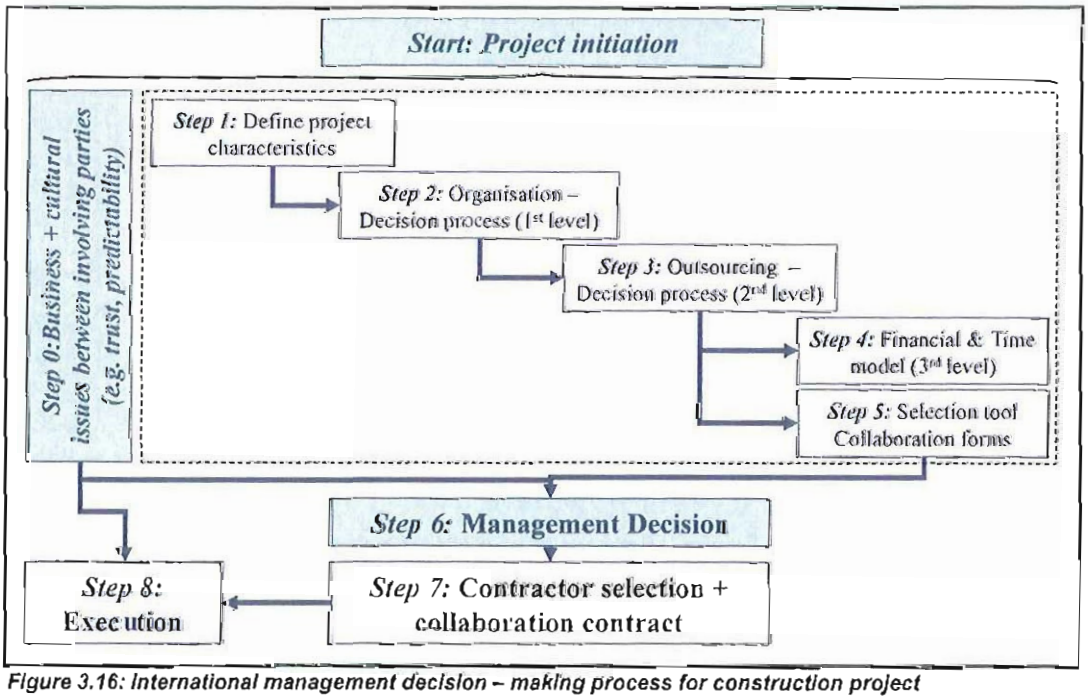


Figure 3.16: International management decision – making process for construction project

3.6. Terms of Requirements (TOR)

This paragraph gives an overview of all requirements, demarcations and assumptions related to this thesis.

3.6.1. Requirements

- Tebodin practical supporting tools to advise principals and to arrive at a building contract form
- The support tool should provide advice on national as well as international collaboration industrial construction projects
- An overview and understanding of the management decision-making process towards an industrial construction project
- In this thesis Tebodin must be seen as a consultant party for the principal

3.6.2. Demarcations

General

- No attention will be paid on contracts in the collaboration group: management – consultants
- A conceptual model has to be realised with only the consideration of one or two building contract forms per collaboration group
- Only requirements, characteristics, advantages & disadvantages is considered of the building contract forms, no attention is given to general construction conditions, legal and financial aspects
- No attention is paid on the different reimbursement systems which often is coupled to the choice of a certain building contract form
- 3 to 5 management decision-making criteria are considered on the organisational decision process
- 3 to 5 management decision-making criteria are considered on the outsourcing decision process
- Focus is put on business and cultural differences related to business between the two countries

Tebodin

- Tebodin Asia Pacific office is located in Shanghai, the research area to be considered, is the Shanghai Delta
- The construction industry focus is mostly based on commercial buildings and Industrial plants
- Interesting markets to be considered are Chemicals & Pharmaceuticals, Food & Beverages
- The focus on parties is commercial international clients
- Only focus until management decision phase, contractor selection is not considered
- No attention is paid on differences in the management of the execution of a construction project
- No attention is paid on the collaboration with public parties
- In relation to the practical tools, a conceptual acquisition model is preferred, a detailed explanation and work – out of the model in the form of a user manual is not needed

Delft University of Technology

- Focus only on the Dutch and Chinese building contract forms, only a small side – step is done on the international forms from FIDIC to make the comparison complete
- Focus only on building contract forms in relation to construction projects, not business collaborations in partnerships
- In the consideration of the "Real Option" theory, the setup of a conceptual approach is enough to be able to perform a first reconnaissance

3.6.3. Assumptions

Interviews

- 10 interviews with commercial companies representing a global overview of important criteria at decision-making, both on project and business level

Research area

- A comparison is made between several building contract forms from the point of view of a principal. The assumption made is that in a general comparison, the difference in general conditions between the forms are not of interest for a principal
- Due to a small survey towards Chinese building contract forms, it appears that the forms are more or less the same. For the whole research, it is assumed that the general characteristics of a Dutch contract forms is also valid for China.
- Chinese business cultural aspects are valid in all kinds of collaborations
- The project criteria defined together with Tebodin's expertise represent the logical decision-making process for the support tool
- Within the functional scope of the first practical support tool, a linear increase is used in the weighing procedure
- The basic principles in decision-making between management decisions and "normal" decisions are more or less the same

4. Market (Box 3)

Chapters 1 to 3 have described the project scope of the thesis. The Chapters 5 to 7 will describe in detail each element within the project scope. This Chapter presents generally the markets and construction types which will be considered. The chosen markets are interesting markets for Tebodin as well as booming markets within China.

4.1. Market segment focus: Chemicals & Pharmaceuticals, Food & Beverages[1]

4.1.1. Chemicals & Pharmaceuticals

The chemical industry comprises management units primarily engaged in the manufacture of a range of diverse chemical products. Key product groups include custom compounding of plastic resins; photographic film, paper, plate, and chemicals and; all other miscellaneous chemical products and preparations. The pharmaceutical industry comprises management units primarily engaged in the manufacture of biological, medicinal and pharmaceutical products in various formats. These are then sold via pharmacies or distributed via hospitals.

Primary activities	Major products
Chemicals	
Custom compounding of resins	All Other Chemical Products & Preparations
Reformulating plastic resins from recycled plastics products	Photographic Film, Paper, Plate & Chemicals
Manufacture of sensitized film, paper, cloth and sensitized plates	Custom Compounding of Purchased Resins
Manufacture of toners and toner cartridges	
Manufacture of photographic chemicals	
Manufacture of other miscellaneous chemical products & preparations	
Pharmaceuticals	
Manufacturing biological and medicinal products	Pharmaceutical preparations
Processing (i.e., grading, grinding, and milling) botanical drugs and herbs	Medicinal & botanical products
Isolating active medicinal principals from botanical drugs and herbs	Biological products (except diagnostic)
Manufacturing pharmaceutical products intended for internal and external consumption in such forms as ampoules, tablets, capsules, vials, ointments, powders, solutions, and suspensions.	In-vitro diagnostic substance products

Table 4.1: primary activities and major products chemical and pharmaceutical industry

Generally in industrial construction projects within the mentioned markets in paragraph 4.1.1 and 4.1.2, there are some key elements which are of great importance for the construction to be realised. These elements comprises of safety and risks issues (during and after the realisation), environmental impact, policy and permitting, value engineering / analysis of the processes, usage of energy , transport and logistic systems.

4.1.2. Food & Beverages

This industry comprises establishments mainly engaged in the manufacture of food and In mixing purchased dried and /or dehydrated ingredients including ingredients for soup mixes and bouillon. This excludes food like artificial

1: Source: http://www.ibisworld.com/industry

sweeteners, animal food; grain and oilseed milling; sugar and confectionery products; preserved fruits, vegetables, and specialties.

Food and Beverages	
Primary activities	***Major products***
Perishable prepared foods sold in bulk or packages, not frozen or canned.	Other food preparations
Desserts (ready-to-mix)	Perishable prepared foods sold in bulk or packages
Sweetening Syrups and Molasses	Liquid, dried, and frozen eggs
Baking Powder & Yeast	Macaroni and pasta products packaged with other ingredients
Macaroni and pasta products packaged with other ingredients, not frozen or canned.	Dried and dehydrated products, except pasta, with other ingredients
Dried and dehydrated products, except pasta, packaged with other ingredients.	Flavoring powders, tables and paste, including dry mix cocktails.
Liquid, dried, and frozen eggs.	Sweetening Syrups and Molasses
Flavoring powders, tablets and paste, including dry mix cocktails.	Desserts (ready-to-mix)
Other food preparations nec.	Baking Powder and Yeast

Table 4.2: primary activities and major products chemical and pharmaceutical industry

4.2. Construction focus: Industrial plants & commercial buildings

Instead of a general description of the considered construction types, the construction focus will be illustrated with characteristics and practical project examples from Tebodin.

4.2.1. Industrial plants

Types of projects which occur are: Greenfield, relocations, copying, revamps and optimization.

Figure 4.1: project example: DSM, HPF[2]

Figure 4.2: project example: Huntsman[3]

4.2.2. Commercial Buildings

- Master planning, Conceptual design, Engineering, Permitting, Procurement, Project management, Construction management

2.: Source: Tebodin project colour photo; DSM
3.: Source: Tebodin project colour photo; Huntsman

Figure 4.3: project example: ING Real Estate[4]

Figure 4.4: project example: Tebodin office[5]

Chapter four is a Chapter to bridge the theoretical part to the practical part. Although Chapter 5, 6 and 7 mainly have a theoretical background from the literature study, these Chapters are also the most familiar towards the principals. Not only will there be an introduction and detailed description of the specific subject, the Chapter will also be closed by a summary. (See Figure 4.5)

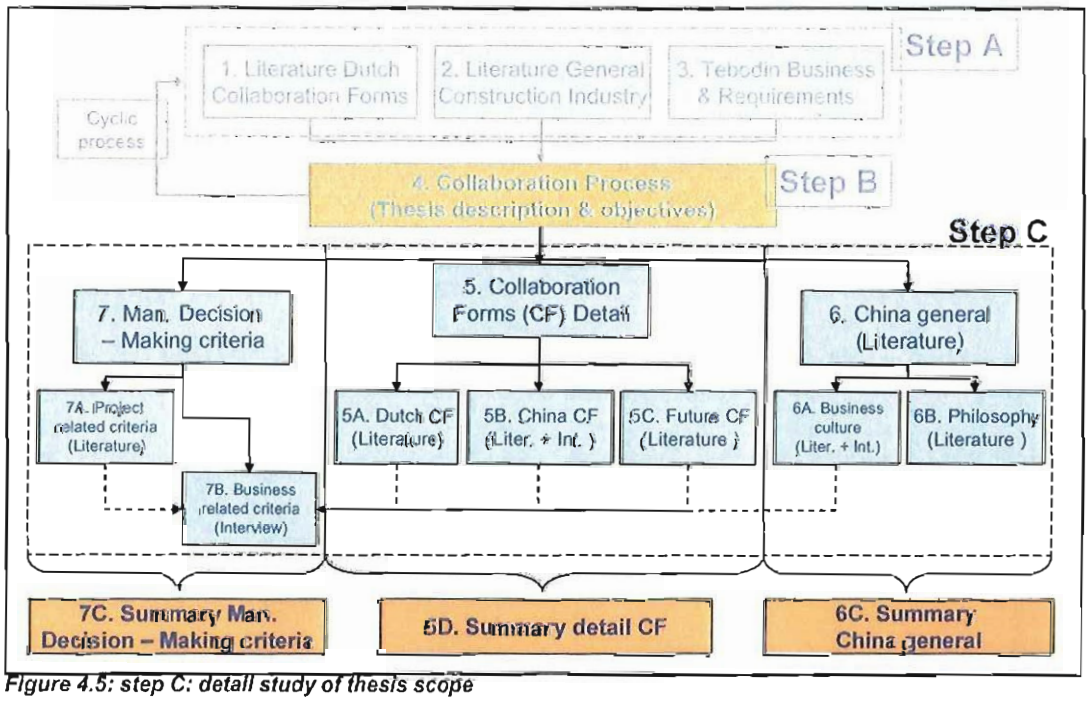


Figure 4.5: step C: detail study of thesis scope

4: Source: Tebodinproject colour photo: ING Real Estate
5: Source: Tebodinproject colour photo: Tebodin headoffice

5. Building Contract Forms (Boxes 1, 5)

Chapter 5 is one of the three Chapters which form the fundamental basis of this thesis research. In Figures 3.10 and 3.15, already a quick overview was given of the different collaboration groups divided in a strategic group and several outsourcing groups. This Chapter will discuss in detail what the building contracts forms imply within each group. What are the main differences between these forms? And how can they be compared with each other? At last an overview of this Chapter will be given in a summary. (See Figure 5.1)

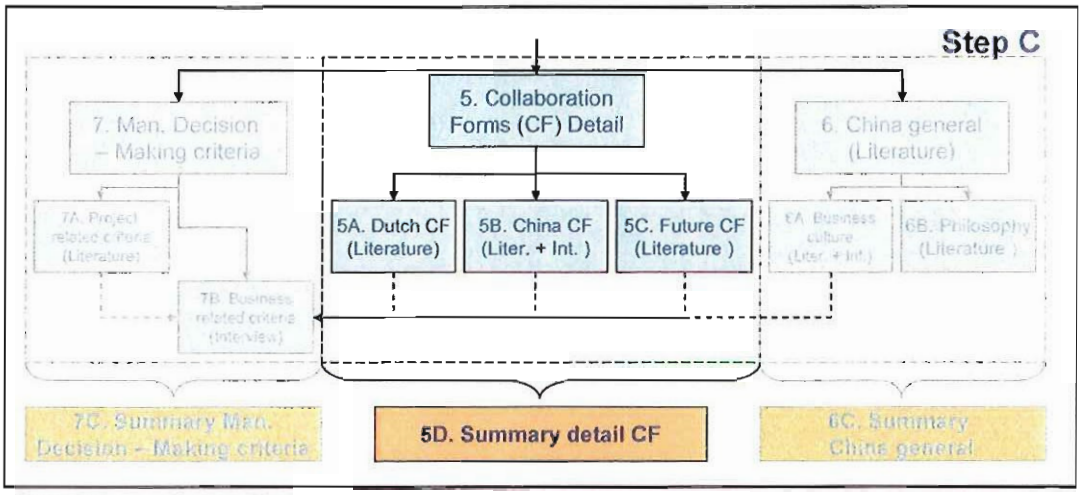


Figure 5.1: step C: detail building contract forms

5.1. Introduction building contract forms

In Chapter three Figure 3.14, the construction project chain was illustrated. Besides the different phases within this chain several standard basic processes can be mentioned during these phases which can serve as a definition for the building contract forms. These main processes are given in Figure 5.2.

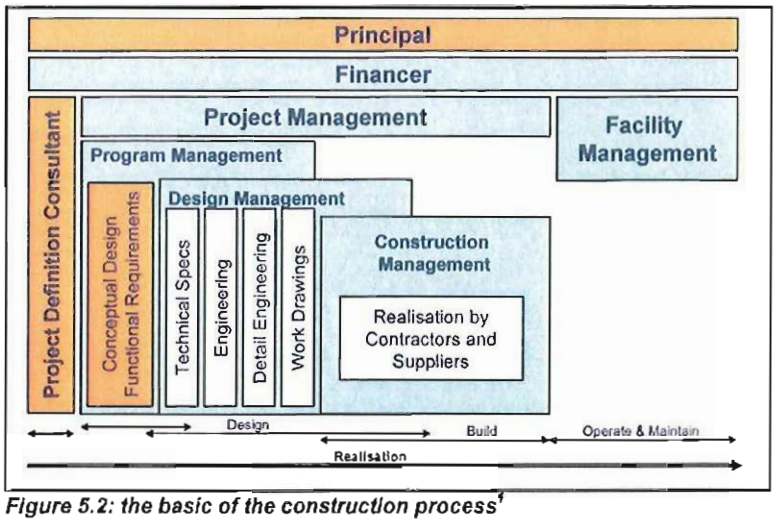


Figure 5.2: the basic of the construction process[1]

The primary responsibility of the yellow marked boxes belongs to the principal itself. He or she should be able to create and define social, economical and functional aspects of the construction project. Sometimes the support by an external consulting company will be used without directly involved in the later commercial aspects of the project.

1: Source: Roelofs, L.A.; Ordening, standaardisering en toepassing van bouworganisatievormen en contractvormen. Hoofddorp: BM Advies, 2005

The overlap in area which often occurs between the processes *"Program Management"* and *"Construction Management"* indicates the actual problems of desirable and undesirable integration.[2] The moment of contracting and procurement in these processes stipulates the building contract forms. What are these forms and how can they be categorised? First of all, Figure 5.3 presents an overview of existing building contract forms in the construction industry. The sequence of the presented contract forms depends on the liabilities and obligations of the contractor. From top to bottom the involvement of the principal will increase. A detail description and explanation of this figure can be consulted on literature text[3].

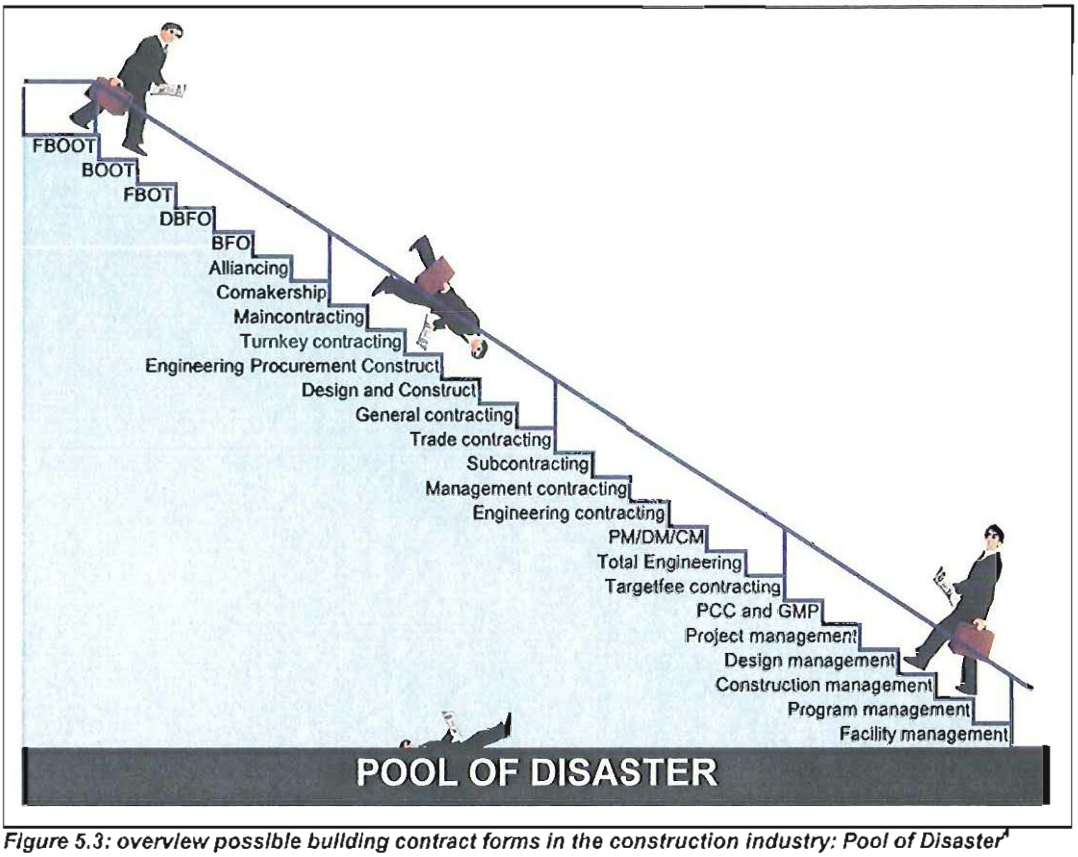


Figure 5.3: overview possible building contract forms in the construction industry: Pool of Disaster[4]

An often observed phenomenon is that principals or project managers are not aware of all possible building contract forms and the differences between these forms. Before trying to understand the reason of this phenomenon, the main elements of each form are given (see figure 5.4):

- Description of the parties involved with their activity: the tasks to be agreed on
- Responsibility of the involved parties
- Authority of the involved parties
- Liability of the involved parties (relationships): the relationships in a construction project between parties can be split up in contractual and functional relations. The contractual ones describe the responsibility and liability of the parties, whereas the functional ones describe the organisational structure within a construction project.
- Risk management: two schools of thoughts can be distinguished, causal approach and conditional approach. The most important is that controlling risks is not a matter of elimination of their origins; neither seeks to place all the emphasis on the party that causes the risks.
- System of reimbursement: the reimbursement system is often coupled to a commitment based on an "obliged effort" or an "obliged result". The choice of a reimbursement system will not be considered, this choice is normally done on the 3rd level of the collaboration process which is a deepening of this thesis.

2: Source: Roelofs, L.A.; Ordening, standaardisering en toepassing van bouworganisatievormen en contractvormen. Hoofddorp: BM Advies, 2005

3: Source: Roelofs, L.A.; Presentatie Praktijkvoorbeeld geïntegreerde contractvorm. Hoofddorp: BM Advies, 2005

4: Source: Roelofs B.: Presentatie college Civiele Techniek, TU Delft, 2004. Hoofddorp: BM Advies, 2004

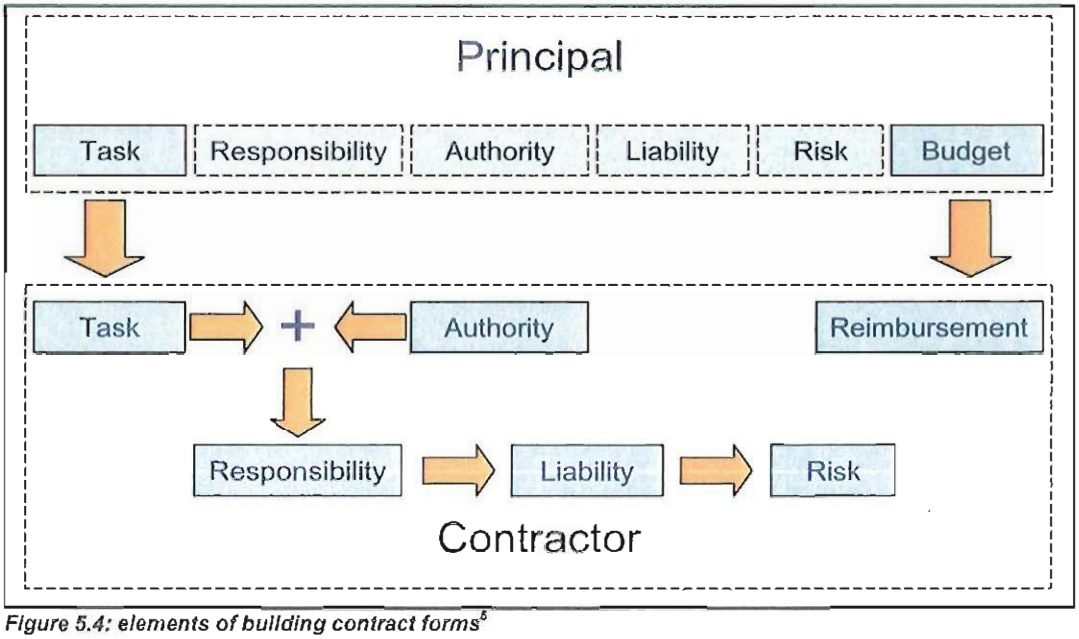


Figure 5.4: elements of building contract forms[5]

A contractor can only be responsible for a certain task if the task is accompanied by required authorities. In other words, the responsibility is a combination of the tasks and the authorities given. A liability is a result from the responsibility which finally is translated into (financial) risks. In all kinds of building contract forms there still will remain some responsibility, authority, liability and risks at the principal's side. In figure 5.4 they are presented in dash lines. The matter of shifting tasks to the contractor represents the characteristics of the building contract form. The elements of the building contract form which will be considered in this thesis are indicated as the following key aspects:

- Characteristics of the building contract forms[6]
- Advantages and disadvantages for principal as well as for contractors[5]
- General risk profile with respect to four aspects (Time, Money, Quality, Organisation)[7]
- Liabilities → relationship between the involved parties[6]
- Position in the building process[5]

This thesis discusses the key aspects within a building contract form and uses these aspects for further research, for some examples and a detail description of the building contract forms itself, a consultation of the literature: "Collaboration and procurement procedures in the civil engineering industry[6]", "Ordening, standaardisering en toepassing van bouworganisatievormen en contractvormen [8] " and "Contractering bij bouwprojecten[5]" is recommended.

5.2. Existing Building contract Forms

Like it was presented in Chapter 3, several groups of collaboration are possible. First of all a general description is given of the examined group of the Dutch national building contract forms, of which the key aspects are presented in detail per form. A selected amount of forms is worked out in a practical overview which enables the comparison between these forms; these forms are presented in Appendix E. Second, the Chinese building contract forms are given as established from literature and interview and finally also an overview of international building contract forms in the construction industry is discussed.

5: Source: Straatman, V.; Keuzemethode voor samenwerkingsvormen bij infrastructurele bouwprojecten in Nederland. Delft: Delft University of Technology, Master thesis, 2001

6. Source: Koning, H. de & Sprondken, W.; Contractering bij bouwprojecten. Osborn & Berenschot, 2001

7: Source: Ridder, H.A.J. de; Collaboration and procurement procedures in the civil engineering industry. Delft: TU Delft, college reader CT5981, 2004

8: Source: Roelofs, L.A.;; Ordening, standaardisering en toepassing van bouworganisatievormen en contractvormen. Hooddorp: BM Advies, 2005

5.2.1. Dutch national collaboration groups

The basic of a collaboration in the construction industry consist of a classical contract form where three main parties are involved. A detailed description was already given in Chapter three in the formulation of the problem statement. Nowadays the classical perception can be expanded with other participants (financer, consultant, project manager) in the construction processes. The relations and parties are given in Figure 5.5.

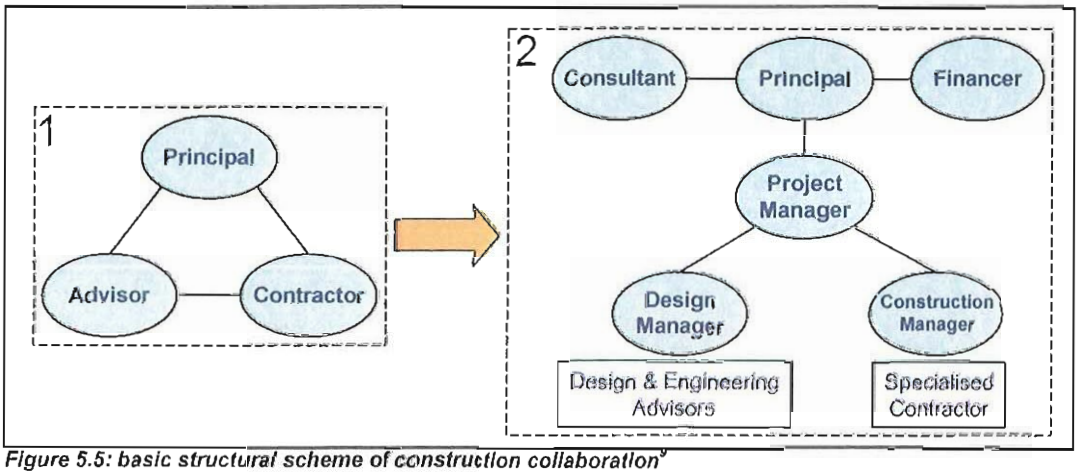


Figure 5.5: basic structural scheme of construction collaboration[9]

Instead of considering al the mentioned parties in both countries, the basic structural scheme can be defined in the form of collaboration groups. For this thesis the collaboration groups are considered as one contractor (contracting party) located in China. Basically five main collaboration groups can be distinguished due to a strategic vision. This strategic vision has the same approach as the description of the collaboration process in Chapter 3. These five groups can be organised in the two different fields of the outsourcing – decision process in management decision-making. The five main groups[9] together with the strategic cooperation once again can be defined in:

Strategic cooperation
Several parties in the cooperation process have the same intention and purpose when it comes to realising a construction project. At first the project is the property of all the cooperating parties, although somewhere in the middle or towards the end, the structure itself can be handed over to one main party. The main focus in the cooperation process is on partnership. Building contract forms that belongs to this group are presented in Table 5.1

1. Partnering	**3. PPP (Public Private Partnership[10]**
2. Alliance	4. PFI (Private Financed Initiative)

Table 5.1: strategic cooperation contract forms

Integrated Outsourcing
The principal has the choice to decide in which part of the construction project external parties will be involved. The possibilities may involve everything from a simple engineering task move to the total development of a construction project. Further a sub decision can be made as to whether the principal wants to work in a principal / consultant, principal / contractor or principal / total supplier collaboration group.

- Total Development[11] → Principal / Total supplier (collaboration group 1, see Figure 5.6[9]) A collaboration group whereas the principal has a construction contract with the total supplier which can provide finance, design, realisation, operation and maintenance in the project chain. (See Table 5.2 for contract forms)

1. DEPBMOOT + F[12]	5. BOOMT + F
2. DEBMOT + F	6. BOOT + F
3. DEBM + F	**7. BOT + F**
4. DEBO + F	Etc.

Table 5.2: financial integrated building contract forms

9: Source: Roelofs, L.A.; Ordening, standaardisering en toepassing van bouworganisatievormen en contractvormen. Hoofddorp: BM Advies, 2005
10: Nowadays PPP is often used in The Netherlands for the collaboration group: Total Development, in this thesis PPP will also be considered the same as Total Development
11: In the detailed description of the building contract forms, one example will be described. The various collaboration contract forms differ from each other only in the expansion of project phases
12: DEPBMOOT (+F): Design, Engineering, Procurement, Build, Maintain, Operate, Own, Transfer, Finance

- Forward Integration → Principal / Contractor (collaboration group 2, see Figure 5.7[13]) A collaboration group whereas the principal will let the contracting party develop a total solution on the basis of an integrated design and construction method. An extensive description of the functional requirements is given by the principal. (See Table 5.3 for building contract forms within this group)

1. Main Contracting	**3. Turnkey**
2. (Detail) Design & Construct	4. EPC (Engineering Procurement Contracting)

Table 5.3: Integrated contractor building contract forms

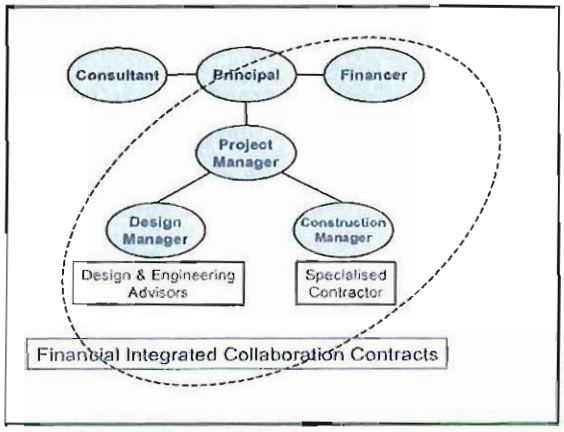


Figure 5.6: collaboration group 1

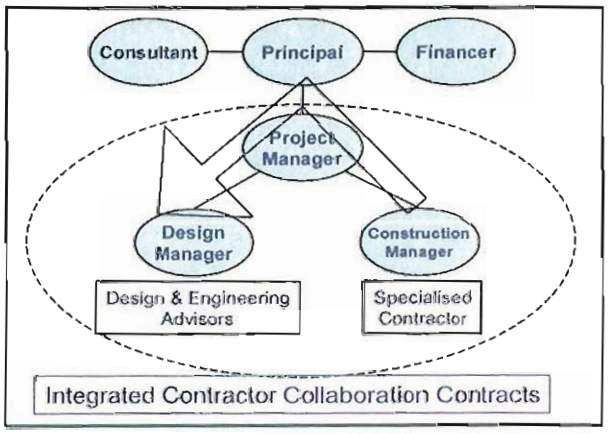


Figure 5.7: collaboration group 2

- Backward Integration → Principal / Engineer Contractor (building contract group 3, see Figure 5.8[13]) A collaboration group whereas the principal has an engineering contract agreement with the engineer; the engineer will be responsible for managerial activities within the project. (See Table 5.4 for contract forms)

1. Construction Management	3. Total Engineering
2. Management Contracting	**4. Engineering Contracting**

Table 5.4: Integrated engineering building contract forms

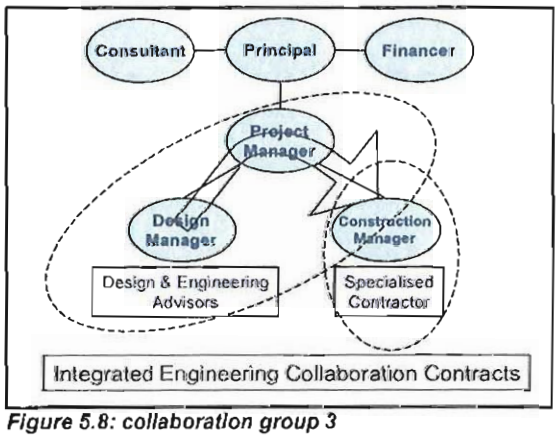


Figure 5.8: collaboration group 3

Standard Outsourcing

- Traditional → Principal / Contractor (collaboration group 4, see Figure 5.9[13]) This part forms the traditional historical well known part of tendering, both with contractors and consultants. (See Table 5.5 for building contract forms within this group)

1. General Contracting / Bid - Build	2. Subcontracting

Table 5.5: traditional / classical building contract forms

13: Source: Roelofs, L.A.; Ordening, standaardisering en toepassing van bouworganisatievormen en contractvormen. Hoofddorp: BM Advies, 2005

- Management Consultant → Principal / Consultant (collaboration group 5, see Figure 5.10[14]) A collaboration group. This part of the outsourcing – decision process represents the collaboration group between the principal and the consultants, but also architects and management companies who acts as an advisor to the principal. (See Table 5.6 for building contract forms within this group)

1. Project Manager	3. Construction Manager
2. Design Manager	4. Facility Manager

Table 5.6: management building contract forms

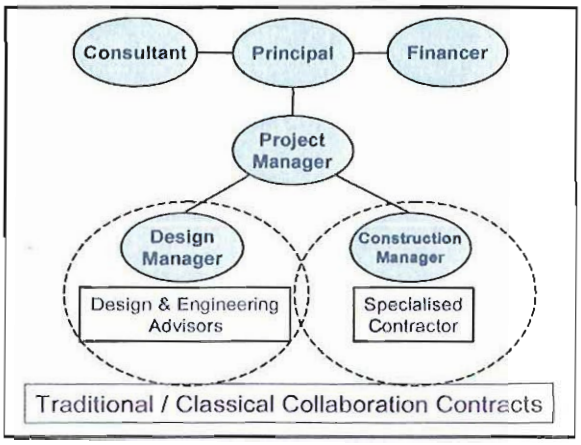


Figure 5.9: collaboration group 4

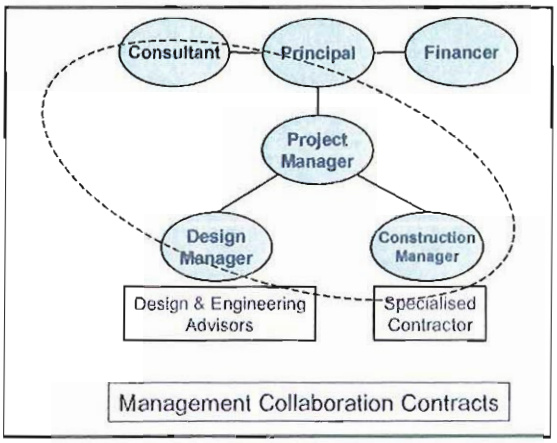


Figure 5.10: collaboration group 5

The highlighted building contract forms are considered with the mentioned key elements before in the further research of this thesis. A brief overview of the characteristics of the considered[15] forms is presented in Table 5.7, whereas a detailed explanation is given on the pages to come. The considered building contract forms are also attached in Appendix E.

Traditional		Management	
Bid - Build	Detailed and standard clauses for classical tender procedure, split project phases	Not considered	
Strategic Cooperation		**Total Development**	
Contract Form	*Characteristic*	*Contract Form*	*Characteristic*
Alliance	Shared risks by all partners in the design and construction processes. Defined product output and fit for purpose guarantees. Operate with risk fund.	DBFMOT (Design, Build, Finance, Maintain, Operate, Transfer)	Concession with purchase guarantee of the project for an agreed fixed price for a certain period
Partnering	Shared joint and several liabilities, split responsibility	DBFM (Design, Build, Finance, Maintain)	Concession with maintenance for a certain period
PPP	A form of collaboration between public and private parties. Nowadays, PPP represents the building contract forms of Total Development	BOT (Build, Operate, Transfer)	Construction and exploitation risks for the contractor for a certain period
Forward Integration		**Backward Integration**	
Contract Form	*Characteristic*	*Contract Form*	*Characteristic*
Turnkey	One party is responsible for design and construction. Integrated solution based on functional requirements for a fixed price	Engineering Contracting	Engineering contractor is responsible for the total design and coordination plus construction management
Design & Build	Same as turnkey, only the functional and technical requirements and the conceptual design is done with involvement and responsibility of the principal	Management Contracting	Integrated project management, design management and construction management in one contract

Table 5.7: brief overview characteristics considered building contract forms

A link between the outsourcing – decision process and a total overview of the building contract forms is given in Figure 5.11. The orange marked building contract forms are the often used forms between Tebodin and their clients.

14: Source: Roelofs, L.A.; Ordening, standaardisering en toepassing van bouworganisatievormen en contractvormen. Hoofddorp: BM Advies, 2005
15: Collaboration contract forms are selected on the point of view of a principal, in each group two often considered forms are discussed in detail.

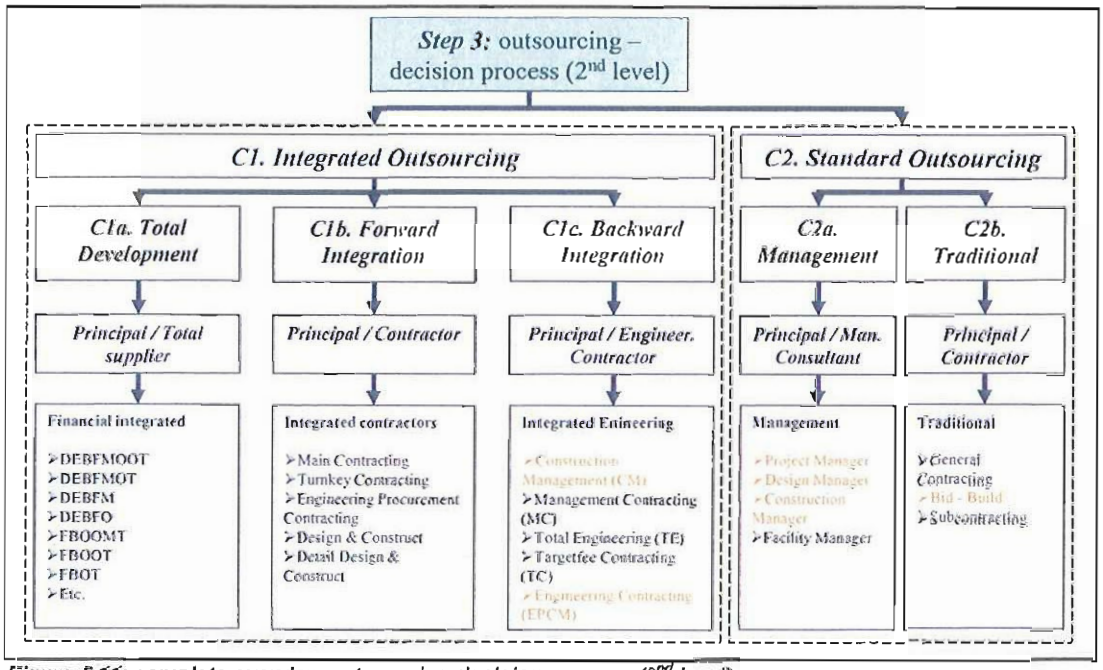


Figure 5.11: complete overview outsourcing decision process (2nd level)

5.2.2. Considered Building Contract Forms

A complete overview of considered building contract forms (both on 1st and 2nd level) divided in the collaboration groups is presented in Figure 5.12. Each form[16,17] is presented with its characteristics, advantages & disadvantages, risk profile, their position in the building process and the functional and contractual relationships.

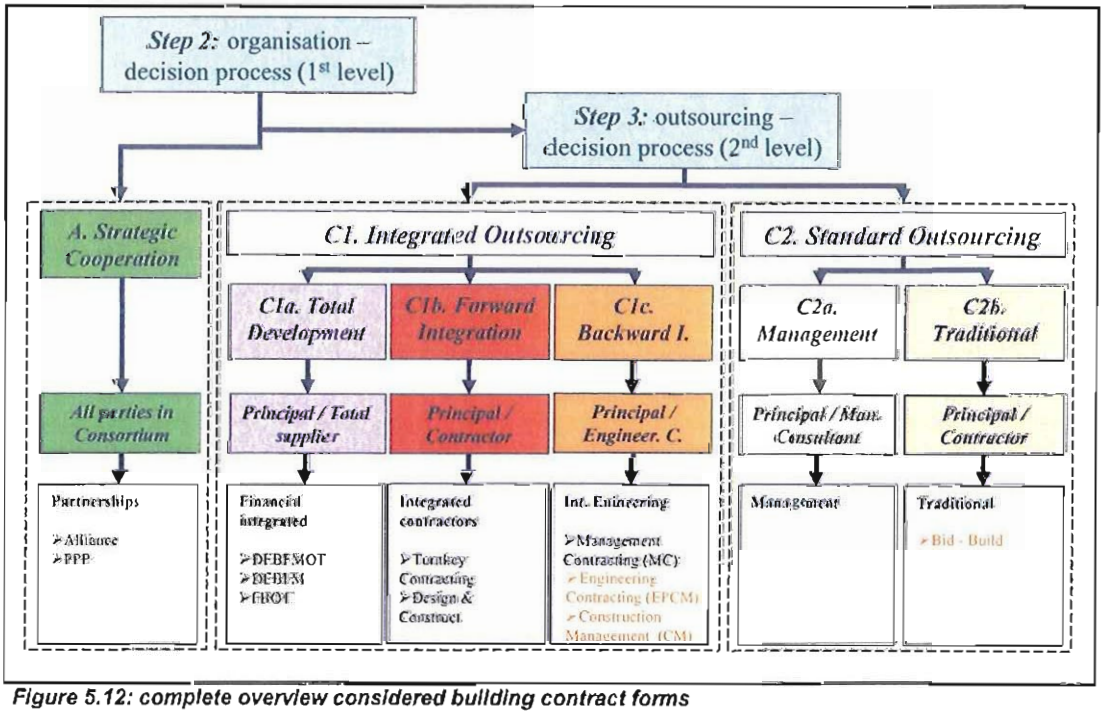


Figure 5.12: complete overview considered building contract forms

16: Source: Ridder, H.A.J. de; Collaboration and procurement procedures in the civil engineering industry. Delft: TU Delft, college reader CT5981, 2004.

17: Source: Koning, H. de & Sproncken, W.; Contracteren bij bouwprojecten. Osborn & Barenschot, 2001.

5.2.2.1. *Traditional Construct / Bid-Build (TC)*

Characteristics

This is one of the most common building contract form with a very long history. The principal is responsible for the design and the provision of the tender package and during the construction phase, the principal also supervises the works. The contractor "designs' the method of construction, makes a planning schedule for the works and executes the works in accordance with the contractual obligations, i.e. the technical and administrative conditions.

Time	Money	Quality
Less flexibility and a longer project time	Lowest bid results in more competition	Clearly defined role partitioning
	Good control of budget	Principal has much influence in project process and design
	The project is divided in different phases, reduction of financial risks	Construction responsibility is by main contractor, control is done by advisor / directors
	Price per unit or hour are mostly standard known	Optimal price / quality proportion can be negatively influenced by separation

Table 5.8: characteristics: traditional construct

Advantages and disadvantages

Advantages	Disadvantages
Detailed and standard clauses hardly give any reasons for discussion	Slowdown effect on the building process due to separation of design and construction phases
Parties clearly know their position, tasks etc.	Expertise contractor only in construction phase
Good checking possibilities	Inadequate "tuning" of design and construction causes high chance of additional works

Table 5.9: advantages: traditional construct

Risk profile and relationships between involved parties

Traditional Construct			
Degree of risk			
	Less		More
Integration design and realisation	■		
Possibility to make changes in the middle			■
The measurement of contractual remedies		■	
Possibility to shorten the project phases	■		
Price guarantee in an early phase		■	

Table 5.10: risk profile: traditional construct

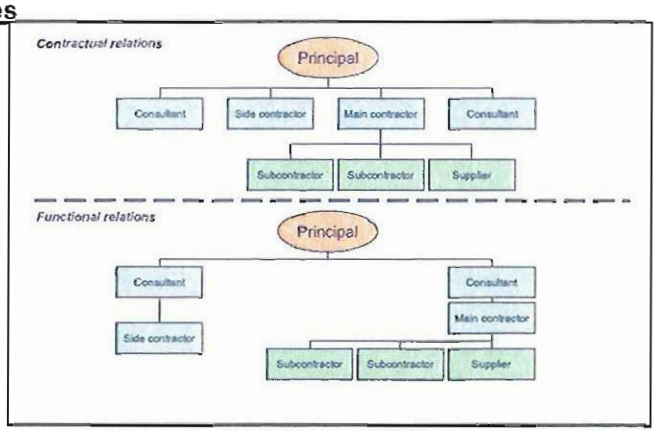


Figure 5.13: relationships parties: traditional

Position in building process

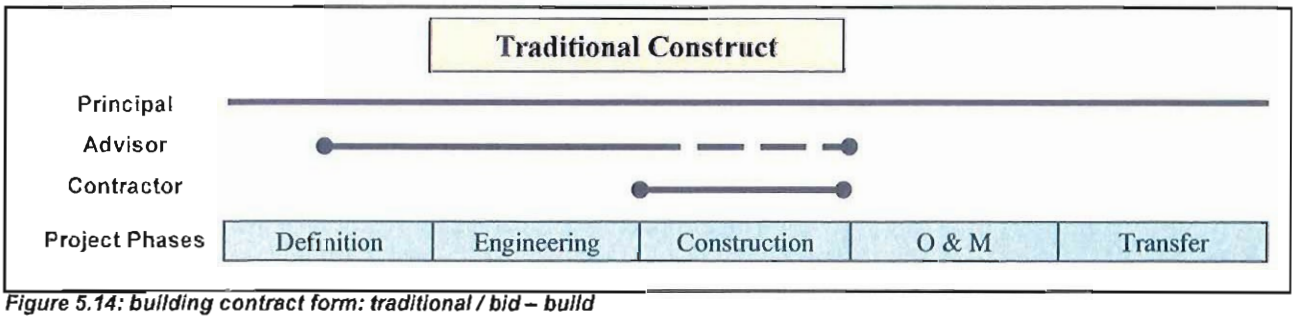


Figure 5.14: building contract form: traditional / bid – build

5.2.2.2. *Alliance*

Characteristics

The purpose of an alliance collaboration model is that parties work together on the basis of equality, in order to reach a single, common result. The essence of this collaboration is that detailed procedures are agreed upon with respect to mutual consultations. Another important aspect is the "open book" determination of costs and the formulation of a detailed declaration of intention.

Time	Money	Quality
Optimal collaboration will shorten the project time	Based on incentives (cost reduction, risk elimination, benefit raising etc)	All collaborating parties have the same purpose
	Sum of all the budgeted prices from involving parties is also the total project budget	Main agreement --> Alliance collaboration, second agreement between the involving parties are the works - contract
	Optimal collaboration will reduce financial risks	Expansion of the Alliance group is possible during the different project stages
		Other main criteria: openness, transparency, trust and common interest

Table 5.11: characteristics: traditional construct

Advantages and disadvantages

Advantages	Disadvantages
Conflicts diminish in importance	Much time to be invested in consultations
Costs decrease due to less conflicts and duplications	Due to European legislation, it is a less accepted and acceptable collaboration form for public authorities
The atmosphere "on the floor" improves	The degree of price detailing is way beyond the contractor's liking

Table 5.12: advantages: traditional construct

Risk profile and relationships between involved parties

Alliance			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table 5.13:risk profile: alliance

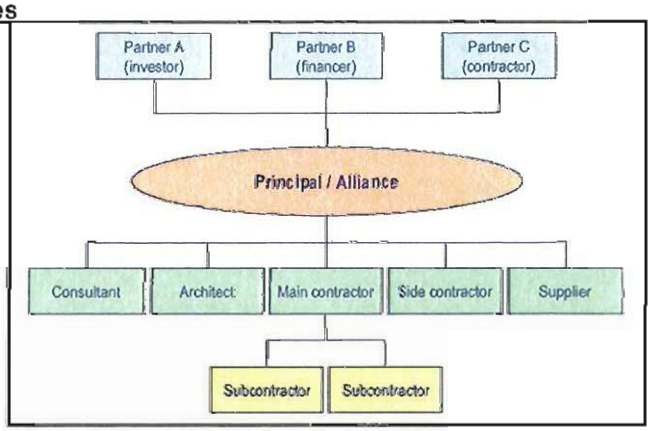


Figure 5.15: relationships parties: traditional

Positions in the building process

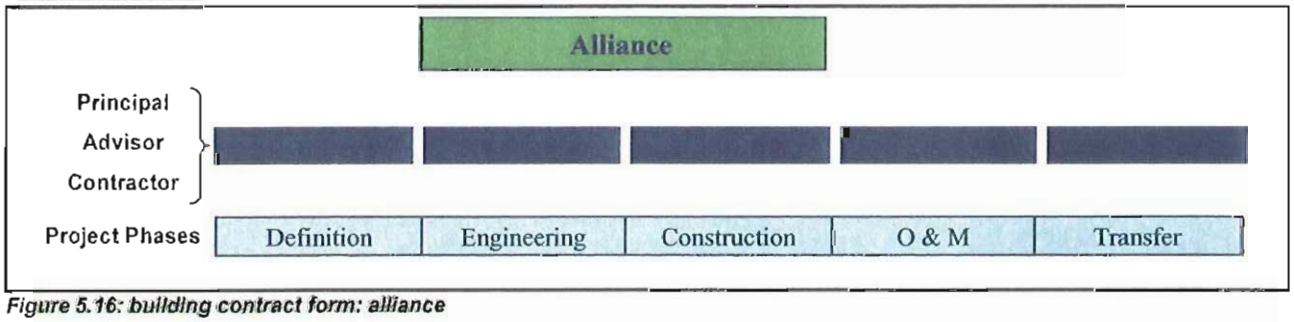


Figure 5.16: building contract form: alliance

5.2.2.3. Build, Operate, Transfer (BOT, variant of DBMOT + F) also indicated as PPP

Characteristics

The BOT procurement procedure is characterised by extensive integration of the building processes. The development of the project consists of design and construction but also maintenance and operation with a final transfer. Parties work together in a consortium. A condition is that a project is suitable for integration of all the processes from the start until and including operation. A BOT is an option if there is a financing problem for the owner. Private Financed Initiative (PFI) is the same as BOT, only there is a participation of financial private party. PFI developed, financed and exploit while at the end a transfer will take place with performance conditions.

Time	Money	Quality
PFI is European focussed with lot of regulations and permits	Consortium parties will run the full exploitation risks	Forming a consortia with different kind of parties from all markets
	Transfer at the end of the exploitation period	

Table 5.14: characteristics: Build, Operate, Transfer

Advantages and disadvantages

Advantages	Disadvantages
New public facility without principal's budget	
Traditional interface problems disappear through integration of tasks	Determination and the distribution of risks can sometimes lead to delays or financial problems
Works are taken over without additional costs or for a low price	Dependency of other factors (economy, politics, the environment and the social context)
In case of public partnership, the government can provide social need without carrying the financial burden for it	

Table 5.15: advantages: Build, Operate, Transfer

Risk profile and relationships between involved parties

Build, Operate, Transfer			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table 5.16: risk profile: Build, Operate, Transfer

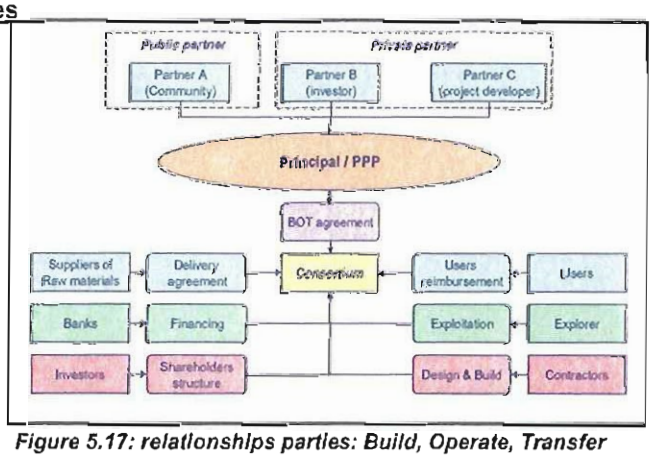


Figure 5.17: relationships parties: Build, Operate, Transfer

Positions in the building process

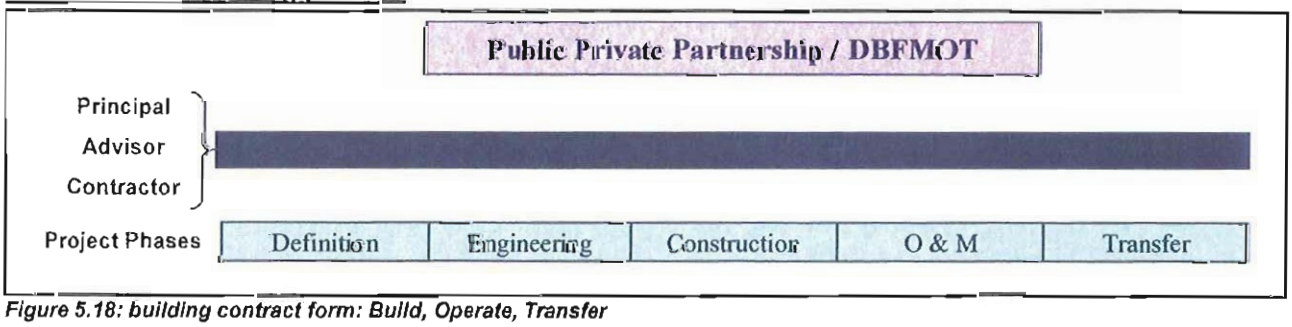


Figure 5.18: building contract form: Build, Operate, Transfer

5.2.2.4. *Turnkey*

Characteristics

The principal will let the contracting party develop a total solution on the basis of an integrated design and construction method. An extensive description of the functional requirements is given by the principal. One party is responsible for design and construction –> consultation will take place, but detail engineering and construction is full responsible by the contractor (buy agreement).

Time	Money	Quality
Tendering stage can be short, the principal is just dealing with parties who can deliver the whole package based on performance	Total financial risk is laid down by turnkey contractor	The turnkey contractor is fully responsible for damages and mistakes during the design and construction stages
Project time will be reduced to the minimum, due to the fact that the turnkey party is fully responsible for the finance of the project	Commercial risks belongs to the principal	Principal is also responsible for the setup of the TOR, later on the responsibility will move to the turnkey contractor
Project time shortening is possible because of the parallel phase of the different stages managed by one party		Full tendering of the whole project, one TOR with the minimal requirements and performance conditions
		Changes and adaptation should be avoided --> there is no clear set off

Table 5.17: characteristics: Turnkey

Advantages and disadvantages

Advantages	Disadvantages
Integration design and construction (innovation possible)	Less competitive parties to be able to tender
Unnecessary complexity is avoided	Difficult to attain the desired balance between construction cost and running cost
Consultancy costs can be reduced	

Table 5.18: advantages: Turnkey

Risk profile and relationships between involved parties

Turnkey			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table 5.19: risk profile: Turnkey

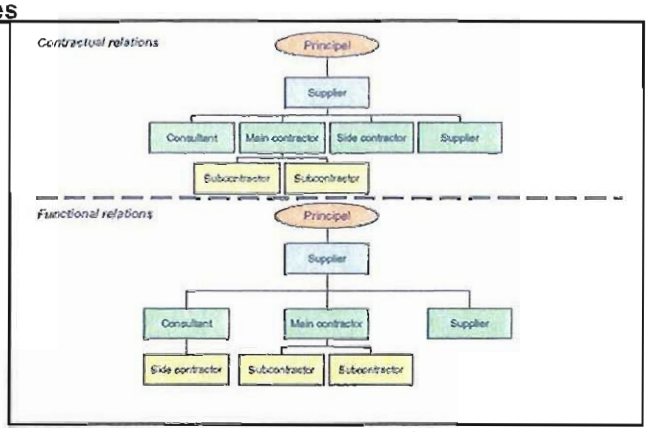


Figure 5.19: relationships parties: Turnkey

Positions in the building process

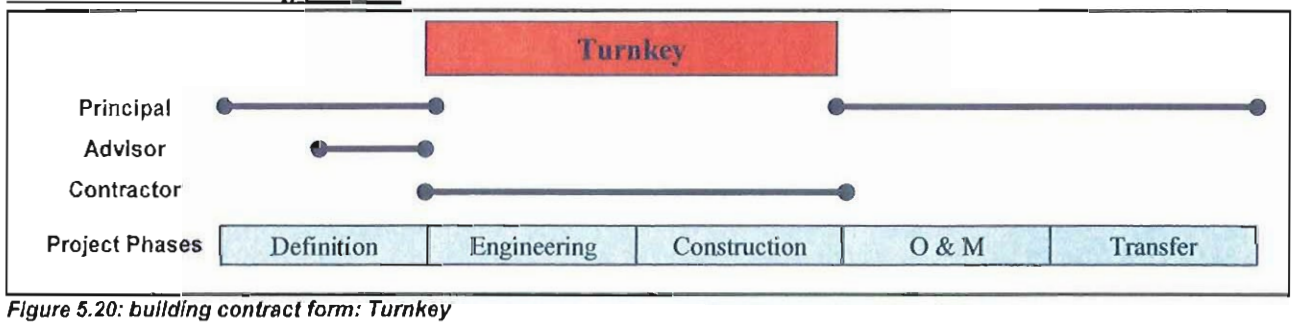


Figure 5.20: building contract form: Turnkey

5.2.2.5. Design & Build (D&B)

Characteristics

Design (Engineering) and construction are in one hand. Forward integration in the construction industry chain. With this type of procurement there is no traditional form of supervision from the side of the principal, although the contractor shall allow him a general authorisation for inspection to make sure of compliance with the contract.

Time	Money	Quality
Shorter cycle time in the stages design and construction	D&B implies a risk repurchase from the point of view of the principal. This often will lead to a less favourable price alternative	The design is coordinated with the construction method.
	Everything about the scope of delivery which is not explicit mentioned in the contract can be a discussion point	Changes and variants form the side of the principal are hardly to realise unless it's written in contractual matter
	Competitive forces are small, qualitative and quantitative comparison of tendering documents is difficult --> long negotiation time	D&B means to think and act in performance and results instead of descriptions and specifications

Table 5.20: characteristics: Design & Build

Advantages and disadvantages

Advantages	Disadvantages
Principal has to deal with only one party	Limitation of D&B contractors
Fewer discussions about responsibilities and liabilities	Contractor responsible for the estimated costs
Execution of the works and "harmony" is improved	
Design and works preparation are fully defined by the construction processes	Difficult to attain the desired balance between construction cost and running cost
Design is aimed at efficient methods of construction (standardisation, less complex etc.)	Principal is legally bound to adhere to contractual conditions

Table 5.21: advantages: Design & Build

Risk profile and relationships between involved parties

Design & Build			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table 5.22: risk profile: Design & Build

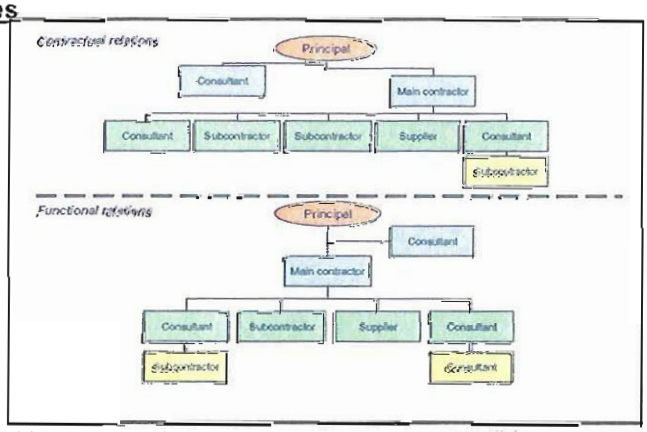


Figure 5.21: relationships parties: Design & Build

Positions in the building process

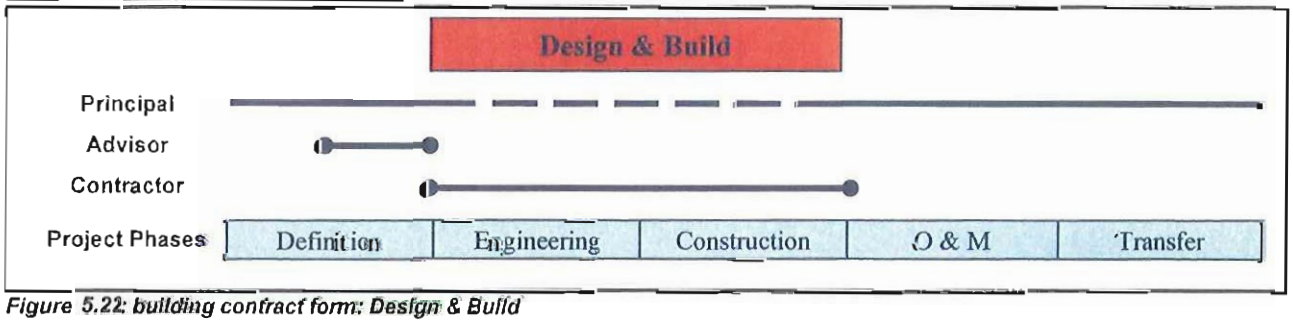


Figure 5.22: building contract form: Design & Build

5.2.2.6. *Management Contracting (MC)*

Characteristics

Involvement of a construction manager in an early phase makes it possible to consult the design team by the construction manager. A more efficient and better tuning will take place which result in fast tracking, efficient coordination and cost control.

Time	Money	Quality
Integration of design and construction without dealing with one contractor	Risk rises is eliminated, these costs are now divided by the principal and management contractor	Technically less complex project with a clear definition of risk profile for design and construction
Subcontracting will result in price and time advantages. The management contractor is an objective party towards the construction stage	Maybe cheaper to realise the construction due to subcontractors, but the principal is responsible for all direct damages	Focus on production, use of standard methods and materials, create more efficiency
Subcontracting could also lead to capacity problems in overheated construction market	Construction management applicable in a rising economic situation, risk - rises will be fully calculated. In recession time, the margin will be very small	Less compatible for innovative design and construction methods, usage of different kind of materials

Table 5.23: characteristics: Management Contracting

Advantages and disadvantages

Advantages	Disadvantages
Working with subcontractor instead of one main contractor lead to diminishing risk rises by principal	Extensive coordination by management contractor is necessary
	Principal is responsible for the whole project

Table 5.24: advantages: Management Contracting

Risk profile and relationships between involved parties

Management Contracting			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table 5.25: risk profile: Management Contracting

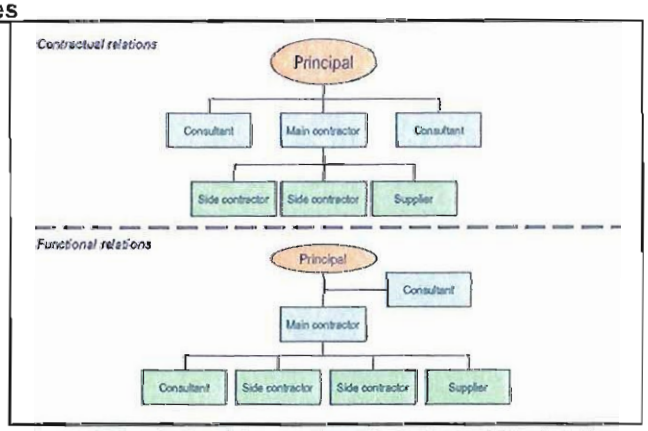


Figure 5.23: relationships parties: Management Contracting

Positions in the building process

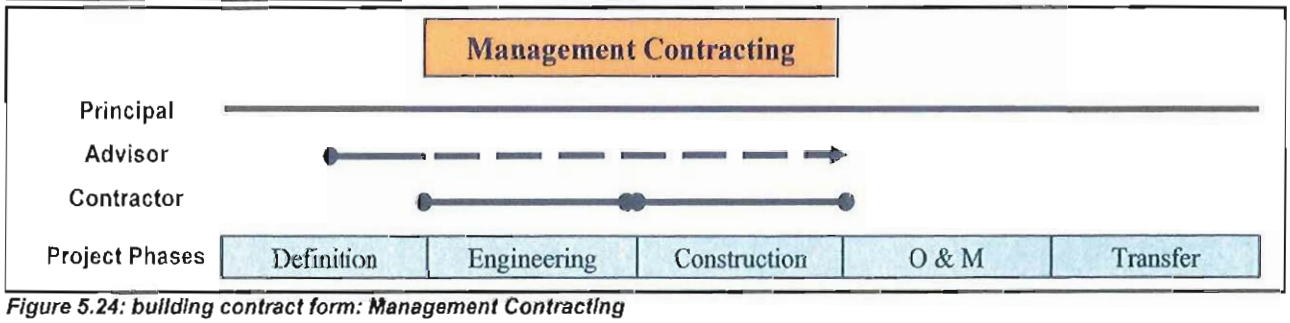


Figure 5.24: building contract form: Management Contracting

5.2.2.7. EPCM / Engineering Contracting (EC)

Characteristics

In this form the Engineering Contractor is responsible for the total design and coordination. (General contracting or Total engineering)

Time	Money	Quality
Gaining time is possible due to the EPCM coordination	A comparable price shaping like the traditional form	Engineering contracting is drive by design
	Engineering contractor will procure on behalf of the principal. Clear agreements are necessary to define the project	There is a chance that quality risks will be moved to the procured parties. This can lead to complex claim situations

Table 5.26: characteristics: Engineering Contracting

Advantages and disadvantages

Advantages	Disadvantages
Working with subcontractor instead of one main contractor lead to diminishing risk rises by principal	Principal is responsible for the whole project
Integration between design & engineering and execution of a project, while flexibility is maintained	

Table 5.27: advantages: Engineering Contracting

Risk profile and relationships between involved parties

Engineering Contracting			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table 5.28: risk profile: Engineering Contracting

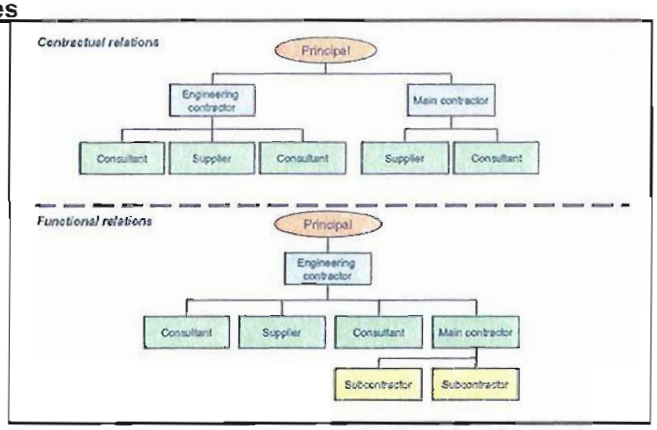


Figure 5.25: relationships parties: Engineering Contracting

Positions in the building process

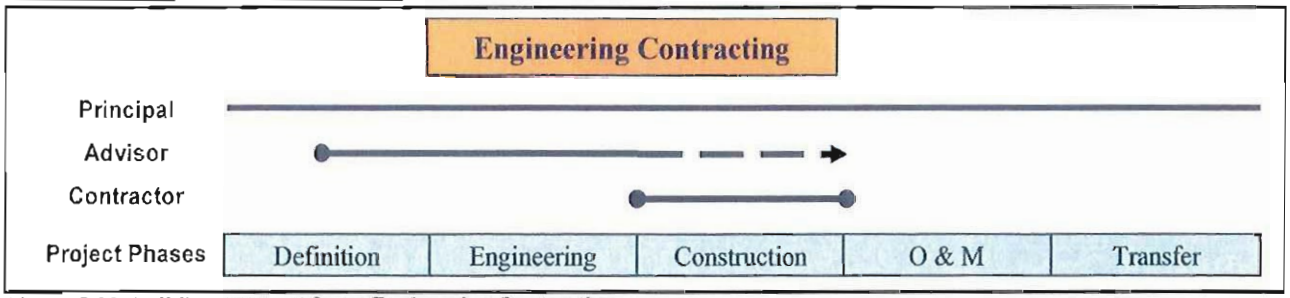


Figure 5.26: building contract form: Engineering Contracting

5.2.2.8. Construction Management (CM)

Characteristics

A variant of Management contracting. A construction manager managed the design and construction stage. The principal is directly in contact with all his suppliers and subcontractors.

Time	Money	Quality
Maximal flexibility concerning several involving parties --> fast tracking	Maximum transparency regarding to subcontractors and sub suppliers, more certain price expectations	Most flexible CF concerning quality aspects --> principal maximum of influence
	Less risk rises due to separateness of contractors and suppliers --> no fixed price in an early stage	Extensive and professional management is needed for all the parties involved
		Separation of responsibility of design and project management

Table 5.29: characteristics: Construction Management

Advantages and disadvantages

Advantages	Disadvantages
Maximum flexibility in the whole project, besides contractors experiences can be used in an early stage	

Table 5.30: advantages: Construction Management

Risk profile and relationships between involved parties

Construction Management			
Degree of risk			
	Less		More
Integration design and realisation	■		
Possibility to make changes in the middle			■
The measurement of contractual remedies	■		
Possibility to shorten the project phases			■
Price guarantee in an early phase	■		

Table 5.31: risk profile: Construction Management

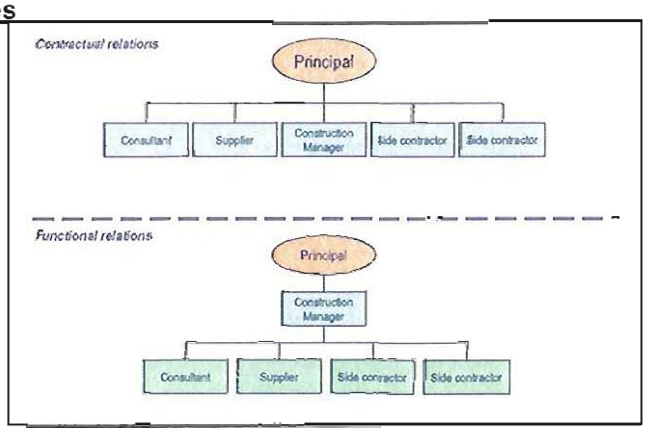


Figure 5.27: relationships parties: Construction Management

Positions in the building process

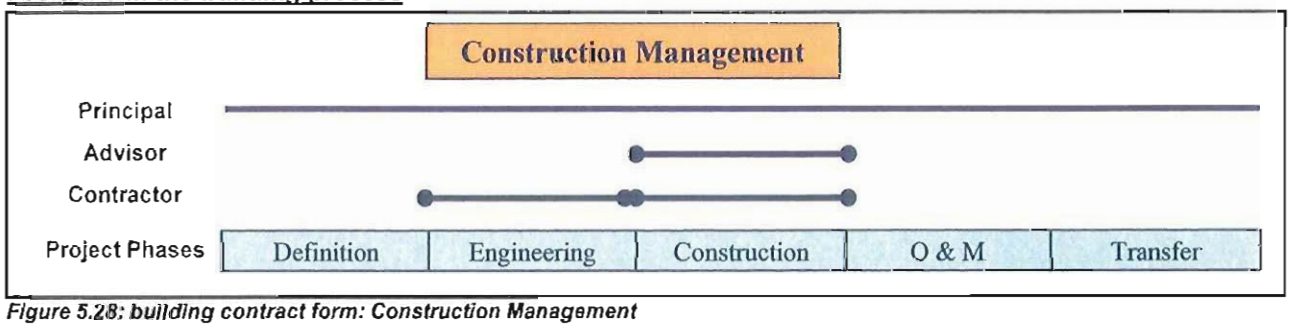


Figure 5.28: building contract form: Construction Management

Eight building contract forms have been considered. An overview of characteristics can also be found in appendix E[18]. Once again, the considered contract forms often occur, but they are not limited to. Different variants or combinations are also possible, but for the demarcation of this thesis, they will not be considered.

5.2.3. Chinese national building contract forms

To be able to understand which building contract forms generally are used in China, a literature study is done concerning universities[19] and an interview was taken with Tebodin Asia Pacific, Mr. Rong He, and a Chinese contractor SMEIC (Mr. Y.C. Yu, Joint Venture Partner of Tebodin Asia Pacific). Based on the interview there are two different types of projects which can be realised in China.

Multinational projects: projects of a multinational investor / principal who want to expand their business in China or who want to invest in a local Chinese project. The organisation of these projects is mostly based on principal – advisor → advisor – contractor relationship basis. The multinationals often collaborate with international consulting & engineering companies in the realisation of a construction project. The reason for this choice is because of some bottle necks for a principal to directly get in contact with a local Chinese contractor:

- 80 to 90% of the projects are initiated by local authorities and companies and mostly followed up by local investors → building up a network of relationships is crucial
- There is a lack of information about the construction method and technology used → principals do not have enough transparency in the construction processes
- Most of the contractors are governmental companies, they still feel a barrier to cooperate with foreign companies
- Cultural differences in the way of doing business hinder the collaboration process
- Marketing differences, the tendering procedure is not clear. In other words, the matter of how to get in contact with the right contractors is unknown
- Chinese contractors promise a lot, but the compliance often differs in reality, there is a lack of management control / project management in the point of view of a Western principal

To be able to realise a project, several permits and licenses are needed. For a foreign investor / company it's hardly possible to get these permits and licenses. A common solution is to arrive at a collaboration with international engineering companies or well-known local contractors. Current projects are mainly based on EPCM (Engineering, Procurement, and Construction Management) or Turnkey building contract forms.

Local projects: projects which are mostly initiated by the government or public authorities. Often local technology and knowledge are used to realise these projects. But nowadays there is a rising interest for international support in management and in expertise and experience. Local projects are realised in the traditional way. Due to the bounded and specific knowledge of the local companies, the classical bid-build tendering procedure is therefore often used for different phases in a construction project. Despite their narrow focus, these companies are trying to deliver a whole service package to be able to realise a construction project, but still it will take a long time before it is a common feature.

Based on literature study from the Shanghai University and Hong Kong Polytechnic University, the most common building contract forms in China used are:

- Bid-Build
- Build, Operate, Transfer (BOT)
- Turnkey
- Engineering Contracting & Construction Management (EPCM)

Not only are there developments in the building contract forms in the Netherlands, also in China one can see some changes. As it was presented in Chapter 2, the Chinese government has the aim to both enforce the law and management and to concentrate efforts on macro regulation and control while creating a sound market environment, without directly intervening in enterprises. The Chinese government has announced[20] that it will follow the international standards and regulations in several directions. Hong Kong as a "Special Administrative Region" for China will play a major role in being an example in which such a sound market environment works. Hong Kong has a lot of experience in different international building contract forms such as Design & Build, Partnering, PPP (Public Private Partnership) etc. Because of the results of the interviews and the expectations of the Chinese

18: The key elements of a building contract form are taken into account. The underlying general conditions (RVOI, UAV etc.) which a contract form refer is not considered
19: The Hong Kong Poytechnic University, Shanghai University, Shanghai Jiangong University, Guangzhou University
20: Source: China's undeniable stake. The Hague: EVD, 2003

government to come in relation to the construction industry, for this thesis the substantive aspects of the considered building contract forms will be considered the same for the Netherlands and China.

5.2.4. International building contract forms

So far only Dutch building contract forms are discussed. How are they related to the international standardised building contract forms and is the assumption made in the previous paragraph valid considering The Netherlands and China? For many years now, the Fédération Internationale des Ingénieurs – Conseils ("FIDIC") publishes a number of standard forms of contract. FIDIC was founded in Europe in 1913 and today her membership numbers is more than 60 countries[21]. There are also other forms of contract, like "The World Bank", "Asian Development Bank", "European Investment Bank", etc. These forms are more or less used in public projects financed by an international agency whereas one of the main requirements is that the project should be delivered in accordance with international standards. Fur the purpose of this thesis only the FIDIC forms[17] of contract is discussed.

5.2.4.1. Green Book

This form of contract is recommended for relatively simple or repetitive work, or for work of short duration, or of small capital value. This is irrespective of whether the design is provided by the principal or contractor and whether the phases a project involved.

5.2.4.2. Red Book

This form of contract is recommended for building or engineering works designed by the principal or by his representative, the engineer. The contractor constructs the works in accordance with a design provided by the principal. The design is the responsibility of the principal, except in the case when some contractor – design is specified in the contract. The Red Book is comparable with the Dutch "Traditional Construct" building contract form.

5.2.4.3. Yellow Book

This form of contract is recommended for the provision of electrical and / or mechanical plant, and for the design and execution of building or engineering works. The contractor designs and provides plant and / or other works, in accordance with the principal's requirements. The design is the responsibility of the contractor. The Yellow Book is comparable with the Dutch "Design and Build" building contract form.

5.2.4.4. Silver Book

This form of contract is recommended for the provision of process or power plant on a turnkey basis and which may also be used where one entity takes total responsibility for the design and execution of a privately financed project or an infrastructure project which involves little or no work underground. This form also includes BOT or similar type of contract. The Silver Book is comparable with the Dutch "Total Development and Forward / Backward Integration" collaboration subgroup.

5.2.4.5. White Book

This form of contract describes the relation between the principal and a consultant or a contractor and a consultant. From the point of view of a consultant, the principal or the contractor is seen as the client. In this type of contract the consultant renders services to the client for assignments such as design, engineering and supervision services, management services, etc. The White Book is comparable with the Dutch "RVOI[22]" and belongs to the collaboration group: management consultants.

5.3. Development in construction industry

Chapter 2 briefly described the main characteristics of the construction industry in The Netherlands. Besides the "traditional" focus points on construction projects, one can see some movement and changes in the matter of collaboration. Also in the International context, much people are occupied with developments in the construction industry, especially the civil engineering sector. This paragraph provides a general overview of some of the main developments within this sector.

21: Source: Ridder, H.A.J. de; Collaboration and procurement procedures in the civil engineering industry. Delft: TU Delft, college reader CT5961, 2004

22: RVOI: Regeling van de Verhouding tussen Opdrachtgever en Adviserend Ingenieursbureau – Arrangement of the Relation between Client and Consultant

5.3.1. (Re-) Value Constructioning[23]

In every construction project (probably in every economic market) one has to deal with at least two chains, the demand and supply chain. The demand chain consists of the society, the stakeholders, the financers, the end-users and the principals (clients), whereas the supply chain embraces the raw materials industry, the suppliers, the subcontractors, the main contractor and the system integrator. In many cases one party can represent several groups, for example in the commercial sector more often the principal (client) is also the end-user and financer of a project. Besides the groups in both chains other parties can also be involved such as architects and engineering consultants.

Involvement of direct and indirect parties → Life cycle orientation

Until now only a small group of parties (directly involved parties) are considered during the construction project. They are indicated in Figure 5.29 in the dotted circle. In the (re-) valuing context[24] the focus of each individual construction project is to involve parties from both chains directly as well as indirectly. Not only is it important to look at the principal's benefits, towards parties outside the dotted circle the mid and long term impact and influence of the project to be realised are important. One can think of sustainability for society and environment but also more added values for both principals and suppliers which can result in higher service and quality.

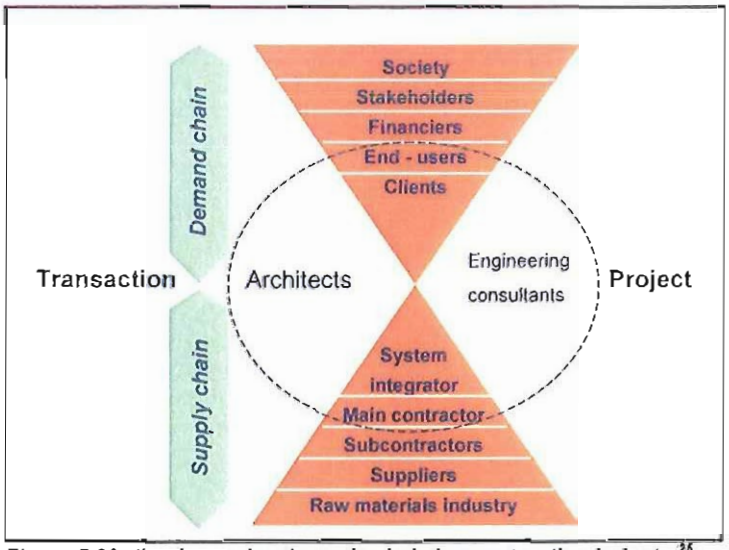


Figure 5.29: the demand and supply chain in construction industry[25]

Chain Integration

A second important thought in (re-) value engineering is the integration within the construction chain. At the moment, a project passes through several phases in a certain sequence by starting with the planning phase (initiated by the principal), followed by the design and construction phase and finally finished with the operation and maintenance phase. Although innovative and / or efficient methods will be developed during the execution (construction, operation, maintenance) phase by the contractors, it is not fully exploited. On the one hand the added value created by the contractor in the realisation phase can not be maximised due to a lack of harmony between design and construction, on the other hand the tendering system is mostly based on the lowest price which will force the contractors to keep their costs at a minimum which in most cases will result in traditional "normal" construction methods.

Chain integration allows innovative and efficient methods with a fine-tuned design and construction system. Figure 5.30 represents the thoughts of an integrated project delivery. The aim is to involve parties of several phases as soon as possible in an early stage of a project to benefit from their expertise and experience. This approach will finally result in an efficient (shorter) construction time with lower costs and higher quality with respect to sustainability.

23: Information is gathered from presentations given during the seminar: Revaluing Construction 2005
24: (Re-) value engineering projects are mostly interesting for large complex construction projects
25: Source: Horst, H. van de.; Presentation: Driving Innovation in Dutch Construction. PSIBouw, 2005

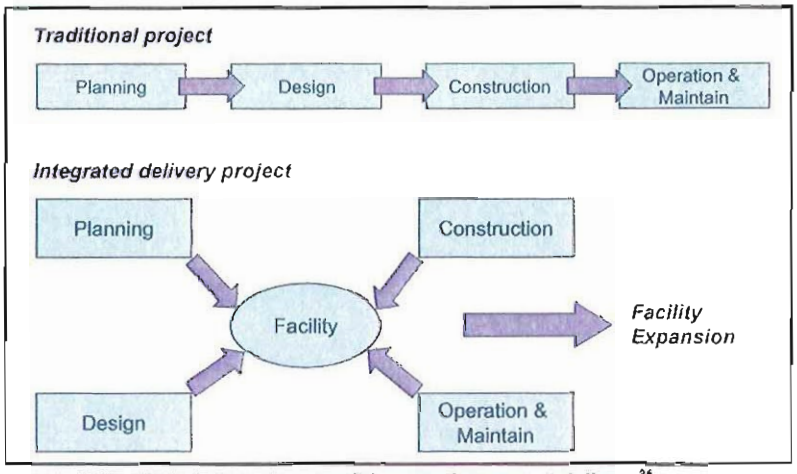


Figure 5.30: chain integration; traditional to integrated delivery[26]

Risk Management

Another important thought in (re-) value engineering is the concept of risk management. Nowadays in construction projects, the risks and costs which could not be controlled and managed by the principal are separated and carried out by different parties in different phases. Not only has the contractor to deal with risks which can be caused by himself or herself, but he or she must also take account of foreseen and unforeseen risks caused by other parties in other phases, whereas the final benefit only belongs to the principal. Due to these separations of risks and costs, the risks and consequences a contractor has to take will be translated into the price tag for construction costs.

It sounds very normal and fair when a certain risk shall be born by that party which is capable of both estimating and controlling that risk in the best possible way, but in practice this is not the case. In the "new" concept of risk management, the intention is that involved parties share together the risks but also the reward. The risks and reward should be equally spread through the supply chain. And finally the decision-making process which is directly related to risk management has to shift from static to dynamic. Chapter 9 will consider the management decision-making part.

5.3.2. Conclusion development in construction industry

As indicated in Chapter 2, the Dutch construction industry has its competition mainly on price instead of competition on value. In other words, the mentality should go from price to value as been indicated in Table 5.32.

Competing on price		Competing on value
Customer value is fixed	→	Better value for money
Costs are (almost) fixed	→	Better price / cost ratio
No possibilities for creating economic value	→	Total economic value grows
My profit is your loss!	→	**Everyone wins!**

Table 5.32: competing on price versus competing on value[27]

Besides of this, the Dutch construction sector is still in the industrial stage, focussing on the physical chain, efficiency and reduction of costs rather than on customer. Other industries have gone already through the transition towards service-provision and value creation.

The previous paragraph provided some key thoughts of (re-) valuing construction about the new developments in the construction industry. In Table 5.33 an overview of changes is given from the traditional focus point of view towards the preferred situation.

26: Source: Halvorson, S.; Presentation: Revalue Construction 2005 – Changing the Business Model Design Build and Project Delivery Trends in the USA. The Haskell Company, 2005

27: Source: Boons, R.; Presentation: A case about added customer value. Schutte Groep bouw & ontwikkeling, 2005

Existing situation	Preferred situation
Static control of product	Dynamic control of processes
Project orientation	Life cycle orientation
Involved parties	All stakeholders
Fragmented value chain	Chain integration
Seperation of costs and risks	Risk management
Fixed price	Price / Quality ratio
Originial price	Value - Benefit - Cost model
Initial investment	Life cycle investment

Table 5.33: main developments in the civil construction industry[28]

What kind of impact will all these changes have on the construction industry? To be able to approach the answer(s) of this question, one should "rethink" the processes within a construction project. As an example, Figure 5.31 presents the drivers for change and their influences towards the project processes which finally results in the targets for improvement.

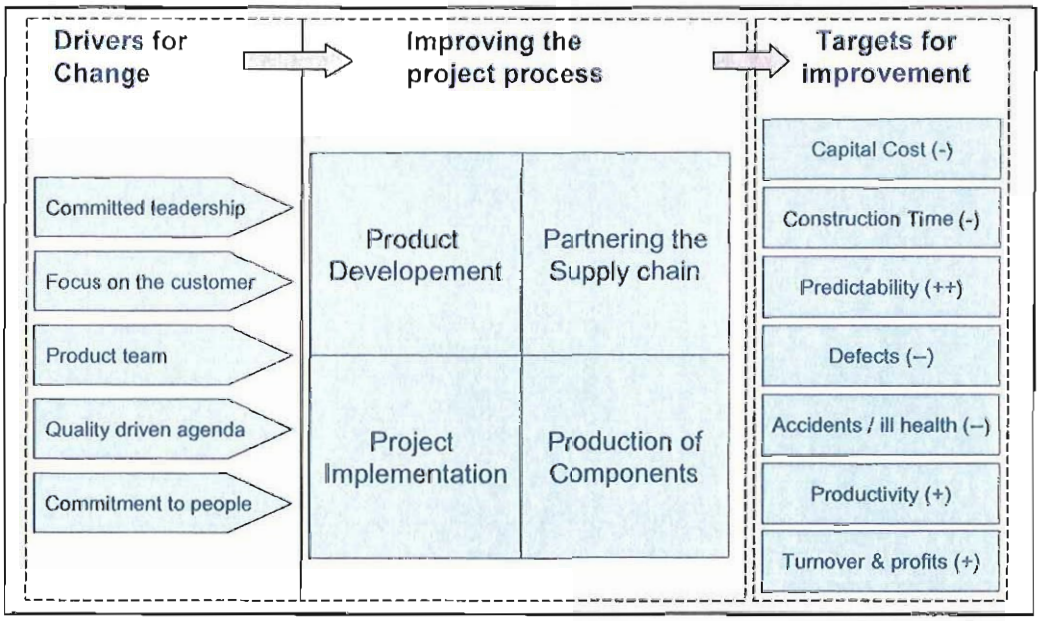


Figure 5.31: building contract form: partnering[29]

As a final remark, the vision of the European Construction Technology Platform[30] towards the developments in the construction industry for the year 2030 can be characterised as:

- Knowledge and demand driven sector
- Satisfaction of the needs of clients and society
- To provide high quality of life
- Long – term responsibility to the mankind's environment
- Good reputation as an attractive sector
- Deeply involvement in research and development
- Reputation of companies by their competitiveness on local, regional and global levels

A summation of possible benefits for principals as well as suppliers and other directly or indirectly involved parties are presented in Table 5.34.

28: Source: Horst, H. van de; Presentation: Driving Innovation in Construction Industry. PSIBouw, 2005
29: Source: Evans, E ; Presentation: Achieving Change in UK Construction. Constructing Excellence, 2005
30: Source: Rodriguez, J ; Presentation: The Challenge of change in construction. European Construction Technology Platform, 2005

Added value for principals	Added value for suppliers	Added value for others
Greater usage of tolled facilities	Projects value system	Create and sustain safety, health and wealth
Higher prices from sales or rents	Long term framework	Create and sustain quality of life
An investment model	Possibility for innovation	Environmentally sustainable construction
Greater footfall from customers	Improved business environment	
Reduction of cost	Off - site manufacture	
Higher quality due to innovativity	Improved construction processes	
High flexibility		

Table 5.34: possible benefits for construction industry parties[31,32,33]

5.3.3. Key Performance Indicators (KPI) for "new" developments

To be able to realise the developments in the construction industry, another fundamental approach is needed in order to arrive at a collaborative form. The main elements of such approaches are indicated as "Key Performance Indicators" (KPI). It is a continuous process to define new indicators and evaluate existing ones. Indicators which are important points for the developments in the construction industry highlighted during the symposium of "Revaluing Constructioning 2005" are presented in Table 5.35. Some of the indicators, given in bold typeface might be interesting for further Chapters.

Key Performance Indicators (KPI)	
1. Trust	8. Environmental impact
2. (Financial) performance	**9. Image**
3. Probity	**10. Predictability**
4. Client satisfaction	**11. Transparency**
5. Compliance	12. Safety
6. Efficiency	13. User satisfaction
7. Employees (attract and retain)	14.Waste and whole life

Table 5.35: main key performance indicators in 2005[34]

5.4. Summary building contract forms

People are familiar with certain building contract forms, but are they aware of the basic ins and outs of each form and what are the differences between al these forms? The aim of this Chapter was to provide the reader a detailed overview of possible building contract forms in the construction industry with their characteristics, structure, advantages & disadvantages in both national (The Netherlands and China) and international context.

Although the construction industry itself can be often characterised as static, closed and not transparent, in recent years, lots of developments can now be considered in improving this industry and making it more dynamic and efficient. An overview of important key performance indicators was presented. Of course, a large part of the construction industry still will remain traditional, but what kind of impact will these "new" developments have in the matter of collaboration?

Developments are ongoing at a global level. Some of the key performance indicators include trust, probity, predictability and transparency. In the Dutch context, it is quite a challenge to handle these abstract aspects, aspects which play a major role in the way of doing business. An extra dimension occurs when an international collaboration is considered, such as in China. What are the elements of this extra dimension? Chapter 6 is devoted to this topic.

31: Source: Winch, G.M.; Presentation: Why should we value construction? Centre for research in the management of projects, Manchester Business School, 2005
32: Source: Ang, G.K.I.; Presentation: An international overview of construction reform initiatives. PSIB / CIB W060, NL Government Building Agency, 2005
33: Source: Hampson, K.; Presentation: Construction 2020 – Inspiring change in Australian property and construction. Australian Cooperative Research Centre for Construction Innovation, 2005
34: Source: symposium "Revaluing Constructioning 2005, combination of several presentations

6. Chinese aspects (Box 6)

The previous Chapter describes the fundamental theoretical background of existing building contract forms and future developments. This Chapter presents some of the fundamental elements of the Chinese philosophy and culture. With the Chinese philosophy, a deeper understanding of the thoughts of the Chinese people is possible while the cultural elements / values are a concrete translation of the philosophy towards behaviour. This chapter will also be finished with a summary. (See Figure 6.1)

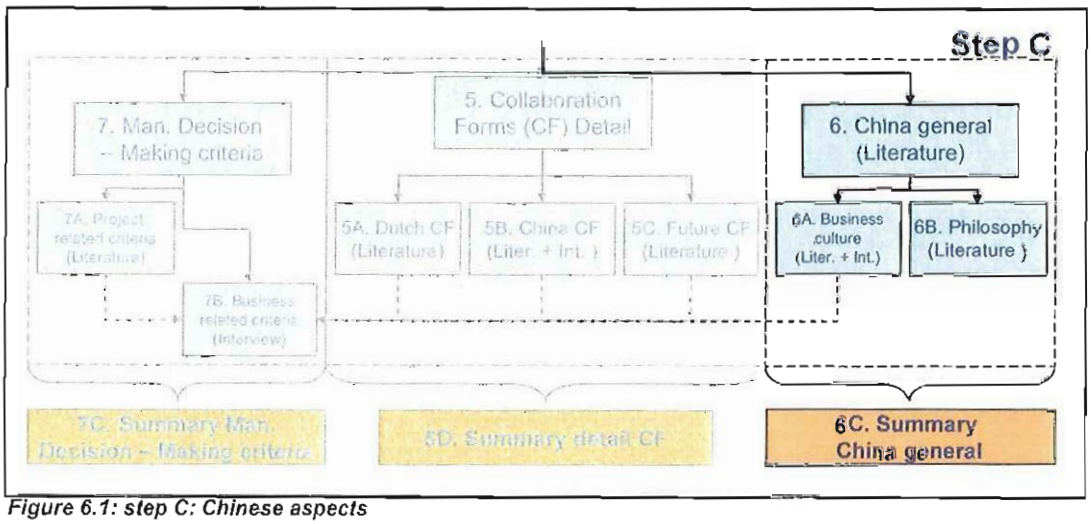


Figure 6.1: step C: Chinese aspects

6.1. Chinese philosophy[1]

A comprehensive coverage of the roots of contemporary Chinese business thinking would take a thousand scholars a thousand days.[2] Here, a short chronological overview in time of the Chinese philosophy is presented in Figure 6.2 Within this Figure key determinative aspects are highlighted which will be described briefly in this paragraph. A description of all presented philosophy can be consulted in appendix F.

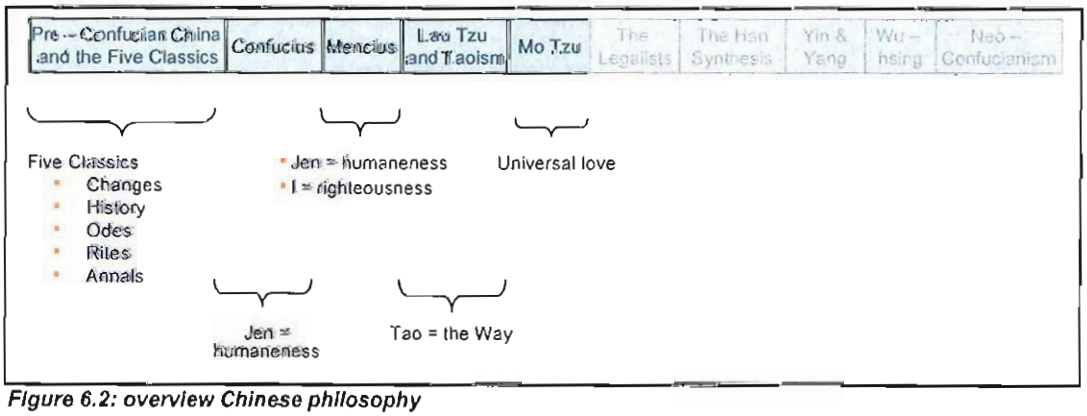


Figure 6.2: overview Chinese philosophy

Before moving to in the philosophical sphere, an average Chinese can be described as follow[2]:

> *"The average Chinese has long been and still is an animist, a Buddhist, a Confucianist, a Taoist and a Communist with no sense of incongruity or inconsistency"*

1: Source: http://www.wsu.edu/~dee/CHPHIL/CHPHIL.HTM

2: Source: Ambler, T. & Witzel, M.; Doing business in China. London: Routledge, 2000

6.1.1. Pre – Confucian China and the Five Classics[3]

At the heart of Chinese thought stand the five great classics. The five classics supposedly have been written down during the various cycles of dynastic change. These five classics constituted the program of learning for anyone in the upper classes, the ruling classes, or the educated classes. Not only do they contain the early Chinese history, but also all the ethics and wisdom of China.

The Five Classics:

1. *The Book of Changes:* description of the metaphysical structure and dynamics of the universe
2. *The Book of History:* a repository of political wisdom
3. *The Book of Odes:* a collection of three hundred poems from the Chou dynasty
4. *The Book or Rites:* rituals that make up ancient Chinese life
5. The Spring and Autumn Annals: a history of a single Chinese province (700 to 500 B.C.)

Confucius (born in 551 B.C.) is regarded as editor and compiler of most of the mentioned books and is described in the next paragraph.

6.1.2. Confucianism & Mencius[4]

Confucius laid down a pattern of thinking followed by more people and for more generations than any other human being on earth has done. He had a natural talent for brilliant teaching and his teachings were recorded and became known as the Analects. The Confucian method characterises all Chinese learning to the present day; its fundamental principle is the belief in the perfectibility of human beings through learning. Confucius had one message:

> *"If we are to achieve a state of orderliness and peace, we need to return to traditional values of virtue"*

One of these values is based on the concept: ***jen***, which is best translated as "humaneness," "humanity," "goodness," or "virtue." One of the early Chinese thought was the belief in heaven, governing the world in its entirety, including human affairs. Confucius believed that the human order in some way reflected the divine order, or the patterns of heaven. According to Confucius, the ancients understood the order and hierarchy of heaven and earth; as a result, Confucius established the Chinese past as an infallible model for the present.

Mencius (372 – 289 B.C.) also based his entire system of thought on the concept of ***jen*** and added an extra concept of ***i*** meaning "righteousness," or "duty". The meaning of both concepts together is that the "humaneness" one shows to individuals should in some way be influenced by the type of personal relationship one has with that person. For example, you owe more ***jen*** to your immediate family than you do to a Prime Minister of your country. Besides this, the ***i*** means that one has also obligations to people that arise from social relations and social organisation.

The ***jen*** and ***i*** are two of the five constant virtues which are of great importance in Confucianism. The other three virtues are: propriety, wisdom and faithfulness. All these virtues are expressed in **"Five Cardinal Relations"** between the following pairs:

- Sovereign and subject
- Parent and child
- Elder and younger brothers
- Husband and wife
- Friend and friend

The first four are vertical relations whereas the last one is of "horizontal" origin and still seen as necessary, especially in business. Horizontal in the meaning of a direct relation no matter what the status is between the considered parties.

3: Source: http://www.wsu.edu/~dee/CHPHIL/CHPHIL.HTM
4: Source: http://www.wsu.edu/~dee/CHPHIL/CHPHIL.HTM

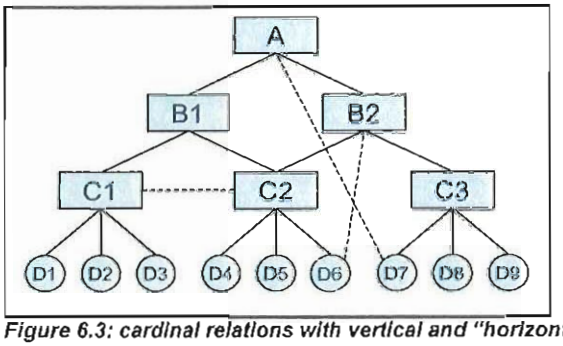


Figure 6.3: cardinal relations with vertical and "horizontal" relations

Figure 6.3 shows arbitrary cardinal relations, the dashed line represents the horizontal friend – friend relationship. If one doesn't have any friend – friend relationship, the procedure is than quite hierarchic. For example, if D1 wants to arrange something with D9, he / she should go via C1 to B1 to A and then down to B2 and C3. If D1 has a friend – friend relationship that exists at C level, the procedures can be shortened. In this case, D1 to C2 and via B2 to C3 and finally D9.

6.1.3. Taoism[6]

Taoism is based on the idea that behind all material things and all the change in the world lies one fundamental, universal principle: the Way or ***Tao***. This principle gives rise to all existence and governs everything, all change and all life. The purpose of human life is to live life according to the ***Tao***, which requires passivity, calm, non – striving, humility, and lack of planning, for to plan is to go against the ***Tao***. The next phrase illustrates the way of thinking from the point of view of Taoism[6].

> *"Taoism has been accused of being at the root of fatalism in China. If what will be, will be, there is no need to do anything to prevent it"*

6.1.4. Mo Tzu[7]

At the heart of his thinking was the belief that all human beings are fundamentally equal and should be loved equally: universal love. Love for Mo Tzu was a practical thing closely related to Confucius's ***jen***. To love people was to take care of them, to feed them when hungry, to clothe them when naked, and to house them when they are homeless. It also meant avoiding any activity that might hurt another person but also avoiding any activity that did not directly take care of someone.

Conclusion
The above mentioned five philosophical thoughts are nowadays of tremendous importance for the Chinese culture and business practices. The next paragraph will describe the most important values in Chinese society; the cultural dimensions of doing business in China and several aspects within the Chinese social network.

6.2. Chinese philosophical thoughts into Chinese values

It is important to understand the values described below, but one must recognise that these days younger people do not necessarily share the values of their elders. A discussion of values in Chinese society deserves a book in its own right. Here, a few of the most important ones are focussed upon.

5: Source: http://www.wsu.edu/~dee/CHPHIL/CHPHIL.HTM
6: Source: Ambler, T. & Witzel, M.; Doing business in China. London: Routledge, 2000
7: Source: http://www.wsu.edu/~dee/CHPHIL/CHPHIL.HTM

6.2.1. Age, hierarchy and authority[8]

Respect for tradition, ancestors and age, stemming from Confucius, were among the main values of people in old China. The hierarchical relations of a Chinese family were determined by age. The family was held responsible for the public acts of its members as part of their social pressure on each individual. Similarly, industrial workers in old China did not typically question higher authority or seek authority themselves. Authority in industry and business was viewed as an absolute right of owners and the managers in control.

6.2.2. Wealth[9]

The need for self-sufficiency traditionally bred a savings mentality. Money should be hoarded: if times were good now, they were likely to be bad later. The culture required even the rich to pretend to be poor. Inside China, the first-class cabin is likely to contain only the occasional Western business person. Outside China, first-class air travel is taken by some who cannot afford it but must be seen to do it. Warning: do not be taken in by appearances.

6.2.3. Face[10]

The pervasive Chinese concept of gaining, giving or losing "face" focuses on questions of prestige and dignity, reflects surprising vulnerability in self-esteem. The importance of this concept can simply be derived from one of the "Five Classics, The Book of History and Rites". The Chinese are acutely sensitive to the regard in which they are held by others or the light in which they appear. Chinese courtesies have always been formal and follow strict rules, although sometimes Chinese people in public places seem to be impolite according to Western norms in public places. To properly understand the Chinese, certain concepts should not be ignored:

6.2.3.1. "Mianzi" → Face value[10]

The idea of shame, usually expressed as 'face' could be loosely defined as the 'status' or 'self-respect' in Chinese people and is by no means alien to foreigners. To lose face is the worst thing that can happen to a Chinese person. Therefore: Never insult, embarrass, shame, yell at or otherwise demean a person, since all these actions would risk putting a Chinese person in a situation that he might lose face. Neither try in public to prove someone wrong, or shout at him. In order to get a successful effect without letting a Chinese lose face, any criticism should be delivered privately, discreetly and tactfully, or else, the result will be just the opposite to what one wishes. The Chinese concept of sincerity is the opposite of the Anglo – American, in that the Chinese believe that they can manifest sincerity only by adhering carefully to prescribed etiquette, whereas Westerners believe that etiquette obscures truth. "Giving face" is also closely connected with ***guanxi*** which will be described in Paragraph 6.2.3.

6.2.3.2. "Lianzi" → Confidence of society in a person's moral character[10]

Lian is the confidence of society in a person's moral character, while mianzi represents social perceptions of a person's prestige. For a Chinese person the maintaining of face is important within social relations because face translates into power and influence. A loss of lian would result in a loss of trust within a social network, while a loss of mianzi would likely result in a loss of authority. To illustrate the difference:

> *"Gossiping about someone stealing from a cash register would cause a loss of lian but not mianzi. Repeatedly interrupting one's boss as he is trying to speak may cause a loss of mianzi but not lian"*

When trying to avoid conflict, Chinese in general will avoid causing another person to lose mianzi e.g. by avoiding to bring up embarrassing facts in public. Conversely, when challenging authority and another person's standing within a community, Chinese will often attempt to cause a loss of lian or mianzi.

8: Source: Ambler, T. & Witzel, M.; Doing business in China. London: Routledge, 2000
9: Source: Ambler, T. & Witzel, M.; Doing business in China. London: Routledge, 2000
10: Source: http://en.wikipedia.org

6.2.3.3. *"Keqi" → Polite, well mannered, modesty*[11]

Keqi not only means considerate, polite, and well mannered, but also represents humbleness and modesty. It is impolite to be arrogant and brag about oneself or one's inner circle. The expression is most often used in the "sense of denial", as in buyao keqi, meaning "you shouldn't be so kind and polite to me," or "you're welcome."

Anyway, Chinese seldom express directly what they think and they prefer a roundabout way to let other people know. Neither do they like showing their emotions and feelings in public. They rarely greet people with a handshake, even though it is very popular among foreigners, to say nothing of embracing or kissing when greeting or saying good-bye. Consequently, as a Westerner it is better not to behave too carefree in public, even though you may be well – intentioned.

6.2.4. Social relations[12]

The Chinese social relations can be derived from the philosophical thoughts of Confucius and Mencius. These relations are social relations typified by a reciprocal social network. Often social obligations within the network are characterised in familial terms. The individual link within the social network is known by ***guanxi*** and the feeling within the link is known by the term ***ganqing***. Social relations are often expressed by the exchange of gifts. Unlike other societies, the Chinese tend to see social relations in terms of networks rather than boxes. Hence, people are perceived as being "near" or "far" rather than "in" or "out".

6.2.4.1. *"Guanxi" → Relationship with people*[11]

Throughout much of Chinese history, the fundamental glue that has held society together is the concept of guanxi, relationships between people. It is very important for the Chinese to have good relationships. They often regard good social relations as a symbol of personal ability and influence. Someone who has no connections would be despised and is only half-Chinese.

Guanxi describes the basic force that holds the personalised networks of influence together. It has always been a central concept in Chinese society and describes a personal connection between two people in which one is able to prevail upon the other to perform a favor or service. The two people need not be of equal social status. It could be a network of contacts which an individual can call upon when something needs to be done, and through which he or she can exert an influence. The term is generally not used to describe relationships within a family, or terms which are defined by bureaucratic norms (vertical relations due to Confucius). The relationships formed by guanxi are personal and not transferable.

> *"Business may flow out of friendship whereas, in the West, friendship may flow out of business"*

It has been extensively studied and described in studies of Chinese economic and political behavior, and sociologists have linked it with the concept of social capital. A closely related concept is that of ganqing or feeling which reflects the depth of feeling within an interpersonal relationship.

6.2.4.2. *"Ganqing" → Feelings*[11]

Ganqing is an important concept in Chinese social relations which is loosely translated as "feeling" and is related to the concept of guanxi. Ganqing reflects the tenor of a social relationship between two people or two organisations. One can speak of having good ganqing meaning that two people have a good rapport or deep ganqing, i.e. meaning that there is considerable feeling within a social relationship.

The term ganqing is often seen in Chinese government comments, and is often mistranslated when used in this context. Often one will see a statement that an action "hurts the feelings of the Chinese people." This statement is better translated as an action that "disturbs the relationship with the Chinese people." When used in this context the

11: Source: http://en.wikipedia.org
12: Source: Ambler, T. & Witzel, M.; Doing business in China. London: Routledge, 2000

statement is actually implicitly threatening, in other words: that should the action continue, the existing cooperation would not be forthcoming in the future.

6.3. Strategy[13]

"Strategy", as most business school students learn at some point, means almost anything anyone wants it to mean. The word is often confused with planning and with marketing. In China, the idea that one can lay out strategic moves, step by step, in some pre – planned sequence is even more unlikely than elsewhere. But that does not mean that Chinese businesses do not think strategically. Quite the reverse, one main aspect will be considered: strategy as warfare.

Business strategy as warfare

As the people who led the army during war and the government administration during peace were frequently the same people or drawn from the same circle, the same strategic management principles were applied in peace and war. The chief of material for strategist theorists was **Sun Tzu**. According to him, the supreme aim of war was "*not to win one hundred victories in one hundred battles*", but to "*subdue the enemy without fighting*". In competition either in politics or business, strategy should be aimed at disposing one's resources in such an overwhelming fashion that the outcome of the contest is determined before it gets started.

> *"Strategy is the great work of the organisation. In situations of life or death, it is the Tao of survival or extinction. Its study cannot be neglected."*
>
> *Examination of the plan with Five Working Fundamentals is necessary:*
> - *The first is Tao*
> - *The second is Nature*
> - *The third is Situation*
> - *The fourth is Leadership*
> - *The fifth is Art*

6.4. Summary

China is not a unitary whole but is a number of vastly different regions, each with its own sub-culture and its own language or dialect. It has a long and eventful history and a rich culture of which its citizens are justly proud.[13] History and culture are very important to the Chinese. History in particular exercises a powerful influence over thinking and behaviour. China is also rich in terms of philosophical traditions and modes of thinking. Many of these share common features.

The three paragraphs which have been described in this Chapter considered the main important Chinese aspects. Chinese thoughts based on philosophical grounds can be translated in values for Chinese people. The importance of social network and strategy has been briefly described. Not only is China a country with a total different language and mentality, the way of thinking, understanding of certain contexts and emotional perception of issues are also totally different from the practice in Western countries. What are in concrete terms the differences in thinking? How can these gaps be bridged? And what are the experiences of Dutch principals in the collaboration with Chinese parties? An answer to these questions may be found in the Chapters to come.

13: Source: Ambler, T. & Witzel, M.; Doing business in China. London: Routledge, 2000

7. Management Decision-Making Criteria (Box 7)

This Chapter is the third fundamental part of the thesis. In this Chapter not only decision criteria from literature study of different levels are discussed, but also the point of view of commercial clients in relation to decision criteria and practical experiences are considered. (See Figure 7.1) After the presentation of criteria on both levels, at both these levels, a select group will be highlighted fur further research and explanation in the coming chapters. On the one hand, the specific meaning of the criteria itself will be given and on the other hand the relationship between the first and second level are a point of interest. Finally a conclusion of this chapter will be given.

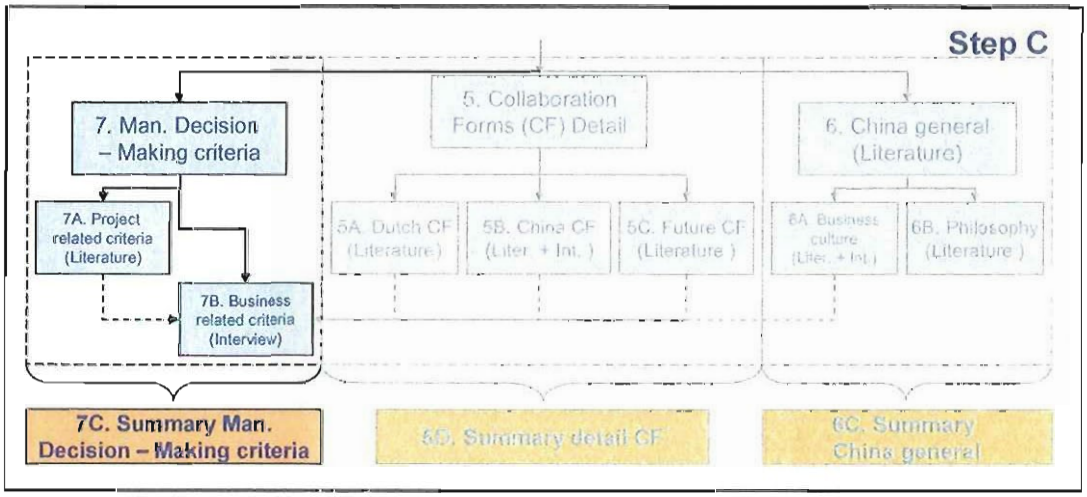


Figure 7.1: step C: management decision-making criteria

7.1. Management decision-making criteria based on literature study

During the collaboration process several decisions or choices have to be made in order to arrive at a desired collaborative form. This decision or choice can be either of cooperative (1st level) or of project nature (2nd level).

7.1.1. First level (Organisational – decision)

Cooperation nature: several parties in the cooperation process have the same intention and purpose in the realisation of a construction project. The aim on this level is to create a sound and trustful business relationship between the cooperating parties. Important aspects on this level are presented in Table 7.1.

First level cooperation aspects	
1. Trust in involved parties	5. Past Performance of considered parties
2. Openness and Transparency	6. Sustainability in collaboration
3. Flexibility in collaboration	7. Ethical awareness from both sides
4. Cultural fit from both sides	8. Predictability of parties

Table 7.1: cooperation aspects[1]

7.1.2. Second level (Outsourcing – decision)

On the second level three kinds of main groups can be divided where different aspects can be of influence in the collaboration process:

1: Aspects are gathered during various literature study in collaboration contract forms as well as management books.

- **Outsourcing aspects:** more or less the same aspects which are considered in the first level cooperation nature are also valid in this part. During the outsourcing process, parties also seek for business collaboration. Only the degree of meaning of these first level aspects, are less important on this second level. The main reason for this difference lies in the final responsibility and liability for the principal. At the end the principal will remain responsible for the project to be realised at this level.

- **Principal aspects:** from the point of view of the principal or the company, also a list of important aspects can be considered. These aspects are related to the managerial skills, capabilities of the company and their willingness to take risks. (See Table 7.2)

Second level principal aspects	
1. Certainty of involved parties and project	8. Influence & flexibility within the project
2. Manageability of the project	9. Early involvement of contractors
3. Posibility for quality control	10. Independancy of third parties
4. Responsiblity and liability of project risks	11. Market and Political risks
5. Risks allocation to the principal and contractor	12. Change in the environment
6. Expertise within principal	13. Customer satisfaction – product
7. Better evaluation of client's need	14. Customer satisfaction – service

Table 7.2: principal's aspects[2]

- **Project aspects:** on the level of a construction project, five fundamental basic aspects can be considered; Time, Money, Quality, Information and Organisation. (See Tables 7.3 to 7.7) Besides of these five, other aspects may also be taken into account and are grouped together as general. The different criteria within these aspects are often translated into risks. Risks may than be allocated and managed to the party which the best is in controlling them. In the tables shown below, there are also some cursive bold criteria's, these criteria's represents the developments in the construction industry nowadays.

7.1.2.1. *Time*[2]

Second level project aspects: TIME	
1. Time pressure on a project	6. Shortening of cycle time in preparation and construction
2. Integration of design & Build	
3. Possibility for changes during the project	***7. Value – Benefit – Cost model***
4. Fixed contractual matters related to time delivery	***8. Total Life Cycle***
5. Chain integration to shorten the project time	***9. Integrated supply chain***

Table 7.3: project aspects: TIME

7.1.2.2. *Money*[2]

Second level project aspects: MONEY	
1. Budget pressure on a project	***5. Quality / price proportion***
2. Price certainty in an early stage	***6. Integration of Cost Control System***
3. Management of risks and costs	***7. Life Cycle Financing***
4. Sharing risks and reward	***8. Sharing savings instead of lowest price***

Table 7.4: project aspects: MONEY

2: Aspects are gathered during various literature study in collaboration contract forms and also management books.

7.1.2.3. Quality[3]

Second level project aspects: QUALITY	
1. Competence & capacity in designing	***7. Dynamic control of the process***
2. Competence & capacity in maintenance	***8. Off – site manufacture***
3. Competence & capacity in exploitation	***10. Value engineering***
4. Standard methods for construction	***11. Quality of life***
5. Repetitiveness of works	***12. Sustainable features***
6. Complex processes or construction method	***13. Continuous improvement***
	14. Management of risks and costs

Table 7.5: project aspects: QUALITY

7.1.2.4. Information[3]

Second level project aspects: INFORMATION	
1. Project scope	5. Experience shared during project
2. Frozen project definition	6. Project management process
3. Level of detail in project definition	7. Contracting and procurement
4. General information / workload	8. Interested party in the life cycle

Table 7.6: project aspects: INFORMATION

7.1.2.5. Organisation[3]

Second level project aspects: ORGANASATION	
1. Resources – personnel and equipment	***5. Member commitment***
2. Quality assurance	***6. Structured system for planning***
3. Financial position of contractors	***7. Human and organisational relationships***
4. Site visit for better project understanding	

Table 7.7: project aspects: ORGANISATION

7.1.2.6. General

In the context of the general aspect group, two aspects have more and more attention in the recent decennia; Safety & Health and Technology. The quality of life becomes more interesting than the quantity of life, this result in the rising attention for safer and healthier environment during and after the construction. The other aspect is related to the globalisation and internationalisation of people's focus. To be able to continuously create added value in one's own market, innovation in technology and processes are needed. The criteria which play a major role within these aspects are given in Table 7.8.

3: Aspects are gathered during various literature study in collaboration contract forms as well as management books.

Second level project aspects: GENERAL	
Ø Safety & Health	Ø Technology
Pre – planned	Collaboration and supply chain management
Well designed	Smart / intelligent buildings & infrastructure
Use processes chosen for safety	Innovation in design and constructioning
Carried out by a competent, trained workforce	Easy to understand (accountability and tracebility)
Construction safety	Ambition level / open for alternatives
Systems safety	Summary of volume / features of shapes and goods (data linkage)
	Production technology reform

Table 7.8: project aspects: GENERAL[4]

7.2. Management decision-making aspects based on interviews

With the available information form Chapter 5, 6 and 7.1, a questionnaire was made in order to be able to take an interview with commercial clients about their experience with the realisation of construction projects in China. The purpose of these interviews was to create a list of main important criteria which are considered in the process to arrive at a building contract form, particularly focussed on the collaboration with Chinese contractors. Several criteria and aspects as described above are dealt within the decision-making process. At different levels in an organisation, criteria and aspects can be split up in organisational and project aspects.

Not only are the criteria and aspects important. The relations between these factors and the degree of importance should be considered as well. Also the gathered information is analysed and structured. Combined with the characteristics of existing and expected future building contract forms, a conceptual decision-making model for project building contract forms will be realised in Chapter 8 and 11. An overview of the taken interviews with commercial principals can be found in appendix G.

The general sequence of the questionnaire can be seen as follow:

- How is a construction project initiated and what is the scope of a project?
- Who are the several parties involved in the different project phases?
- What are important project aspects from the point of view of a principal?
- What kind of building contract forms and reimbursement systems are used?
- What are important cooperation aspects in doing business from the point of view of a principal?
- How to handle project- as well as collaboration aspects?
- What are the developments & innovations towards the construction processes and methods?

Eight interviews have been taken with international companies in the market sectors; chemicals and pharmaceuticals (3), food and beverages (3) and industrial products (2). Two interviews have been taken with international consultancy companies who advise principals or clients in doing business in China. An assumption is made that the taken interviews provides a general overview in which principals collaborate in international context, mainly with the Chinese. It should be noticed that consultation of literature study is a necessity to form a global picture of the main processes. Later on in Chapter 9, a special part will be divided on cross – cultural management.

1. **Project initiation + scope: projects are often initiated on:**

   - ***Business Unit level:*** request for expansion of existing plants or new plants is often made as a result of market circumstances / studies which directly relate to the growth prognosis of a business unit

   - ***Corporate level:*** corporate strategy to expand and broaden the business opportunities worldwide. This will often lead to expansions of existing plants, but also totally new plants in other branches will be realised

4: Aspects are gathered during various literature study in collaboration contract forms as well as management books.

Figure 7.2 presents some characteristics of an industrial construction project.

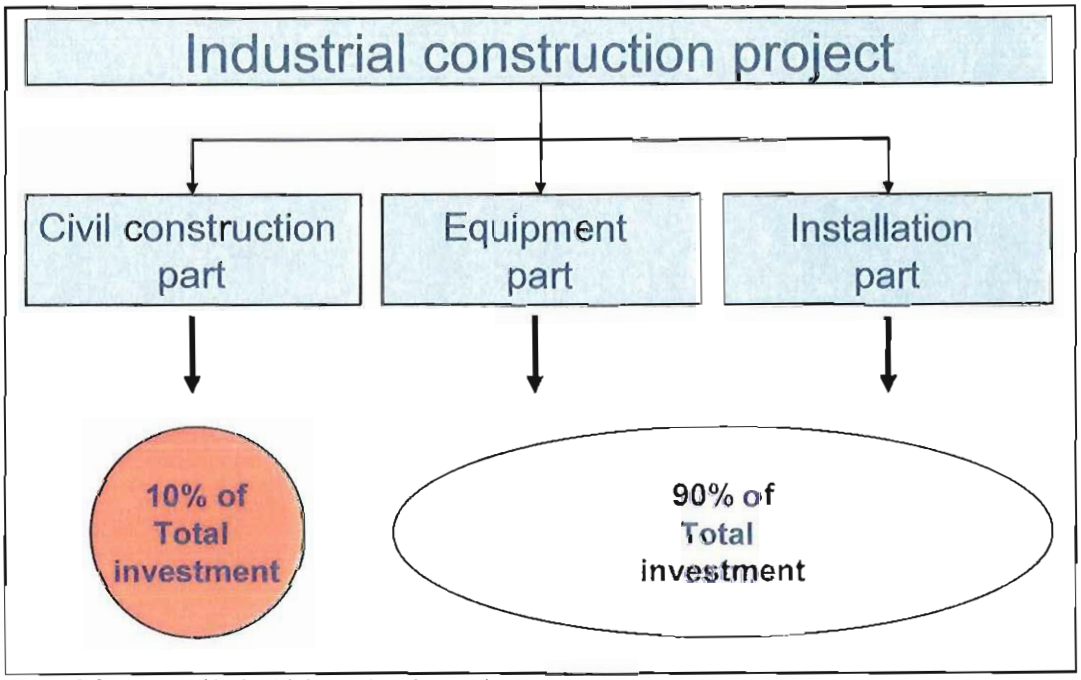


Figure 7.2: scope of industrial construction projects

An industrial construction project mainly can be divided in three construction parts:

- ***Civil construction***: this part may often be seen as the box / housing round the plant to be realised. It often contains simple design and construction methods. In the considered markets, the investment value represents a small part of the total investment. The main reason can be assigned to the complex processes and equipments to be build. It requires special attention comparing with the civil part.

- ***Equipment construction***: this part contains the design and construction of the equipment needed for the production processes. Not only equipment machinery, also the design and construction of infrastructure inside the plant is considered in this part.

- ***Mechanical and electrical installation***: inside the manufacturing plants, lots of time is spent on process engineering, a product have to past certain production processes from raw material towards the distribution to warehouses. After this design phase is done, all the components have to be installed and connected to each other in the mechanical and electrical installation phase.

2. Parties involved in several project phases

Project phase	Activity done by
1. Initiative phase	Often done by Business Units or Corporate level
2. Definition phase	Feasibility, process & market studies. Start up assessment. All still done within the organisation
3. Engineering phase	Conceptual, Basic & Detail engineering. It depends on the expertise, know-how & relevant experience within the organisation which of these engineering parts will be outsourced to an external party. In case of a joint venture partner in China, the project phases engineering, procurement, construction and operation & maintenance can be managed by the joint venture partner

4. Procurement phase	A part of the procurement activities directly related to the core business is often done internally. These activities are more or less similar and repetitive for existing as well as new production plants.
5. Construction phase	The organisation itself has its project managers during the project. Construction and construction management is done by an external party.
6. Operation & Maintenance phase	Operation (exploitation) is done within the organisation Maintenance is done by an external party

Table 7.9: activity and parties in several project phases

3. **Important Project aspects:** during the interviews, the presented project aspects in Table 7.10 are considered to be important.

Project aspects by principal	
	6. Prequalification of contractors:
1. Health, Safety & Environment during and after project	*1. SHWE issues*
2. Quality of the delivered project	*2. Experience*
3. Within Time should the project be realised	*3. Certificates*
4. Money - lowest price or balance between aspects	*4. References*
5. Risk management	*5. Financial position*
	6. Local presence

Table 7.10: Important project criteria by principal

4. **Building contract forms & Reimbursement systems:** table 7.11 presents the forms and systems used in two possible ways.

Collaboration contract forms and reimbursement systems	
Principal with western contractors	*Principal with Chinese contractors*
EPCM (reimbursable + incentive)	EPC
Lump Sum Turnkey	Design and Build
Engineering (fixed price)	Traditional tendering
Design and Build	Lump Sum Turnkey
Construction Management (cost plus with celling)	

Table 7.11: building contract forms and reimbursement systems

5. **Important cooperation aspects:** table 7.12 gives the general and international cooperation aspects which are of importance when doing business in China.

Cooperation aspects by principal	
1. Trust / belief / feeling about partner	9. International issues:
2. Openness and Transparency	*Be aware of cultural differences*
3. Predictability of project and partner	*Language barrier*
4. Controllability of project	*Intellectual property*
5. Respect to all parties	*Interpreter in the right industry*
6. WIN – WIN situation	*Local knowledge required in design and realisation*
7. Pleasure in the activity to do	*Lot of effort to bridge the cultural gap*
8. Stakeholders opinion	*Costs / quality perception is different from Western*

Table 7.12: Important cooperation criteria by principal

6. **How to handle project- as well as cooperation aspects**

From the point of view of a Dutch principal, often project related aspects are translated into a contract. Four main aspects are considered the most important. In the first place, SHWE (Safety, Health, Welfare and Health) issues followed by Quality, the costs of a project and the duration of it. Quality of life plays more and more an important role during and after a construction project. In most interviews Dutch principals aims to balance the aspects of quality, money and time. In other words, a project should deliver a certain scope, within a certain budget realised in a certain time span. These three aspects will be derived into risks, responsibilities and liabilities.

Two collaboration possibilities can occur for the Dutch principal. Actually, there is a third one which is discussed in a later chapter. The first possibility is a collaboration between the Dutch principal with a Western contractor. Briefly the collaboration process can be split in:

- Define project scope
- Define requirements and conditions for the contractor to be selected
- Selection of contractor is based on prequalification (track record, experience, reference etc.)
- Trust, openness and transparency are important and all agreed conditions are translated in a contract

In the second possibility the Dutch principal collaborates with a local Chinese contractor. Not only will the mentioned elements be taken into account, extra attention is paid to:

- The extra effort needed to manage a project
- A good interpreter, not only to bridge the language barrier, but also with un understanding of the construction market and both cultures

- **If one of the two mentioned aspects is missing, a project will be unpredictable, and uncontrollable risks will occur.**

7. **Developments & innovation**

Dutch principals are generally spoken not engaged with the developments and innovations of the construction industry, particularly the civil engineering sector. Only a few of them have noticed the recent developments and sometimes a contractor will propose "new" innovations in the construction methods, but in most cases the innovation is related to the civil part of the construction project, while the equipment and installation part are the most important. Although developments and innovations are not of primary interest, when an opportunity occurs to reduce costs or construction time, Dutch principals are always interested to look at the possibilities.

7.3. Summary

Besides the theoretical founded aspects towards projects, practical experiences from Dutch principals have also been consulted in this chapter on international cooperation and project level. Overviews of aspects which are of main importance within a construction project have been considered. Some of these aspects have passed this report for several times, such as: trust, openness, transparency, predictability, others are new in context. Several main criteria and aspects will be taken into account for further detail development. Only criteria and aspects which are related to existing building contract forms will be considered.

The first level criteria (cooperation level) have to deal with abstract aspects which often will be considered in strategic management decision-making. The second level criteria (mostly project related) can mostly be divided in Time, Money or Quality and quantified in risks. It can be noticed that the characteristics of the building contract forms can be divided and separated in the same basic groups. Besides these two levels of criteria, the international dimension with its own aspects has also been taken into account in the decision-making process. Is it possible to create a Western project support tool which will guide the principal to the best fitted building contract form? And to what extend will the two levels influence each other and how will the international dimension be involved in decision-making? These are questions which will be examined in the next chapters.

8. Processes researched for support tools (steps D & E)

Until this part of the report, three fundamental pillars have been discussed. First of all, a detail overview of characteristics of existing building contract forms and their developments were given. Also an approach to divide the considered contract forms in groups has been discussed. Secondly a side-step was made to the philosophical and cultural issues related to China. Not only is China rich of history, it also has a total different way of thinking. Finally the main important aspects in management decision-making based on literature study and interviews have been taken into consideration.

From these three chapters, three processes can be parallel researched. (See Figure 8.1) First, a Western Project collaboration support tool, this research field is a derivation from the Chapters 5 and 7. Aspects taken into account are mostly based on project and building contract level. The functional description of this conceptual model is given in paragraph 8.1. On the second place, research will be done in the fields of management decision-making, for Dutch people in The Netherlands as well as for a Dutch people in China. This is a derivation from all three chapters. As a result from Chapters 6 and 7, the final third part will examine the possibility and approach to merge different ways of thinking in doing business.

The functional description of the Western project collaboration support tool will result in a conceptual model (***Quick TEB Toolkit***) considering project related aspects. One part of the management decision-making research field will result in a Western business collaboration support tool (***Quick TEB ROAT***) considering business cooperation aspects. The other part will flow into the business cultural merge. Due to this merge, an extra dimension will be added to the Western business collaboration support tool (***Quick TEB ROAT - China***). Both support tools will finally be tested and evaluated.

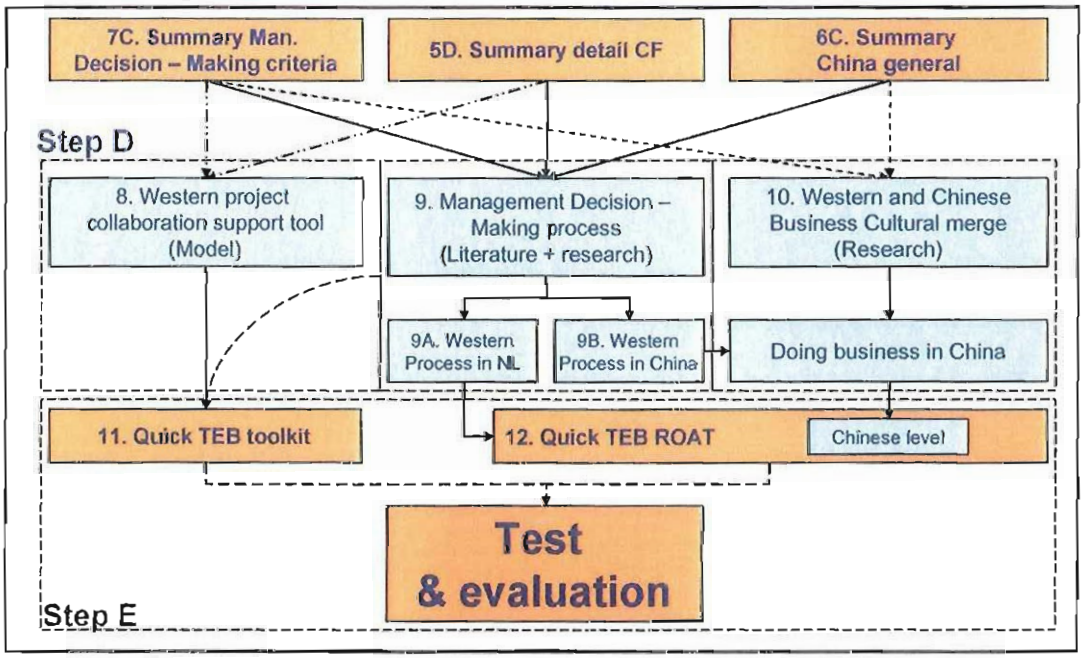


Figure 8.1: step D: processes research for management decision-making support tools

8.1. Western project collaboration support tool (Box 8)

The intention of this Chapter is to define the functional scope of a Western project collaboration support tool[1]. With this tool, it should be possible for the Dutch principal or consultant and engineering company to logically arrive at a building contract form due to given project criteria. Important aspects on project level have already been discussed in the previous Chapters. With the expertise and experience from Tebodin employees and literature study, a set of important criteria categorised in certain groups can be stipulated.

8.1.1. Introduction approach

Before the functional design can be explored, several choices have to be made. Often the project definition phase is done by the principal itself. Hereafter, a selection of main aspects should be done, aspects which have a direct influence in the different project processes. The second step is to define what the main criteria are within each aspect. The criteria should be formulated very concretely in order to be able to compare them in the next step with the characteristics of the building contract forms. In the comparison stage, the criteria are examined whether they have positive or negative influence for the different project processes. Finally in step four the possibility of a weighing procedure between the main aspects will be added in this functional design. The functional design will than be translated in a practical project collaboration support tool in Chapter 11. An overview of the different steps is given in Figure 8.2.

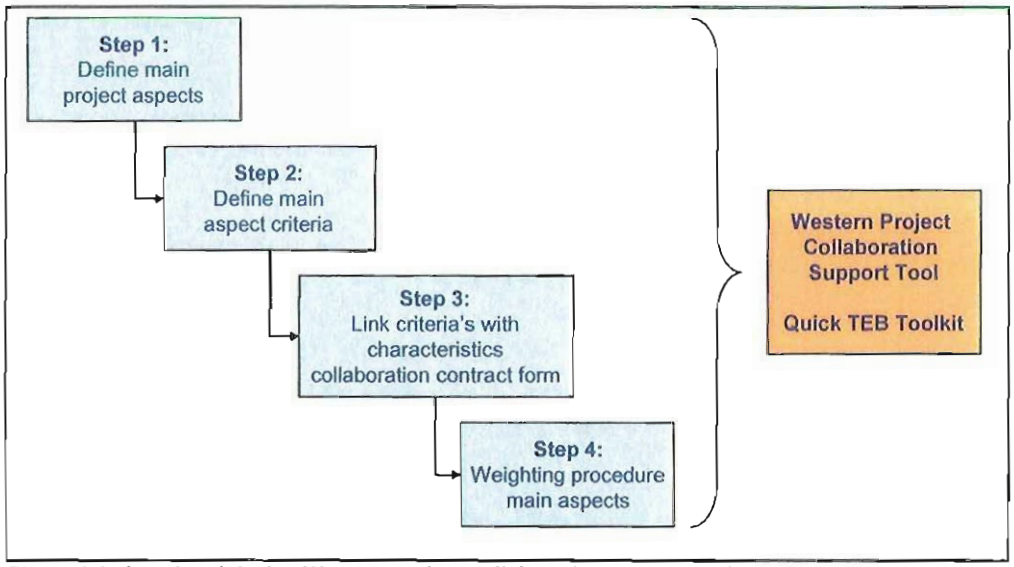


Figure 8.2: functional design Western project collaboration support tool

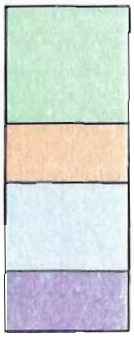
8.1.2. Main aspects of building contract forms

Appendix E provided a detailed overview of the considered building contract forms. However each of them is presented individually, an analysis of common area for a comparison still has not been done. Again, what were the main points of a building contract form?

- **Characteristics, Advantages & Disadvantages:** all of them indicates the relation of the form towards the aspects Time, Money, Quality and Organisation
- **Risk profile:** each form has a certain profile towards risks on several levels, not only are there risks in relation to the project it self, also the environment and the organisation plays a certain role.
- **Relationships between parties:** generally in a contract, relationships, both contractual and functional, are defined between the contracting parties. The matter how intricate these relationships are has a certain impact on the project
- **Position in the Building processes:** each form can be categorised in a certain group which represents the involvement of the contracting party in several project phases.

1: Review of "Ballenbak" of Royal Haskoning is done in the orientation phase in the setup of the Quick TEB Toolkit

Important aspects towards the organisation and project have been discussed in Chapter 7. When both the important criteria and main aspects of building contract forms are compared, common resemblances which can be indicated by each form can be divided in the following four main criteria. They all are considered from the principal's point of view and have direct influences in each other.



- **Risks:** *to which party can certain risks be allocated?* The described aspects towards Time, Money, Quality and Organisation can partly be translated into risks. Two groups can be separated like in the decision-making process, the first one is in relation to the organisation, while the second one is related to a project.
- **Flexibility:** *how much flexibility does the principal want in the project?* Within each project, the flexibility is defined by the different role and relationships between the parties.
- **Influence:** *how much influence does the principal want in the project?* The matter of influence and flexibility is dependant from the complexity of the macro economic aspects and the company's internal strategy.
- **Complexity:** *how complex is the project towards the principal?* The level of complexity can be categorised in organisational, technical and environmental issues.

As it was indicated in Figure 5.4, risk is a derivation of the combination of responsibility and liability, whereas the task and authority stipulates the level of responsibility. In order to be able to manage and control tasks and activities, key elements such as flexibility, the matter of influence and complexity are needed in the decision-making process. Each of them is considered more in detail and sub criteria of it will be concretised in the paragraph below.

8.1.3. Sub criteria within each key element

Together with internal expertise of Tebodin, a set of most important sub criteria have been deployed. During the deployment stage, the pros and cons of a sub criteria is based on actual ness and relative judging possibilities towards a building contract form. Table 8.1 gives an overview and description of the sub criteria.

Criteria group	Sub criteria	Description sub criteria
Risks		
General	**Possibility to cast off responsibilities to one contracting party**	A project consists of several phases. (Design, engineering, construction, maintenance etc.) Within each phase, the principal has to deal with certain risks. (Financial, operational, organisational etc.) This criterion considers the principal's possibility in casting off responsibilities to one contracting party.
	Possibility for fixed prices in an early stage	This criterion mainly can be seen in two fields. On the one hand, a fixed price for each task instead of a reimbursable system (costs per hour), while on the other hand, a fixed price for a large scope of activities within a project. (For example, a fixed price for design & engineering etc.) In this context, the second meaning is considered important towards the building contract forms.
Project	**The need of a financial third party**	To what extend is there a need for a financial party. Usually a third financial party might be interesting in large complex projects with a long construction and execution time. (This is often used in partnership between public – private or private – private)
	Degree of Price / Quality ratio instead of lowest bid	In general, most projects are tendered on the lowest bid by the tendering parties. Contractors only consider their own part in the project chain. There is no integral attention for the whole project cycle, which eventually results in a higher project price for the principal With this criterion, the principal can choose for a good balance in the Price / Quality proportion instead of the lowest bid.
Flexibility		
Organisational	**Possibility to make changes during projects phases**	Unfortunately an integrated contract not only has benefits. Due to the integration of project phases, a lot of agreements and activities have been fixed in the building contract form. This fixation has impact on the flexibility of the project. Certainly in the case of external influences. (Example: sudden change in political situation systems will negatively affect integrated contracts like turnkey)

	Possibility to make decisions per project phase	This criterion is a further deepening of the previous criterion. Not only is it sometimes important to be able to make certain changes during a project, to what extend should some changes be decided by the principal it self? Or can it be coordinated by engineering contractors? Engineering contractors have the ability to adapt changes during a project but not the fundamental decision towards a project. (Example: when internal changes within an organisation is expected, change of management / strategy, the flexibility to be able to make fundamental changes and decisions are important)
	Possibility to tender in different phases	Sometimes a principal can decide only to collaborate with one contractor for several project phases. However in many cases, it is preferred to tender in a competitive environment with several subcontractors. The matter of important ness of this is considered in this criterion
Influence		
Organisational	**Degree of involvement within the project phases**	The important ness of the involvement on the principal's side has to deal with the expected changes within a project.
	Degree of involvement of own knowledge in a project	In the case of complex processes within a construction project, for example an industrial plant, the principal prefers to have influence and involvement in the project and contribute to the project based on own knowledge and expertise.
	Degree of influence to select the contracting parties	This criterion considers the degree of influence a principal wants to have in the selection procedure of a contracting party, sometimes preceded with a pre qualification. It depends on the time and organisational aspects whether a principal considered this criterion important or not.
Complexity		
Organisational	**The need of experience and capacity to manage the project**	The matter in which a principal is capable to manage its own project is directly related to the building contract forms. The more time and capacity a principal has to manage the project, often the more willing he / she is to carry risks and separate project phases.
	Possibility to combine knowledge of contracting parties	A situation can also occur that on the one hand a principal do not want to integrate project phases within one contractor, but on the other hand an integrated solution is preferred. The difference between these two lies in the contractual and functional relationships between involved parties. Engineering contractors have the ability to manage and coordinate integrated activities, while the principal keeps its influence and flexibility
Technical	**Openness for alternatives and creative solutions**	To what extend is their clearance for technological and creative solutions. Often in projects with a long project life cycle it is recommended to come up with solutions covering the whole project life cycle.
Environmental	**Degree of influence of third parties towards the project**	What is the possibility, a third party will have direct or indirect influence in a project? Issues like site property, cultivated environment, public interests etc. plays a major role in the determination of this criterion.
	Degree of influence of market activities towards the project	What are the conditions of the market in which the project is to be realised. Development countries, economic zones, public or private destinations are issues which determines the complexity of the market environment. To the principal, it is important to know which building contract form will the best suits the local situation.
	Degree of influence of politics towards the project	More or less, this criterion is the same as the previous one. Instead of considering the market situation, this criterion deals with the political issues which can influence a project. For example, building permits & regulations. (Design Institutes in China)

Table 8.1: description of sub criteria for collaboration support tool

Main criteria and its sub criteria have been discussed, the next steps are to fill in the relative comparison between the considered building contract forms and the sub criteria, and to weigh the importance of each main and sub criteria towards each other.

8.1.4. Link between main criteria and building contract forms

To be able to make a comparison, a relatively quantitative assessment is needed. Each building contract form has to be weighed up against sub criteria. A scaling proportion is used. The contract form with the least contribution of a sub criterion will be numbered low, while the maximum contributed one results in a high score. The contribution to other contract forms is in between. The results are presented in Table 8.2.

Only available for internal Tebodin purposes

Table 8.2: quantitative assessment of sub criteria towards building contract forms

It should be noticed that the final results of the parameters has pass through several cyclic processes and evaluations. To be able to fill in the above shown values, an empty list have been distributed within Tebodin to several project managers as well as department managers related to building contract forms with each an own judgement. An evaluationi has been done and the result is presented in Table 8.2. Chapter 11 will consider the practical tool it self and the evaluation steps with existing past projects.

8.1.5. Score & weighing procedure

A conceptual functional scope is presented in order to be able to compare building contract forms and sub criteria. One can imagine that each principal has a different thought about the importance of main and sub criteria. To be able to indicate this, on the main as well as sub criteria, an extra dimension is added to the functional scope.

Both the main as well as the sub criteria should be relatively compared within its own group. Within each group, the total value should always be 1 or 100% because of a relative comparison. Each (sub) criteria can be classified in a scale of five values (0 to 4). This value indicates the degree of importance towards another within its group. Zero means not important and the value will linearly increase to its maximum of the value 4. This score and weighing procedure is presented in Table 8.3 and Table 8.4.

Mutual comparison of main criteria						
	Highly Important	Important	Neutral	*Un* important	Not Important	Weight
Risks	4	3	2	1	0	25.00%
Flexibility	4	3	2	1	0	25.00%
Influence	4	3	2	1	0	25.00%
Complexity	4	3	2	1	0	25.00%

Table 8.3: mutual comparisons of main criteria

Mutual comparison of sub criteria							
Risks		Highly Important	Important	Neutral	Un important	Not Important	Weight
General	Risk 1	4	3	2	1	0	20.00%
	Risk 2	4	3	2	1	0	20.00%
Project	Risk 3	4	3	2	1	0	20.00%
	Risk 4	4	3	2	1	0	20.00%
Flexibility							
Organisational	Flexibility 1	4	3	2	1	0	33.33%
	Flexibility 2	4	3	2	1	0	33.33%
	Flexibility 3	4	3	2	1	0	33.33%
Influence							
Organisational	Influence 1	4	3	2	1	0	33.33%
	Influence 2	4	3	2	1	0	33.33%
	Influence 3	4	3	2	1	0	33.33%
Complexity							
Organisational	Complexity 1	4	3	2	1	0	11.11%
	Complexity 2	4	3	2	1	0	11.11%
Technical	Complexity 3	4	3	2	1	0	11.11%
Environmental	Complexity 4	4	3	2	1	0	11.11%
	Complexity 5	4	3	2	1	0	11.11%
	Complexity 6	4	3	2	1	0	11.11%

Table 8.4: mutual comparisons of sub criteria

8.1.6. Summary

A description is given of a functional scope which forms the basis of the conceptual practical support tool, ***Quick TEB Toolkit***. A set of important sub criteria categorised in main groups have been deployed and described. On the one hand, a relatively quantitative assessment is made between the considered building contract forms and the sub criteria, while on the other hand an extra dimension is added towards the relative weighing within each group. The setup of a conceptual Western project collaboration support tool has been discussed, the next chapter will reveal the management decision-making process both in Western countries and China. At the same time, a technique to be able to handle cultural issues is described.

9. Management decision-making process (Box 9)

The previous chapter describes the Western collaboration process on project level, this chapter consider the abstract part of management decision-making. Not only will their be an attempt to understand the Western process of management decision-making, also management decisions made towards China are considered in two folds; the practical experience of Dutch managers and the theoretical approach by cross – cultural management. (See Figure 9.1)

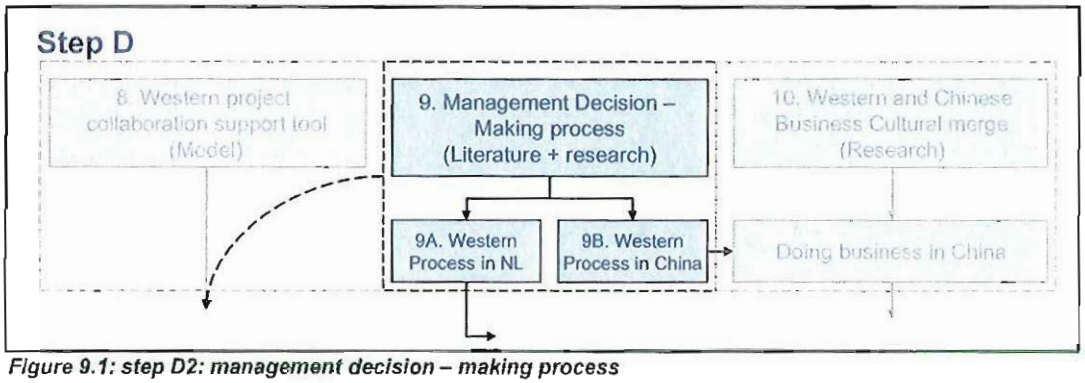


Figure 9.1: step D2: management decision – making process

This Chapter will play a major role in the developments of the second practical support tool. (***Quick TEB ROAT***) The Western part will result in a conceptual business collaboration support tool for management decision-making, whereas the Chinese (cross – cultural management) part will be merged in Chapter 10 together with the facts of Chapter 6, and forms the fundament of an extra dimension of doing business in China in the support tool. Before considering both mentioned part, an introduction is given towards successful strategy, which is a key element related to management decision-making, and strategy as decision support.

9.1. Successful strategy and strategy as decision support

Management decision-making both in Western or Eastern context is often related to a company's or people's strategy. No matter where a choice or decision has to be made, managers will try to understand and verify the impact of a certain decision towards the short, middle and long term period. Not only in the field of doing business, strategy is also related to most fields of human endeavour.[1] The difference lies in the way of thinking approaching the strategies and the supporting tools used in order to be able to make the decisions it selves.

In Chapter 6, already a small paragraph was spent on strategy which is an important aspect in China. The key components of successful strategies from the point of view of Western management books are clear goals, understanding the competitive environment, resource appraisal and effective implementation. A short explanation is given and the mentioned principles are illustrated in Figure 9.2. These principles are not new. Over 2000 years ago, **Sun Tzu**[2] wrote:

> ***Know the other and know yourself: Triumph without peril.***
> ***Know nature and know the situation: Triumph completely***

1: Source: Grant, R.M.; Contemporary Strategy Analysis. USA: Blackwell Publishing, 2004

2: Source: Trans. Wing, R.L.; Sun Tzu, The Art of Strategy: A New Translation of Sun Tzu's Classic 'The Art of War'. New York: Doubleday, 1988

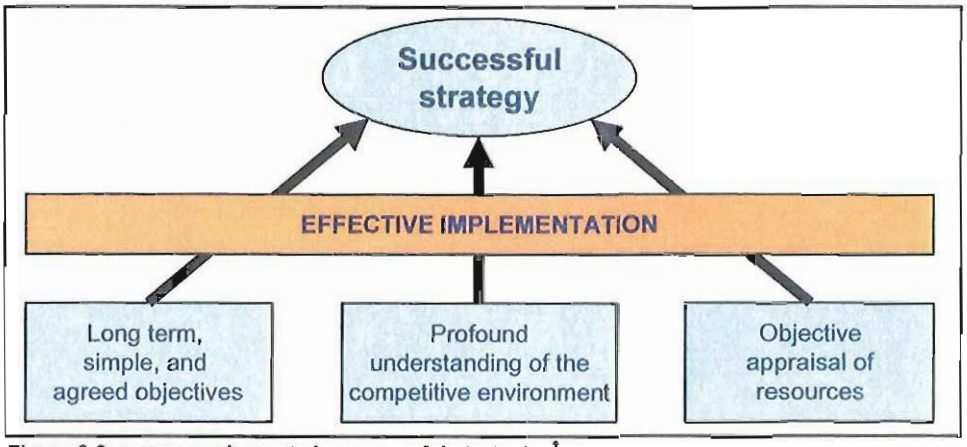


Figure 9.2: common elements in successful strategies[3]

To be able to have a successful strategy, a clearly recognised goal is needed over a substantial part of lifetime. A deep and insightful understanding of the competition area is a must. An effective exploitation of internal strengths, while protecting areas of weakness and finally an effective implementation is necessary.[3]

Bounded rationality – decision-making that is intentionally rational, but is constrained by human beings' limited search and information – processing capacity – creates the need for a strategy to establish a set of guidelines and criteria for how individual decisions will be made.[4]

The benefit to strategy is not just offering simplification and consistency to decision making; the identification of strategy as the commonality and unity of all the enterprise's decisions also permits the application of powerful analytic tools to help companies create and redirect their strategies.[3] This thesis report will not consider further analytic tools for strategy analysis, interested parties can consult the two literature references shown below.

9.2. Western decision-making process in the Netherlands

In paragraph 5.3, (re-) valuing constructioning, little attention was paid to risk management. Both from the interviews (external and internal Tebodin) and literature studies, it can be said that management decision-making is directly related to risks. Before the Western decision-making process is considered; a small introduction is given about risk analysis and risk management.

9.2.1. Risk analysis[5]

In the last decades, a strong increase of risks in construction projects can be noticed. This increase partly is due to the larger scale of projects and investments, a great variety of factors make it complex and uncertain. The need for risk analysis is rising and is particularly apparent when projects involve large capital outlays, fast changing technology and / or sensitive environmental or safety issues. Risk analysis can involve a number of approaches to dealing with the problems created by uncertainty, including the identification, evaluation, control and management of risk.

What the structure is of a risk analysis and how it can be defined is not the purpose of this thesis. However the interesting points are the benefits of risk analysis and its relation towards decision-making. These benefits[5] include:

- Better and more definite perceptions of risks, their effects on the project and their interactions
- Better contingency planning and selection of responses to those risks which do occur and more flexible assessment of the appropriate mix of ways of dealing with risk impacts
- Feedback into the design and planning process in terms of ways of preventing or avoiding risks
- Sensitivity testing of the assumptions in the project development scenario
- ***Insight, knowledge and confidence for better decision – making and improved risk management***

3: Source: Grant, R.M.; Contemporary Strategy Analysis. USA: Blackwell Publishing, 2004

4: Source: March, J.G. and Simon, H.A.; Organizations. New York: Wiley, 1958

5: Source: Sanders, F.M. & Verheijghe, R.J. & Boer, E. de; Infrastructure planning. Delft: TU Delft, course CT4701, January 2005

9.2.2. Risk management

In the process of risk management, managers first have to determine a risk management strategy and point of departure. Hereafter risks which directly or indirectly can influence the project have to be identified and analysed. Risks will be categorised in groups and parties who initiate or can best handle them. The next steps are to determine countermeasures and residual risks. At this point, founded decisions can be made in several project phases. Finally a risk management strategy should also be implemented, monitored and evaluated[6].

9.2.3. Decision-making

First of all, a note for the context of decision-making. In this thesis an assumption is made that the basic principles in decision-making between management decisions and "normal" decisions are more or less the same. One main element of management decision-making, which is in my opinion the main difference between management and "normal" decisions, is that the decisions made by managers are rationally explainable and well-founded for the possible topics. Decisions only based on emotions without rational thinking will not be considered sufficient.

No matter a decision is based on impulsiveness, casualty, carefulness, technical data, under social pressure, all good decision-making follow the same process[7]:

1. Understand the problem and goals clearly, provide someone to be able to consider a wide variety of alternative courses of action.
2. The creation of many possible solutions to the problem. One can't use an inventive solution unless it has been thought of.
3. Collect all the conveniently available information about the probable outcome of each course of action. See if there aren't synergistic ways of combining several promising solutions into potent solutions.
4. Weigh the positive and negative effect of each course of action (solution), and then decide on one that you can commit yourself to fully.

In case of decisions to be made based on business collaboration processes, managers have to deal with abstract aspects, thus like e.g. trust, transparency, openness. Whether it is possible, risks related to these aspects will be identified and quantified / qualified. Unpredictable, unforeseen or uncontrollable risks are added as an amount in terms of percentage to the price. Agreements and conditions are fixed in a legal contract and the collaboration process can start.

9.3. Decision-making process in China

9.3.1. Western decision – making in China as derived from interviews

More or less, the basic thoughts and procedures as it is written in Paragraph 9.2 can also be used in the collaboration process with a Chinese contractor. Although the basic Western thoughts are leading, some other interesting aspects can be derived from the interviews. In Chapter 7, an overview was already given of important aspects which should be considered when a project is to be realised in China. Once again the international aspects to be considered are presented in Table 9.1.

International criteria by principal	Description
Cultural differences:	Cultural differences embrace issues such as e.g. habits, thoughts, history.
Language barrier:	A lot of Chinese people have bad communicating skills in the English language. Although people are getting more familiar with the international language, it still is a big problem to communicate.
Intellectual property:	Often processes within the industrial plants are of high-end technologies. As it is often written, Chinese people are very keen in duplicating e.g. products, technologies. Intellectual property is an important issue Dutch principals have to consider.
Interpreter in the right industry:	Not only is the language a barrier for doing business in China, also the interpretation of certain words and sentences and their thoughts differ. A

6: Steps of Tebodin's risk management approach

7: Source: Tucker – Ladd, C.E., Psychological. http://www.mhnet.org./psyhelp/.

	good interpreter is needed in the right industry.
Price / quality:	The price / quality ratio also differs as a result of differences in quality standards and procedures.
Local knowledge:	Sometimes it is not possible to do business without the support or involvement of a local Chinese party, a good example is in the detail engineering phase. Detail engineering has to be outsourced to a local design institute assigned by the government.
Lot of effort to bridge the cultural gap:	T be able to bridge the cultural gap, from the Dutch principal sides, a lot of effort is required in order to realise a "successful" project.

Table 9.1: important international criteria by Dutch principals

How do Dutch principals deal with such criteria? A conclusive summary of the taken interviews is given below, for a detail result of the interviews; see appendix G. Basically two different types of approaches can be used:

1. Dutch principal collaborates with Dutch advisor who bridges the cultural gap between The Netherlands and China
2. Dutch principal cooperate with its Chinese Joint Venture partner who manage the industrial construction project (2A) or Dutch principal directly collaborate with a Chinese contractor (2B)

Both approaches are visualised in Figure 9.3.

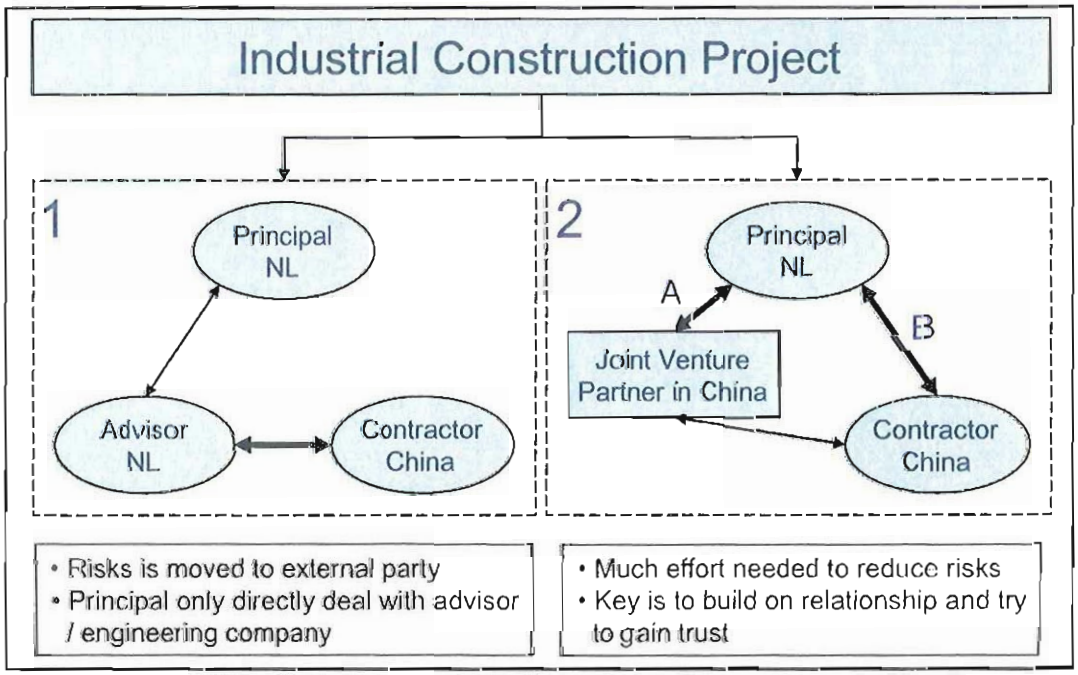


Figure 9.3: Dutch collaboration process in construction project in China

1. Realisation of an industrial construction project is often done via a third external party. Mostly, it is an advisor or engineering company who provides services ranging from engineering to construction management a local presence in China. Although the principal has clear project definitions and scope in detail, the unpredictability of the Chinese partner is difficult to judge. The unpredictability is related to the trust in someone, the feelings one have towards the partner. A result of this unpredictability is certainly the controllability of the project. A lack of predictability and controllability of the partner or project often results in an increase of unmanageable risks which is tedious for the principal. Often tasks, responsibilities, liabilities and risks will be covered by a contract. Unfortunately the interpretation of a contract from the point of view of a Chinese differs from that of the Dutch people. There is also a difference in legal systems between The Netherlands and China which make the situation more complex.

2. There is also a second group of companies who directly work with the Chinese parties. They also face the same problems described above, but instead of contracting a Dutch party, they put a lot of time, effort and patience in creating a relationship with the Chinese partner or contractor. If it is in the case of a Chinese Joint Venture partner, Dutch principals create a long-term relationship and presenting them the functional requirements of the industrial plants to be build. The Joint Venture partner than will collaborate with Chinese local contractors in its own way to realise the construction project. Whether it is the case Dutch

principals collaborate directly with Chinese contractors, a lot of time and effort should be spent on the Dutch project management side.

Some basic principles derived from the interviews to decrease the cultural gap, are:

1. It is important not only to tell the partner or contractor how to do, but
2. Also explain and ask if they **understand** the project in the principal's point of view and
3. Be aware of the cultural differences and act on these issues

9.3.2. Short overview Chinese decision-making and leadership

This thesis report only considers the main aspects of the collaboration process form the point of view of a Dutch principal towards a Chinese contractor. Although a study towards the Chinese management decision-making is a thesis in itself; this paragraph describes the possible thoughts of a Chinese manager. Together with the next paragraph about cross – cultural management and the considered aspects in Chapter 6, an impression will be given of doing business in China in Chapter 10.

The typical good Chinese manager operates in very hands-on style and is familiar with all aspects of the business. Decision-making in Chinese organisations tends to be autocratic. Decisions are usually made by one individual, the owner / manager / director, and in private. The results of the decision are then announced, usually without explanation. It is assumed to have been considered enough that the decision is made and to be understandable to these people under the influence of this decision.[8]

The good Chinese manager listens to the workers and takes their opinions into account, up to a point. Decision-making in China can be remarkably quick or remarkably slow. The quick ones are where experience provides the (apparent) solution. The slow ones are of long-term strategic nature. Nevertheless, there is not much democracy about all this; the leader makes the decisions and the employees are expected to carry them out exactly. Challenging a decision once it has been made is often considered a serious offence; it causes the superior to lose face. At this stage, workers are expected to keep their views to themselves. There is a saying: "Honour the hierarchy first, your vision of truth second".[8]

The thoughts and approach of decision-making both in the Netherlands and in China are briefly discussed. It can be noticed that Dutch managers find it difficult to predict and therefore manage Chinese partners or contractors. The perception of certain aspects like quality, time and costs differs with the Dutch but also the way of thinking and the method to approach risks and problems differs. Cross – cultural management is a method or technique which provides managers the ability to handle such issues.

9.4. Cross – Cultural Management

In international business thinking five main elements, among which one of them is cross – cultural management, are considered important. The first four also applies for national business thinking whereas the last one deals with cultural differences. These elements[9] are:

1. Identifying a new client's needs (new clients demand, cost levels, new markets)
2. Adapting the business model (integrating solutions and organisational requirements to your new clients needs)
3. Innovating your services (bringing your client ahead of competition)
4. Alliance management (combining your knowledge and resources)
5. Cross – Cultural Management (overcoming cross – cultural management)

9.4.1. Introduction cross – cultural management

The aim of cross – cultural management is to better understand other cultures with the intention to better function in these cultures. The core term of cross – cultural management is the word "**culture**". This can be defined as: the collective programming of the human mind. A more concrete description of this concept is: the entirety of norms, values, habits and institutions which characterised a certain human society or a part of it.[10]

8: Source: Ambler, T. & Witzel, M.; Doing business in China. London: Routledge, 2000

9: Source: Someren – Wang, S van & Someren, T.C.R. ABNAmro Wereldwerken, Presentatie: Innovate, 2005

10. Source: Vliet C. van, Cross cultural management. Rotterdam: Highschool for Economic Studies, 1990

Culture can be divided in explicit and implicit. Often managers make the mistake just only to consider the explicit culture which is easy to "see" and understand. (E.g. behaviour in eating and greeting) A huge part of one's thoughts and behaviour is hidden in the implicit culture part. One can think of emotions, friendship, modesty, decision making etc. The perception of culture is illustrated in Figure 9.4.

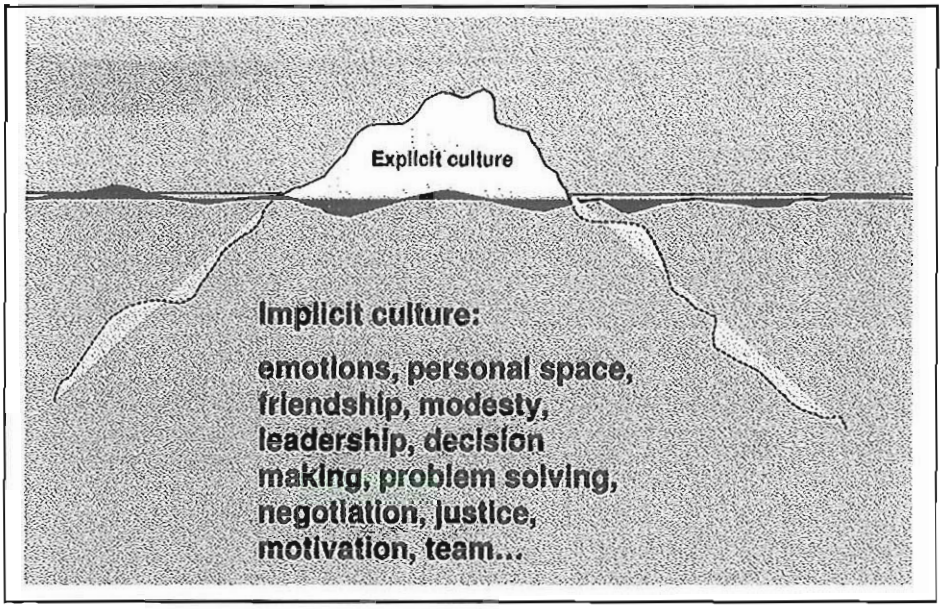


Figure 9.4: perception of culture[11]

Again it is not the purpose to explain the differences between explicit and implicit culture but to create a better understanding of the concept of culture. More in general, which fields of business can be influenced by culture? How can it be approached? And what are the main cultural principles of China? The business fields which can be influenced are presented in Table 9.2. Important fields in industrial construction projects have been highlighted.

The influence of culture on business		
Strategy	***Communication***	Marketing
Innovation	***Negotiation***	***Reporting and deadlines***
Pricing	Meeting	***Management style***
Motivation of foreigners	Human resource management	

Table 9.2: Important international criteria by principal[12]

9.4.1.1. Five Chinese principles[12]

Culture has a lot of influence in different fields of the business processes. First of all, managers should be aware that cultural differences exist and often plays a more major role than one will expect. After the awareness stage, one should also recognise the different cultural dimensions. The next step is to understand these dimensions and be able to predict several cultural profiles. Finally being able to create harmony in business processes, the predicted cultural profiles have to be synthesized within the local organisation.

Doing business in China has become a hot topic in the recent years. Seminars, presentations and workshops are almost given every month or even every week. In some of these cases, the content of the activities mainly contains an introduction of China and an explanation of the difficulties of doing business in China. More often, it will be ended with an overview of the do's and don'ts in China. Although the do's and don'ts are important, in my opinion, when someone has a long-term intention of doing business in China, a thorough understanding of principles is a must. Principles' knowledge together with an understanding of the existence of principles allows someone to derive the

11: Source: Someren – Wang, S van & Someren, T.C.R. ABNAmro Wereldweken, Presentatie: Ynnovate, 2005
12: Source: Someren – Wang, S van & Someren, T.C.R. ABNAmro Wereldweken, Presentatie: Ynnovate, 2005

do's and don'ts by themselves. Before the five main principles are considered, the difficulties of doing business regarding to China are given in Table 9.3.

Difficulties of doing business in China	
1. Power of the governements	8. Harmony is more important than the truth
2. Ruled by people instead of the law	9. Difficulty in getting feedbacks
3. They against me mentality	10. Will of performance
4. Hidden agenda	11. Lack of discipline, planning and sequence
5. Ongoing dialogue instead of debate or bargaining	12. Well practiced tactics: the art of war
6. Different role relationship	13. Different time perspective
7. Who is behind the curtain? (real power)	14. Different communication style
Others...	

Table 9.3: difficulties of doing business in China[13]

The five main principles can be considered, each of them will be introduced by their relation with the Chinese philosophy and followed by a brief description. These five principles represent the translation of Chinese values into concrete (business) attitudes and behaviour.

9.4.1.2. *Hierarchy – Who is the boss?*

Hierarchy can be derived from the philosophical thoughts of Confucius and Mencius. Five levels can be considered, four of them are of vertical origin, while one is based on "horizontal" relationship. (Friend – Friend) Power is an important point of interest, it is not directly related to the function within a hierarchy, but to the role a person fulfil in a network. An analysis of the Chinese attitude internally also provides a lot of information.

9.4.1.3. *Collectivism – Them against me*

Collectivism can be derived from the philosopher Mo Tzu. It is important first to think about the network one belongs to and on the second place the individual itself. Within the network, loyalty and carefulness towards each other indicates the level of relationship. It can mainly be compared with the thoughts of "universal love". To be able to enter these networks requires a lot of time and patience. Not only should the benefits of direct parties be embraced, attention should also be paid to indirect parties within the network.

9.4.1.4. *Performance – Higher and higher*

As it is written in Paragraph 6.2.3, the concept of face value, honour and pride can be derived from the "Five Classics". A success is not only important for the individual itself but also has impact on his or her network. Performance and success are key elements in the Chinese business attitudes and they also want other people to see it. A well-known phenomenon of doing business with Chinese people, is the tremendous fast copying attitude. Chinese people not only copy Western products, technology etc., they also develop it to another level. The copy mentality in Western opinion is against the intellectual property, to a Chinese it's a challenge and performance to be able to improve the success of someone.

9.4.1.5. *Flexibility – Planning is slower than change*

The thoughts of flexibility or in another words, there is always a "way" in doing things, is derived from the philosophical thoughts of Taoism. Planning and procedures are tools to be able to reduce or eliminate business risks which can occur. Chinese people are less avoidance against risks. Due to this mentality they prefer flexibility in their agenda and do not strictly follow prescribed procedures. This is also the reason why a contract has another perception for Chinese people.

13: Source: Someren – Wang, S van & Someren, T.C.R. ABNAmro Wereldwijken, Presentatie: Innovate, 2005

9.4.1.6. Strategy – Long-term and pragmatic practices

Thinking in strategy has its roots from Sun Tzu. Chinese people are well-known in long-term strategic thinking, but they are also pragmatic. Fundamental theoretical rudiments are less important than the practical experience. These both elements together make the Chinese people unpredictable. A loyal partner at the moment doesn't mean it will be loyal after five years. Always be aware and think about the possible long-term strategy of your partner.

Conclusion

A wide variety of aspects have been discussed in a glance. Strategy is not only a thought of Western managers; Chinese people have also many years of strategic experience. Problems and cultural issues Dutch principals mentioned give an impression of the difficulties they face in doing business in China. To be able to cope with several cultural differences, a description of cross – cultural management was given. Finally five important principles can be derived from the Chinese philosophy and values. The last link which have to be made is to look at the similarity and differences between the Western and Eastern thinking and whether it can be translated in the management decision-making process related to an industrial construction project.

An important note: short-term success is less important than good preparations.

10. Western and Chinese cultural merging (Box 10)

A lot of known and unknown, abstract and concrete aspects have been examined until this Chapter. What is the link between the discussed Chinese aspects and issues with the common managerial thoughts in The Netherlands? And how can a conceptual approach be made in order to represent the basic concepts of negotiating with the Chinese? An answer to these questions will be given in this chapter. This chapter is also the last part of step D in the thesis report. Hereafter a conceptual approach for the practical support tools is considered in Chapter 11.

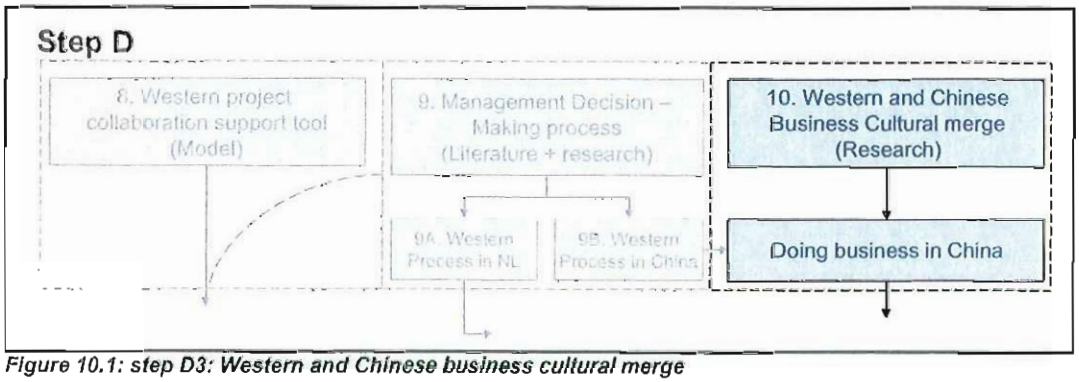


Figure 10.1: step D3: Western and Chinese business cultural merge

The first paragraph, derived from Chapter 7 and 9 discuss main aspects to be considered in business relationships and their processes while the second paragraph derived from Chapter 6, gives a comparison of crucial aspects between The Netherlands and China. The characteristics of doing business in China considered in paragraph three results in a conceptual approach in negotiating with Chinese people. This approach will form the basis for the second support tool. This chapter will finish with a theoretical scheme of Dutch collaboration decision processes.

10.1. Important business related aspects

10.1.1. Overview

In Table 10.1, an overview of two views is given of important aspects to be considered when dealing with Chinese people. One column represents the point of view of Dutch principals based on interviews and literature study. The other column represents the Chinese points of view.

Overview business related aspects	
Dutch principals / managers	*Chinese managers*
Trust / belief / feeling about partner	**Hierarchy - respect to people**
Openness and Transparency	Collectivism - universal love
Predictability and controllability	Performance and success - Face
Perception of context	Flexibility
Respect to all parties	Long - term strategy
WIN – WIN situation	**Harmony between all parties**
Be aware of cultural differences	**Social relationship - Guanxi**
Lot of effort to bridge the cultural gap	
Local knowledge is needed	

Table 10.1: overview business related aspects

10.1.2. Description of considered aspects[1]

This paragraph will consider important aspects in relationships between companies from different context. Almost all of the business related aspects can be translated in six relationship aspects: learning, adaptation, trust, commitment, social interaction and social bonds. Each of the considered aspects will be described more in detail with their important elements. A translation of the relationship aspects in characteristics can be consulted in Appendix H.

10.1.2.1. Learning[1]

Learning takes on a central importance in business relationship between the Netherlands and China. Dutch companies are organised in an inter-organisational network, whereas the Chinese ones are in inter-personal network. Besides the business relationship, the Chinese people differ from the Dutch in their hierarchical structure, collectivism and complex social network of relations and obligations. Other structures which are not considered in the thesis are authority and control systems. Learning is the process by which companies reduce (or increase) their uncertainties. It is also a process of learning how to live with some uncertainties that cannot be reduced.[2] Learning the Chinese context evolves around learning the person before learning about the organisation. The expectation is that individuals know each other personally before engaging in business activities.

10.1.2.2. Adaptation[1]

Business based on guanxi principles is very different from Dutch business principles, and since guanxi principles is the prevailing business more in the Chinese context, Dutch companies most likely need to adapt to them. Mutual adaptation is generally a prerequisite for development and continued existence of a relationship between two companies. Adaptations make firms more similar and therefore strengthen the bonds between them.[3] Adaptation is a continuous and ongoing process, and adaptations take place continuously as the relationship develops through its different stages.[4] Adaptations can be both formal and informal. Formal adaptations are often laid out in contracts, while informal adaptations will be agreed upon in order to cope with a problem or by request of the counterpart.

10.1.2.3. Trust[1]

Trust in the Dutch context exists foremost between organisations, while trust in the Chinese context exists between persons. In order to guarantee reliability in business transactions companies rely on personal relationships. Trust in a business context is a multidimensional and complex concept and is therefore perhaps easiest understood using words such as credibility, confidence, loyalty, reliance, expectation, belief, willingness, reciprocity, predictability, fairness and openness.[5] Trust is the company's belief that another company will perform actions that will result in a positive outcome for the company.[6] Companies develop trust through ongoing interactions and mutual trust, respect, and friendship arise out of close interaction between partners. Every relationship has a specific history of how they have treated each other. The degree of trust and commitment that has been build up is based on past experience of each other as well as on expectations of future exchange.[7]

10.1.2.4. Commitment[1]

Commitment is the intention to continue the relationship in the future and the willingness on the part of both partners to make short-term sacrifices to realise long-term benefits in the relationship. Both firms make an effort to ensure that the long-term relationship remains.[8] Commitment is characterised by mutuality, involvement, dedication to shared goals, willingness to invest resources, personnel assignments and hands-on involvements.[9]

1: Source: Ramström, J.; West Meets East. Finland: Akademi University Press, 2005
2: Source: Ford, et. Al, 1998
3: Source: Johansson and Mattsson, 1987
4: Source: Easton, 1992
5: Source: Revald & Grönroos, 1996; Blomqvist, 1997; Uzzi, 1997
6: Source: Anderson & Narus, 1990
7: Source: Ford et al., 1998
8: Source: Anderson & Narus, 1984
9: Source: Hutt et al., 2000

An important building block for commitment is continuity. A business relationship builds on a strong personal relationship and therefore personnel change means that the local partner need to invest time and effort in getting to know a new manager personally.

10.1.2.5. Social interaction[10]

In China business relationships are built on social relationships, and personal relationships are often a prerequisite for the development of other types of business activities. The goal of social interaction is to foster friendship and personal relationships between actors from each company in order to increase openness and communication frequency. This is important because in any relationship, communication and information flows are crucial in resolving disagreements, speeding decision-making and achieving a shred understanding of goals.[11]

Chinese people are sensitive for personal characteristics. Human character and personnel chemistry have a determining influence on the continuation of the relationship. The personal relationship comes first, and the business relationship builds on a strong and common personal relationship. Finding commonalities and common interests are central elements of social relationships. Social events have a central role on social relationships and a large spot is reserved for eating.

10.1.2.6. Social bond[10]

Social bonds are important for the development of business relationship in the Chinese context. Business networks relationships in China are governed by relational norms rather than contractual obligations. Social bonds require the partners to invest time and energy, which is hoped to create positive personal relationships between the partners.[12] Social bonds are important for mutual trust and confidence in interaction between individuals, and they emerge between individuals as they act according to common accepted norms and rules.[13]

Strong social bonds give access to scarce information. Harmony and face are central building blocks of social bonds. Social bonds are strengthened through informal social event. Business is not conducted between individuals that do not get along socially. Strong social bonds indicate that partners should be available at all times, even during weekends and evening.

10.1.3. Management by relationships and relationship processes[14]

Western companies use systems to control relationships. Chinese organisations use relationships to control systems. Western companies use a legalistic framework of procedures and controls to police relations. This legalistic and financial control framework is confusing for Chinese managers who feel mistrusted and do not know how they stand in relationship to the boss. Chinese managers believe that one of their key tasks is to maintain harmony within the organisation, both between people and between work units. This is particularly the case where Confucian values are strongly extant.

Leadership anywhere in the world operates on the basis of respect. On the one hand, leaders are certainly expected to develop a relationship with their employees. On the other hand, a tactical plan is needed to be drawn up, practical decisions need to be made, and resources need to be in place and not diverted. The coming two sub paragraphs give an impression of the relationship processes in The Netherlands and in China.

10.1.3.1. Relationship process in a Dutch context[14]

Previous research has established that the relationship process in a Western context can be divided into separate stages.[15] Although this development process is divided into stages, in reality there is no clear separation between the different stages. It is also important to realise that relationships do not move into each stage in a pre-determined way. Business relationships are not linear processes that move in one direction towards the ideal state. Instead developing a business relationship is about coping with different circumstances at different times and with varying aims. Figure 10.2 represents the relationship processes in the Dutch context.

10: Source: Ramström, J.; West Meets East. Finland: Akademi University Press, 2005
11: Source: Hutt et al., 2000
12: Source: Granovetter, 1973
13: Source: Hakansson & Snehota, 1995
14: Source: Ramström, J.; West Meets East. Finland: Akademi University Press, 2005
15: Source: Ford et al., 1998 ; Jansson, 2005

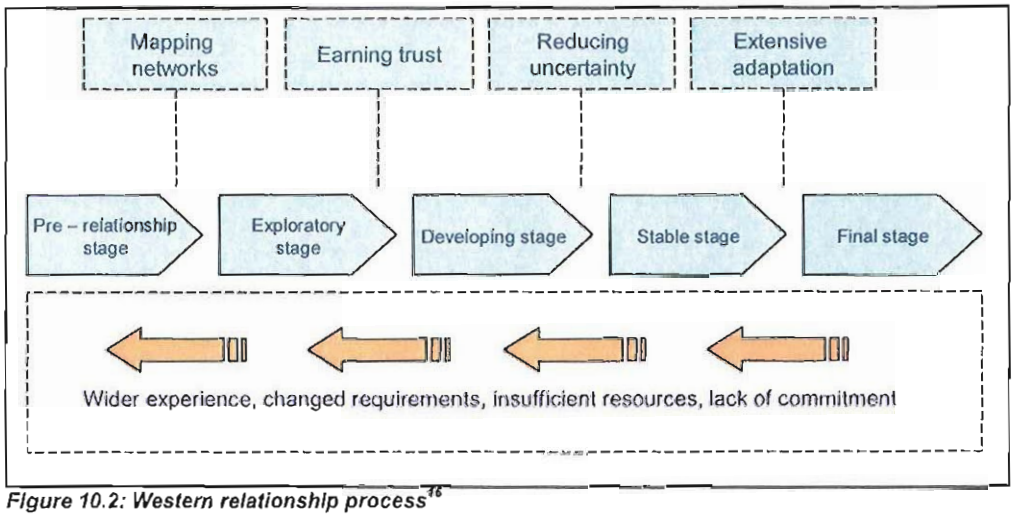


Figure 10.2: Western relationship process[16]

A short description of the different stages will be given here; a detail explanation of this figure can be consulted in Appendix I.

- Pre-relationship stage: prepatory stage to gain contact and evaluate alternative partners
- Exploratory stage: establishment of initial trust and commitment
- Developing stage: intensive mutual learning and increase in sharing resources and adaptation of each other
- Stable stage: extensive adaptation in gaining long-term relationship
- Final stage: extensive institutionalisation and habitual relationship

10.1.3.2. Relationship process in a Chinese context[16]

It is perceived in Chinese culture that one's existence is largely influenced by one's relationship with others. An individual is fundamentally a social or relational being, and developing cultivating relationships is a common preoccupation and a form of social investment.[17] While Western business tends to focus on relationships between an individual business and customer, the Chinese tend to prefer long-term and personalised and mutual cooperation as the basis for most of their business dealings. Figure 10.3 represents the relationship processes in the Chinese context.

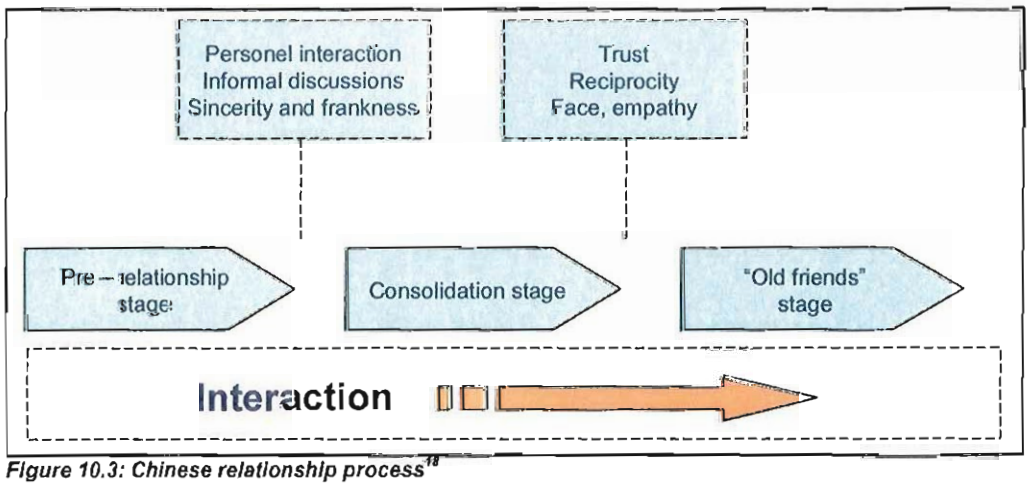


Figure 10.3: Chinese relationship process[18]

16: Source: Ramström, J.; West Meets East. Finland: Akademi University Press, 2005
17: Source: Yeu, Lee, Chow, Sin & Tse, 2000
18: Source: Ramström, J.; West Meets East. Finland: Akademi University Press, 2005

A short description of the different stages also will be given here; a detail explanation of this figure can also be consulted in Appendix I.

- Pre-relationship stage: becoming part of inner circle, guanxi dominated
- Consolidation stage: develop social relationship by construction personal relationship
- "Old friend's" stage: trust building and social relationship towards business relationship

10.2. Comparison crucial aspects The Netherlands & China

Having a thorough understanding of important business related aspects in China, a comparison between Western and Chinese thinking patterns is the next step. First an overview is given, whether some of the differences are detailed explained in cultural dimensions. Finally a list of do's and don'ts can not be excluded.

10.2.1. Overview Western & Eastern Thinking

Understanding Western and Eastern thinking patterns		
Cultural values	West	East
Expressed	America & most European countries	The Chinese and most Asian cultures
Type of logic	Linear (more causal relationship and direct associations between A and B)	Spiral (more roundabout and subtle)
Expressions of agreement and disagreement	More argumentative, willing to express disagreement verbally	More difficult to say no even if one means no, disagreement expression nonverbally
Communication of information	More meaning is in the explicit, verbal message. Use of direct language	Meaning is often implied or must be inferred. Use of indirect language patterns
Expression of honesty	More overt, one is more likely to ask the person to "speak their mind" or "get it out on the table"	Subtle, nonverbal
Expression of self	I – orientated	We – orientated
Thinking orientation	More rule based or based on application of abstract principles such as regulations or laws	Tends to take context and the specific situation into account in rule interpretation
The individual	Has to have rights and greater need for autonomy and individual achievement	Group duty, preservation of harmony
Nature of the business relationship	Less important, tend to substitute relationship for written agreement, superficial, easy to form, not long lasting	Most important business cannot occur until relationship is sound, written agreement secondary to guanxi, hard to form, long lasting
Conflict resolution	Trial or confrontation, use of lawyers and courts	More mediation through trusted third parties
Time sense during meetings	Be on time and end on time	Appointments less driven by exact start and end times
Conflict results	Perception of two states: win or lose	Win – Win, to lose is to win, lose in order to win

Table 10.2: understanding Western and Eastern thinking patterns[19]

10.2.2. Cultural dimensions

In the cultural dimensions, the Western and Chinese decision-making theory are compared more in detail to each other. The perspective on Chinese tradition and Western decision-making theory can be identified in five groups according to Li Hualzu[20].

10.2.2.1. Motivation and consequence[19]

According to Western theory, the manager assembles the possible outcomes from alternative actions, judge the probability of each outcome and then choose the action most likely to have favourable consequences. In contrast, the Confucianist evaluates the motives and intention of the manager, taking ethical, or moral, principles as the criteria. The major decision issues that are examined are those that arose in the past, facts about past decisions and not estimated about the future.

In other words, past performance (a given fact) weighs heavier than future performance (an uncertain 'fact'). Perhaps this is strange from a Western point of view, but once the trust in the Western manager is

19: Source: Johansson, M.; http://www.legacee.com/Culture/CultureOverview.html

20: Source: Ambler, T. & Witzel, M.; Doing business in China. London: Routledge, 2000

confirmed in this way, the Confucianist will have such confidence in him about performing properly in the future, that he will not be so very concerned about the actual decision itself that the manager will be taking.

10.2.2.2. Unity and diversity[19]

Chinese tradition emphasises synthesis and unitary principle, from which problem-solving attributes are deduced, whereas the Western approach is to focus on the specific characteristics of the problem whilst considering a variety of objectives. An example of this thinking is found in the ancient Chinese classic, The Book of Changes, which deals with knowledge of the universe as a whole.

10.2.2.3. Circle and sequence[19]

The Chinese think of nature in terms of closed, spiral or circular systems of interrelated elements, whereas Western decision theory is basically sequentially orientated. In traditional Chinese thinking, consequences of events arise from many interrelated factors. A circular network is used to highlight the effects as a whole. The more linear Western approach can be represented as a sequence of decisions, such as a "decision tree", each branch analysing the problem area more narrowly.

10.2.2.4. Harmony and self-interest[19]

When determining the optimal decision, the Chinese tradition is to emphasise harmony in the group, but looking in from the outside, Western decision theory presumes that the decision-maker will optimise self-interest. Of course, business people, in search of first-mover advantage (e.g. profit), will quite often seek that to be first. A Chinese business person therefore may well be embarrassed by being innovative when a similar partner in the West would be proud of it. Being first in China raises profound cultural and social difficulties. Imitation, however, gives face because it underlines the performance of another than oneself.

10.2.2.5. Certainty and uncertainty[19]

Chinese tradition is oriented towards **certainty**, not the evaluation of uncertainty that is emphasised in Western decision theory. In their struggle for existence against numerous dangers and disasters, the Chinese felt that the future was very hard to face. The Chinese value past experiences more highly, depending on these for determining future actions. Again, note the importance of history and historical thinking. Past experiences are the guarantee and premise for success.

10.3. Doing business in China (5P's[21])

One of the keys to success in global business lies in learning global lessons and then in applying them locally. There is no one "model" for doing business in China. Conditions vary too much; any model would have to be so hedged about with conditions as to be informative or useless. Because events in China are happening so rapidly it is better to describe a method in approaching Chinese people as a framework for anyone doing business in the area. It can be a guiding principle supporting Dutch principals to be able to negotiate with the Chinese people.

10.3.1. Preparation[22]

A thorough preparation is a good step in the direction of success. It's not only critical to define the inner aspects of a company's business such as the fundamental opportunity, a competitive and marketing strategy, and its tactical components. The external aspects when doing business in China are even more important than the inner aspects. For example the market situation; whilst some things change slowly, it took China about one nano-second to revert to the market concept, though the reality is taking a little longer. Trading and bargaining are as natural to China as complaining about the weather is in The Netherlands: both are national pastimes.

A second aspect which requires good preparation is continuity; any reasonably well-educated Chinese knows his or her own country's history well, and most can quote incidents from it. Businesses and managers going into China

21: Source: Johansson, M.; http://www.legacee.com/Culture/CultureOverview.html
22. Source: Johansson, M.; http://www.legacee.com/Culture/CultureOverview.html

need to know something about China's ancient and recent past. They need this knowledge for the obvious reasons of finding a context for the present and attempting to understand the future. They also need to know what is driving their Chinese partners and competitors. No other people on earth are so strongly influenced by their past as the Chinese. The visiting business person should not flaunt any historical expertise; what is done now must be in harmony with what has gone before. Continuity may slow things down, but it also gives confidence in a relationship that the past is a reliable guide to the future.

10.3.2. Priority

Although one should have knowledge about the present and the past situation of China in several contexts. Clear priorities and objectives always have to be kept in mind. A totally new environment with other attitudes and behaviours might cause an adaptation towards China or in a worst case a confusion which reflects in a "cultural shock". A balance has to be found between adaptation and the achievement of one's own priorities.

10.3.3. Patience

Chinese business people are very keen in strategic thinking, especially in long-term. Their strategic attitude can be derived from many years of experience in warfare in the history. Patience and precision are key elements within the strategy of success. If a financially driven company sets high hurdle rates with short-term playback periods, it will give up too early and lose the investment or not have the guts to try. Chinese people are aware of the financial and time mentality pressure on Dutch managers and they will take this opportunity as an advantage in the negotiation.

10.3.4. Precision

In the process of wageing war, it is not only important to prepare a well strategy with one's own priorities. Neither is it only enough to be patient to wait until the "right" moment. To be successful, one should also seek for precision in order to hit the target directly in the middle or push the opponent to surrender without any psychical move. Precision refers to the direct effectiveness of a certain strategy. It requires a lot of time to be able to set up a "successful" strategy and plan. We are bound to make many mistakes. Learn from them and don't make them a second time.

10.3.5. People

Finally to be able to implement one's strategy, people are needed to fulfil certain tasks within the network. Once again, the relationship context guanxi can not be mentioned often enough. Every relationship circles around this "pillar". Guanxi is the single most important concept when dealing with China and the Chinese people in any social context, not just in business. It is the first stage, getting the first contacts and getting inside the magic circle that is hardest; once in, it is possible to exploit contacts, and the contacts of contacts, and thus widen one's own network.

Many companies tap employees who are experts in technical or management matters as their overseas managers. However, a recent study finds other skills vital for success. Prudential relocation, an arm of Prudential Insurance, asked 72 personnel managers working for American multinationals to name the traits required for overseas success. Nearly 35% said cultural adaptability, patience, flexibility and tolerance for others' beliefs.[23] Like many practices, business processes past through the cyclic process of learning, evaluating, adapting, fine – tuning and again learning. (See Figure 10.4) It should also be noticed that the approach of the five P's is cyclic rather than sequential. Although they follow certain steps within the cyclic process, all of them have direct influences in each other.

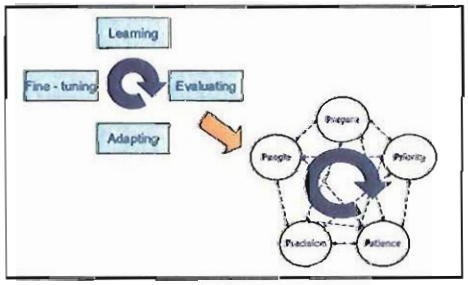


Figure 10.4: cyclic business processes

23: Source: Johansson, M ; http://www.legacee.com/Culture/CultureOverview.html

10.4. Approach Dutch industrial construction projects in China

An extensive description of a Dutch collaboration decision-making process for industrial construction projects was already given in Paragraph 3.6. This Chapter and the previous one consider both the general Western and Chinese decision and relationship processes. Also cultural differences and an approach in dealing with these issues are examined. The last link has to be connected; it is the link between all considered aspects in this thesis towards Dutch industrial construction projects in China.

Again the Dutch collaboration decision-making process is presented in Figure 10.5. This process mainly considers project related aspects. In step one, the project characteristics will be defined, while in step two and three choices have to be made whether to cooperate or outsource the project and to what extend it should be done. Step four and five provides support models and tools to found the decisions to be made. Finally a certain building contract form together with the best fit contractor will be chosen and the execution stage can start.

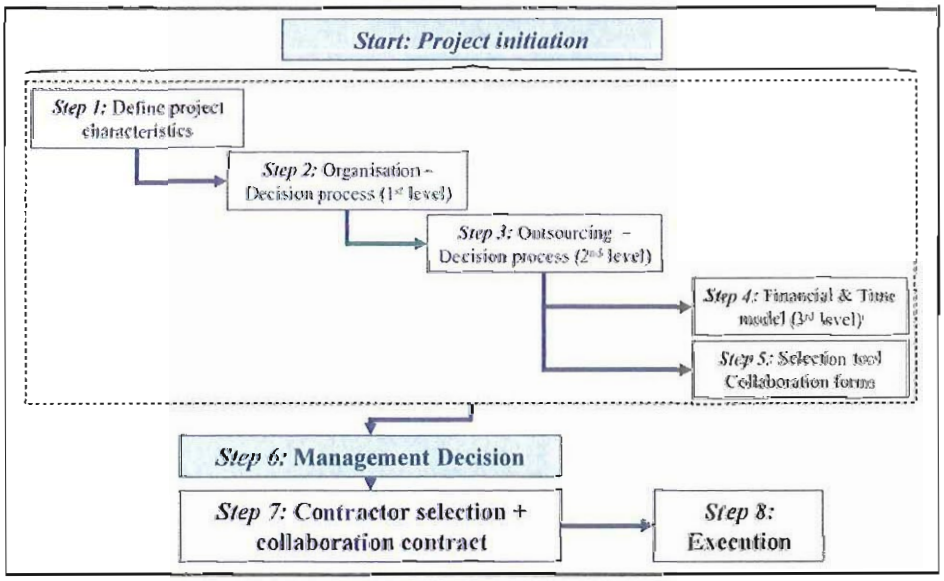


Figure 10.5: Dutch project collaboration decision-making process

When business and cultural related aspects are added to the collaboration process, the presented process can be expanded with business + cultural aspects which are indicated in Figure 10.6.

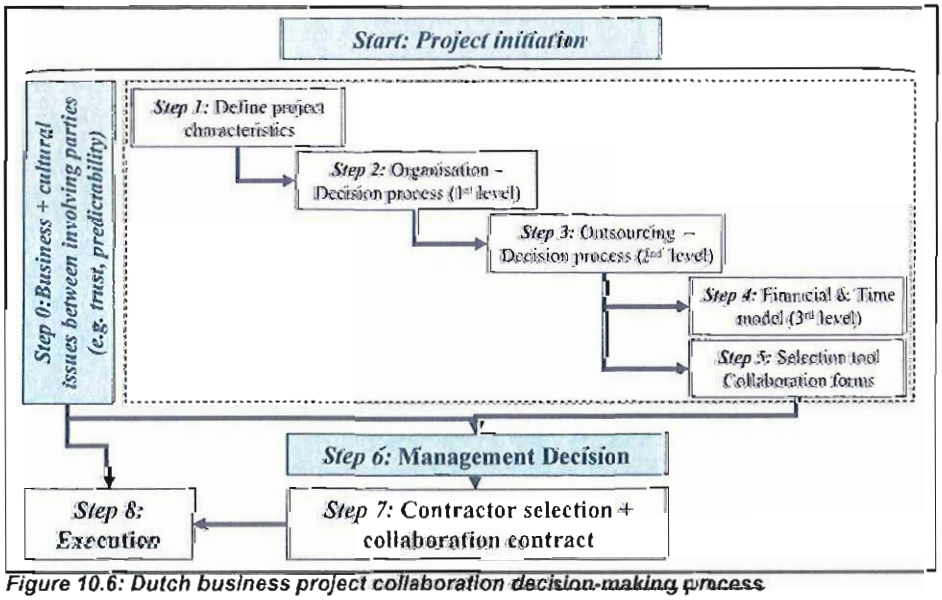


Figure 10.6: Dutch business project collaboration decision-making process

The new added business + cultural dimension not only have impact in the project decision-making process but also in the execution stage. This dimension has to be considered in the whole partnership or collaboration life cycle process. When specific attention is paid to China, parallel to the Dutch business project collaboration decision-making process, creation of personal relationship is a must. An approach how it can be realised was described in the previous paragraph. Together with the collaboration process, finally the Dutch business project collaboration decision-making process towards China is presented in Figure 10.7.

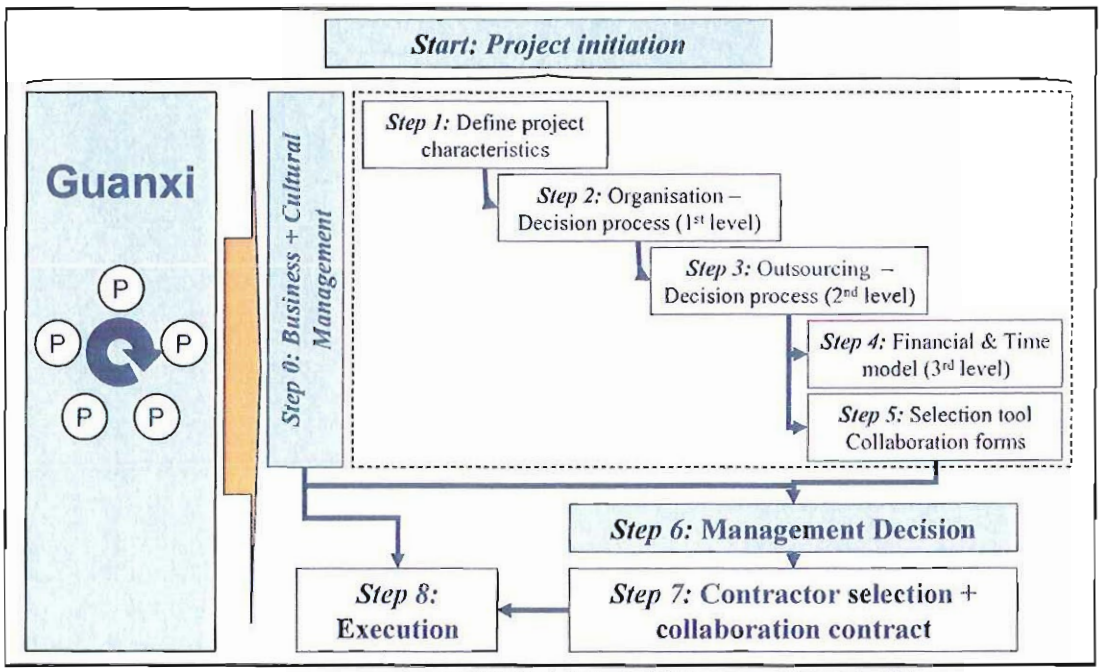


Figure 10.7: Dutch business project collaboration decision – making process towards China

With the theoretical framework indicated in Figure 10.7, a conceptual model of the practical support tools can be realised. One support tool will consider important project criteria based on the experience from both Tebodin professionals as well as the managers which were interviewed. This support tool considers the choice of a building contract form, while the other support tool is a tool to support the decision-making process. Business as well as cultural aspects and an approach of negotiations is taken into account.

11. Practical support tool: Quick TEB Toolkit

Finally the information gathered, researched and analysed from all previous Chapters are translated into two practical support tools. One of them, ***Quick TEB Toolkit***, is being considered in this Chapter. The functional scope, described in Chapter 8, presents the approach to be able to arrive at a building contract form. It is one of the basic pillars of this conceptual model. The other part is a derivation from the Chapters 3, 5 and 9, the decision-making process for a construction project. (See Figure 11.1)

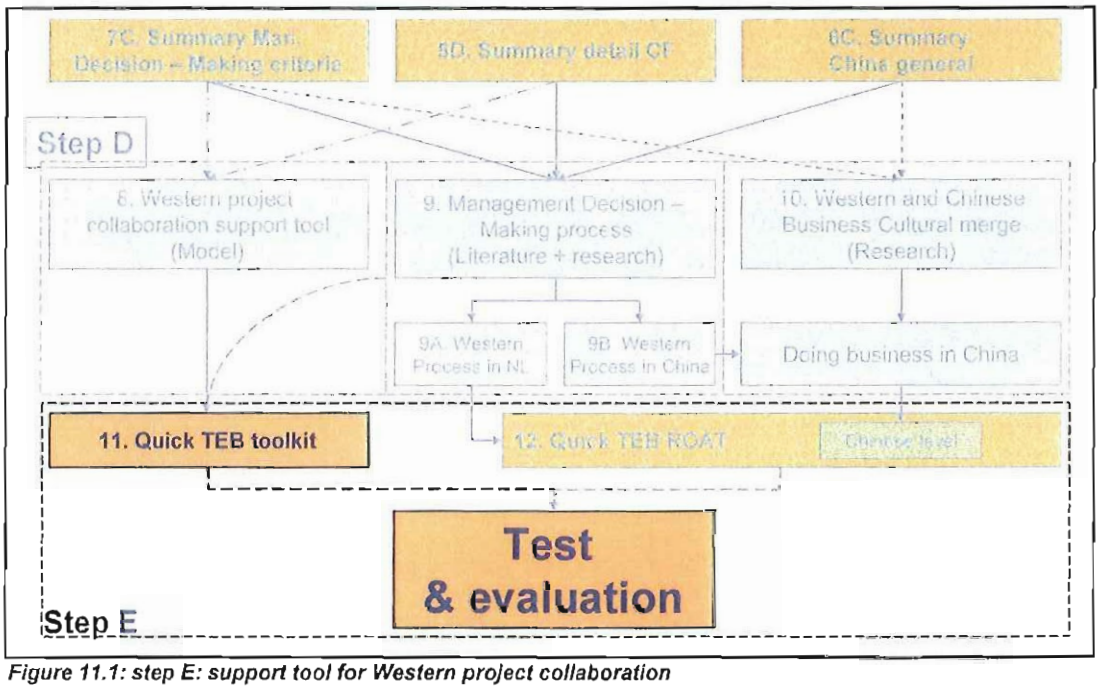


Figure 11.1: step E: support tool for Western project collaboration

First of all, a brief description is given about the second pillar and the judging possibilities from the principal's points of view between the sub criteria and a project. Second, the conceptual model it self will be described and explained and finally it will be tested and evaluated with practical Tebodin projects.

11.1. Basic pillars of the Quick TEB Toolkit

A detailed explanation of a Dutch management decision-making process for industrial construction projects was given in Chapter 3. The consideration of this process is a top-down approach towards a collaboration group, which eventually can be merged together with the bottom-up approach of the Western project collaboration support tool. The different steps together in a decision tree are summarised in Figure 11.2. Basically, two levels are important:

- **Organisation – decision process**: the main question on this level is whether the principal wants to seek for a strategic cooperation or an outsourcing partner. An answer to this question will eliminate certain building contract forms.
- **Outsourcing – decision process**: within this level, the intention is to define in which collaboration group a building contract form should be considered. In order to be able to make this separation, the principal has the opportunity to answer the following questions:

    - **Which parts of the project have to be tendered?**
      A project life cycle chain can be categorised in four main groups; *definition, design & engineering, construction and operation & maintenance*. It is dependent on the project status which part should be tendered to an external contracting party.

- **If the tender package considers more than one project phase, should it be tendered to one or several contracting parties?**
  An answer to this question enables a first separation between standard and integrated outsourcing. Also a sub separation is possible between a total supplier or contractors with forward and backward integration.
- **How can a principal make a difference between the forward and backward integration contractors?**
  The principal has to answer the question whether he / she intends to work with one construction contractor with design and engineering capabilities or an engineering contractor who can manage the subcontractors in several project phases.

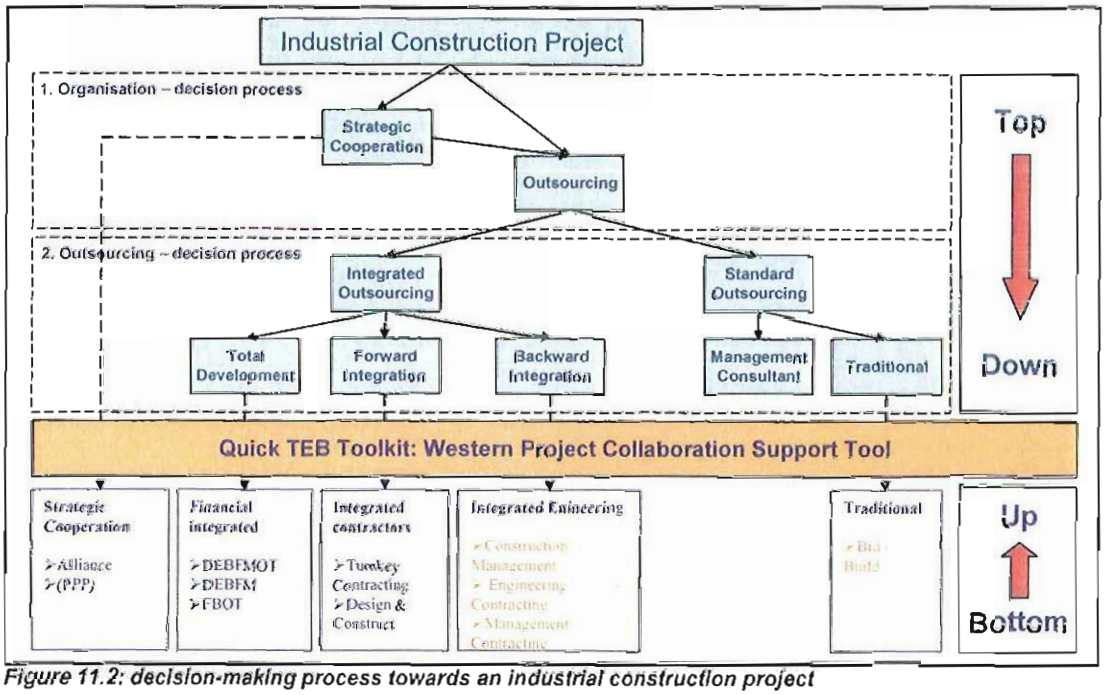


Figure 11.2: decision-making process towards an industrial construction project

The functional scope is a bottom-up approach to be able to select a building contract form. A set of sub criteria are deployed. The only part left is the judgement of the sub criteria from the point of view of a principal. The principal can judge each sub criteria individually in its important ness towards a project. A scaling is made in five levels. (Highly important, important, neutral, unimportant and not important). Each of them represents a factor which is needed in the calculation formula. (See Table 11.1)

Principal's judgement towards the important ness of sub criteria						
		Highly important	Important	Neutral	Un - important	Not important
Risks						
General	Risk 1	2	1	0	-1	-2
	Risk 2	2	1	0	-1	-2
Project	Risk 3	2	1	0	-1	-2
	Risk 4	2	1	0	-1	-2

Table 11.1: judgement of sub criteria

As it is indicated in Table 11.1, a factor can be positive either negative. A positive factor considers a positive contribution to a contract form whereas a negative factor the opposite. The range of values within a contract forms is judged lies between the 1 and 10. The reverse influence due to a negative factor can be expressed in: **(1+10) - n**. The n represents the given value for the combination of a specific sub criteria and a contract form. (See Appendix J)

By the selection of the importance of each sub criteria, a quantitative value will be calculated for the considered building contract forms. Finally, all the values which belong to particularly one contract form are summarised together. The formula needed to calculate each value of each combination together with the dimension of relative weighing is as follow:

> ***Total value per sub criteria per building contract form = weight of main criteria x weight of sub criteria x influence factor x judging value***

11.2. Conceptual model: Quick TEB Toolkit

When the thought about the conceptual model is considered, the thought about Tebodin's needs have to be kept in mind. The conceptual model that will be created for Tebodin has to be a model that supports the acquisition process and activity. The model should represent the relevant characteristics of the different considered building contract forms based upon the literature examined and the interviews conducted. The model should provide more insight on the decision-making process towards a construction project. Once again, this conceptual model has the function of a support tool in the collaboration process.

In a recent graduation study within Tebodin[1], the choice to make a stand alone model within the corporation with the ICT department is not essential. Therefore, it is decided to use Microsoft Excel together with Visual Basic for the conceptual model. Excel provides easy mathematical opportunities that are inherent in an analysis. Together with Visual Basic, Excel provides a system that can be used within the global Tebodin network without extra expenses and training. Base knowledge of Excel can tacitly be assumed.

The conceptual model consist of three data sheets and one user interface sheet, a print – out can be conducted in Appendix J:

- **Datasheet 1: weighing criteria**, this sheet considers the relative weighing procedure of the main and sub criteria within its group
- **Datasheet 2: building contract form data**, this sheet represent the judging values between a sub criteria and a building contract form both in positive and negative ways
- **Datasheet 3: output**, the calculation of the model is done in this sheet
- **Interface sheet: *Quick TEB Toolkit***, it can be deepened in four main parts:
  - Introduction to ***Quick TEB Toolkit*** (see Figure 11.3)
  - Step 1: decision-making towards a construction project (see Figure 11.4)
  - Step 2: criteria scaling (see Figure 11.5)
  - Step 3: selection of optimal contract (see Figure 11.6)

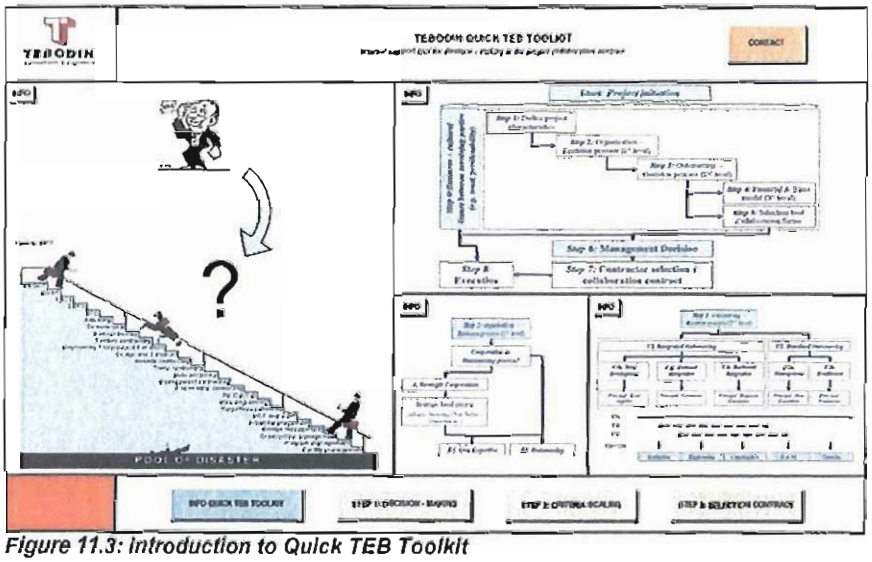


Figure 11.3: Introduction to Quick TEB Toolkit

1: Source: Lemmens, B.; Where should I go or should I stay? Modelling host country selection for Foreign Direct Investments. Delft: University of Technology, bachelor graduation thesis, 2005

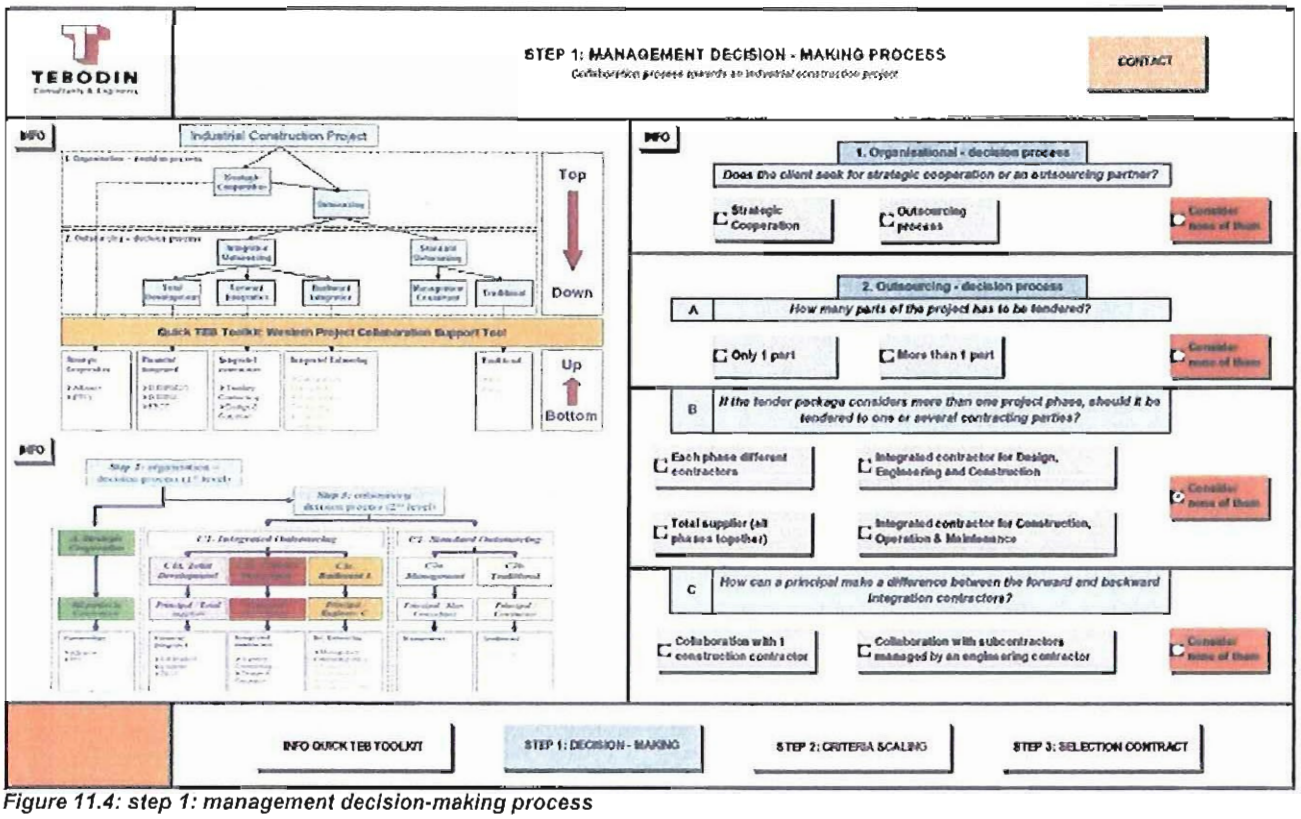


Figure 11.4: step 1: management decision-making process

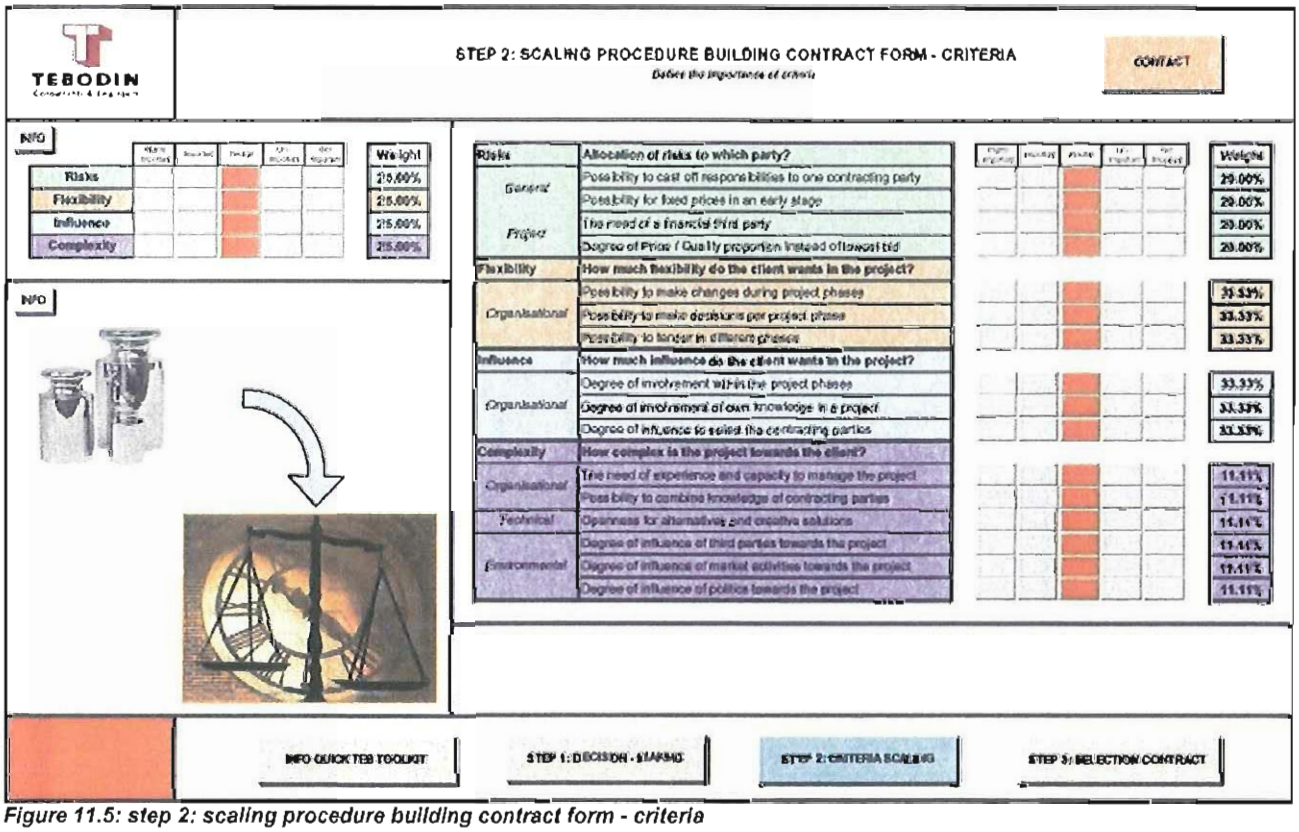


Figure 11.5: step 2: scaling procedure building contract form - criteria

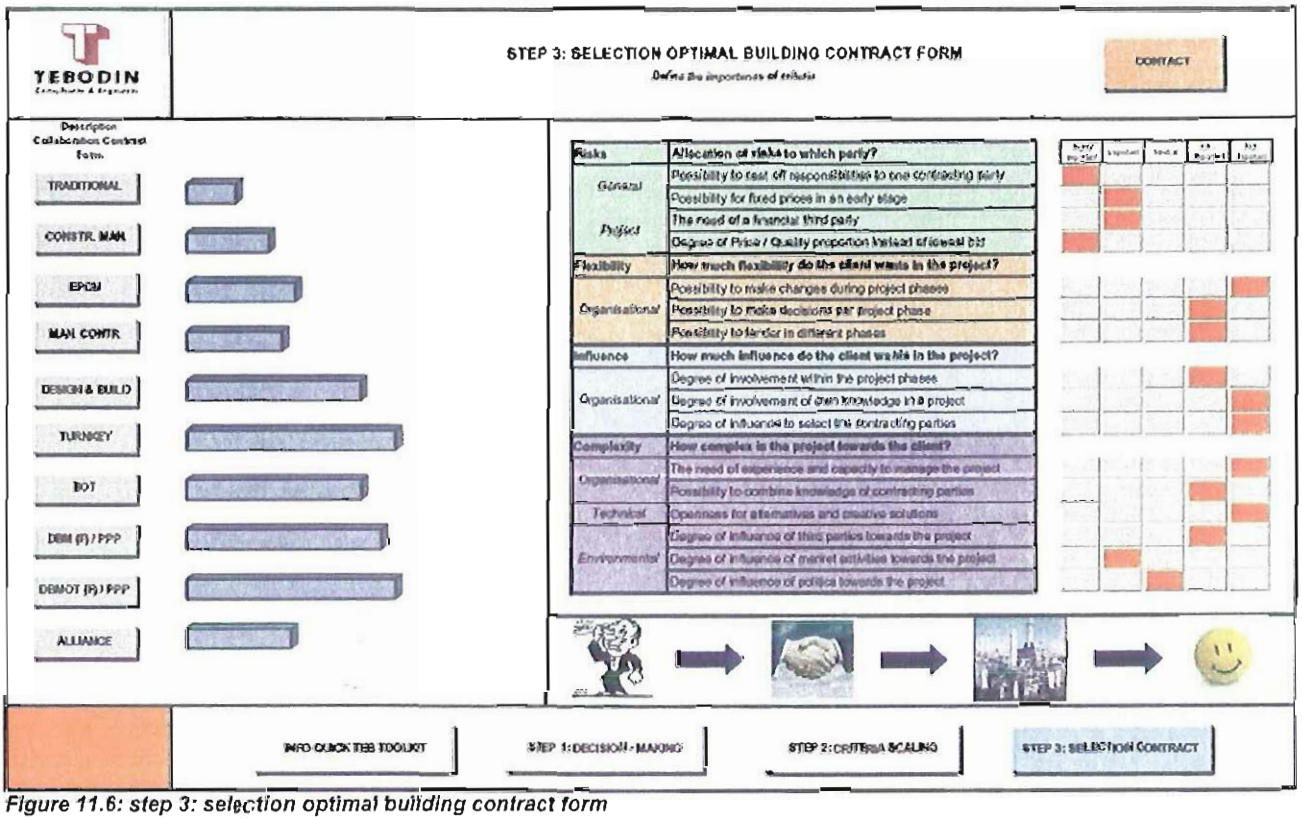


Figure 11.6: step 3: selection optimal building contract form

11.3. Test and evaluations with Tebodin projects

The has been tested internally, based on Tebodin's expertise, related to a variety of practical projects, with different building contract forms. An overview with a brief description of considered projects are presented in Table 11.2. During the testing procedure, an overall comparison of considered contract forms is possible by disabling the functionality of step 1: decision-making process. The testing and evaluation phases are cyclic processes to fine-tune the conceptual model. First of all, typical characteristics of a building contract form are tested whether the model is presenting the "correct" form, while on the second place, "normal" projects have been tested.

Tebodin projects	Brief description
Nuon underground gas storage at Epe, Germany	**Lump-sum turnkey** - realisation of an underground gas storage for Nuon at Epe, Germany. The project concerns the realization of a compressor station for injecting natural gas into four (existing) salt caverns. Furthermore, a 'production line' will be realized to deliver the gas at the right specifications back to the Gasunie grid during periods of high demand. The underground pipeline from the Gasunie station Enschede in the Netherlands to Epe in Germany, as well as the in-field cavern pipelines are part of the project scope.
DHC Solvent Chemie GmbH, DHC Solvent Chemie GmbH, DHC Allianz 2003, Germany	**Alliance** - DHC Solvent Chemie GmbH is a subsidiary of Ruhr Oel GmbH, a joint venture of Deutsche BP and Petróleos de Venezuela S.A. The company produces solvents and related products. An extension was required to increase the production capacity for high-quality and high-purity products. Tebodin Lockwood Greene Gelsenkirchen designed the distillation unit and management construction activities.
NAM (Shell/Exxon), Nederlandse Aardolie Mij. (Shell/Exxon), Bedum DCP, Netherlands	**EPCM** - The Bedum gas field required a depletion compressor for further exploration. Further to the process conditions the following components were included: 2.7 MW reciprocating compressor VSDS driven, 3 air coolers, separators, gasmetering, vessels, etc. The Control system was

	completely renewed. A new Control Building and trafo yard was included. Tebodin performed the Engineering, Procurement and Construction with their 5 year LOP Construction Partner on a lump sum basis.
	- Relocation of a timber trade company to make place for the realisation of a residential area. Tebodin activities involved logistic scan, advice for accomendation, design, tendering, procurement, site supervision and project management.
	- Tebodin performed basic engineering services for small SHE compliance projects such as fire retardancy, emergency lighting and closed dosing systems.

Table 11.2: overview and description considered Tebodin projects for the testing phase

Finally after the fine-tuning phase, the disabled functionality of step 1 is activated to be able to narrow the possibilities of contract forms from the point of view of the top-down approach. Two general comments in relation to the testing and evaluation phases are as follow:

- In the deployment phase of the sub criteria, sometimes it occurs that a criterion is important to all contract forms and / or in all project phases. For example; the time and cost pressure are important criteria towards a principal. But it does not matter what kind of form is chosen, a project should always be delivered in a certain time span within a certain amount.
- In the testing procedure, there are some forms which almost have the same characteristics towards a project. The difference lies in the matter how contractors are involved in which phase of a project. (Turnkey vs. DBFM or EPCM vs. Design & Build)

11.4. Conclusions

The ***Quick TEB Toolkit*** has been discussed. The top-down approach provides the user an explanation of the different steps within a collaboration process in order to arrive at a specific collaboration group. To be able to select an optimal building contract form, the bottom-up approach allows the user via a relative comparison system to give their specific opinions towards a set of sub criteria. When this tool is used as an extension in the acquisition activities, the experience of a professional or company can be scientifically supported. Still there is another part in the decision-making process which is uncertain. It concerns the business relationships between parties. An approach how these specific "uncertainties" can be handled is translated in the next Chapter into the ***Quick TEB ROAT***.

12. Practical support tool: Quick TEB ROAT

The final part left is the consideration of the second practical support tool, Quick TEB ROAT. It is also an extension and additional part (course CT5050) of the "normal" graduation thesis (CT5060). It should be possible for the reader to read this chapter without any knowledge of the previous ones. This tool combines both the theoretical rudiments of the project management decision-making process and the strategic business decisions into a practical tool. Together with the Quick TEB Toolkit (defined in the previous chapter), a set of practical support tools are the deliverables of this final thesis towards the Tebodin's acquisition processes. (See Figure 12.1)

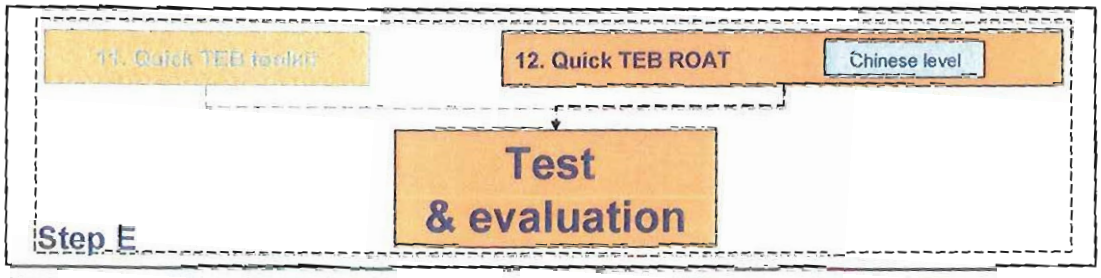


Figure 12.1: step E: support tool for business decision-making

The sequence of particularly this chapter can be described as follows: a general understanding is given about "Real Options", question such as: when should "Real Options" be used?, how is the management decision-making process related to "Real Options"? and what are important factors within the "Real Options Theory"? On the second place, a functional scope has to be defined whether it is able to compare several building contract forms from the point of view of strategic decision-making. At the third place, the functional scope will be translated into conceptual "Real Options" models. This part will also be illustrated with a practical example. Finally this chapter will be finished with conclusions and recommendations. (See Figure 12.2)

The objective of this chapter is:

To identify the possibilities of the "Real Option Theory" towards building contract forms and it's influence in the construction project chain and to identify and evaluate practical models in order to be able to make financial analysis with the ROAT (Real Options Analysis Toolkit)[1]

This tool concerns the issue of uncertainty which may occur in the decision-making process. Many managers believe that uncertainty is a problem and should be avoided. Uncertainty is frequently omitted from important corporate thinking. If the company is properly positioned, one can take advantage of uncertainty. Uncertainty wil create value and take one to market leadership.[2]

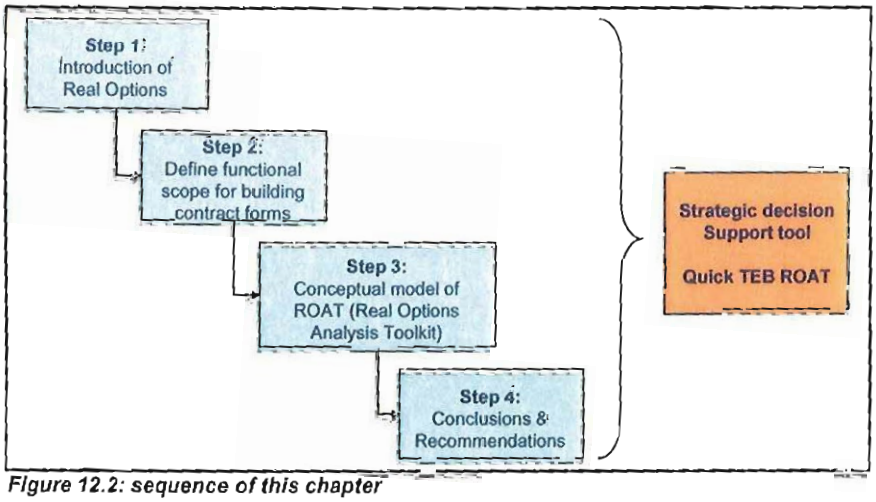


Figure 12.2: sequence of this chapter

1: Real Options Analysis Toolkit is a software from Crystal Ball
2: Source: Amram, M. and Kulatilaka, N. Real Options – managing strategic investment in an uncertain world. Boston, Massachusetts, Harvard Business School Press, 1999

12.1. Introduction Real Options

More and more, principals and managers are facing new business realities such as: strategic investments with lots of uncertainty and huge capital requirements; projects that must adapt to evolving conditions; complex asset structures through partnerships, licenses, and joint ventures. Managers who make strategic investment decisions often view uncertainty as costly. Real options is an important way of thinking about valuation and strategic decision-making, and the power of this approach is starting to change the economic "equation" of many industries.[3] A general description is given of options and real options in the first paragraph, the second one provides an application frame that summarise the real options way of thinking, whereas finally the last paragraph considers several models which can be used to calculate the different impact of strategic investments.

12.1.1. General[3]

Before the theory of real options is to be discussed, one should be familiar with the basic concept of an option. ***An option is the right, but not the obligation, to take an action in the future***. Options are valuable when there is uncertainty. Many strategic investments create subsequent opportunities that may be taken, and so the investment opportunity can be viewed as a stream of cash flow plus a set of options. In a narrow sense, the real options approach is the extension of financial option theory to options on real (non - financial) assets.

Real options analysis applies financial options theory to capital investments. It is "real" because an investment is to be made in operating capital and physical assets instead of financial assets. It is an "option" because one has the right, but not the obligation, to invest. Real options analysis is used in situations where management has flexibility when making large capital budget decisions with high levels of uncertainty. It helps identify and quantify the strategic value of these decisions. Real options analysis is an integral part of the risk analysis process.[4]

The real options way of thinking has three components that are of great use to managers:

- ***Options are contingent decision:*** an option is the opportunity to make a decision after you see how events unfold (nonlinear approach), while fixed decision (non - contingent) have linear payoffs, because no matter what happens, you'll make the same decision
- ***Option valuation are aligned with financial market valuations:*** the real options approach uses financial market inputs and concepts to value complex payoffs across all types of real assets
- ***Options thinking can be used to design and manage strategic investments proactively:*** the nonlinear payoffs can also be a design tool

Once the way of thinking includes uncertainty, the whole decision-making framework changes. A general description is given in the Figures 12.3 and 12.4. The first picture of Figure 12.3 illustrates one of the most important shifts in thinking from the real options approach: increased uncertainty can lead to a higher asset value if managers identify and use their options to flexibly respond to unfolding events (create opportunities). When a future decision depends on the source of uncertainty, managers care about the range of possible outcomes that the uncertain variable might have when the decision date arrives. The key is the link between time and uncertainty. In picture 2 of Figure 12.3, the cone of uncertainty[5] shows how value might evolve over time.

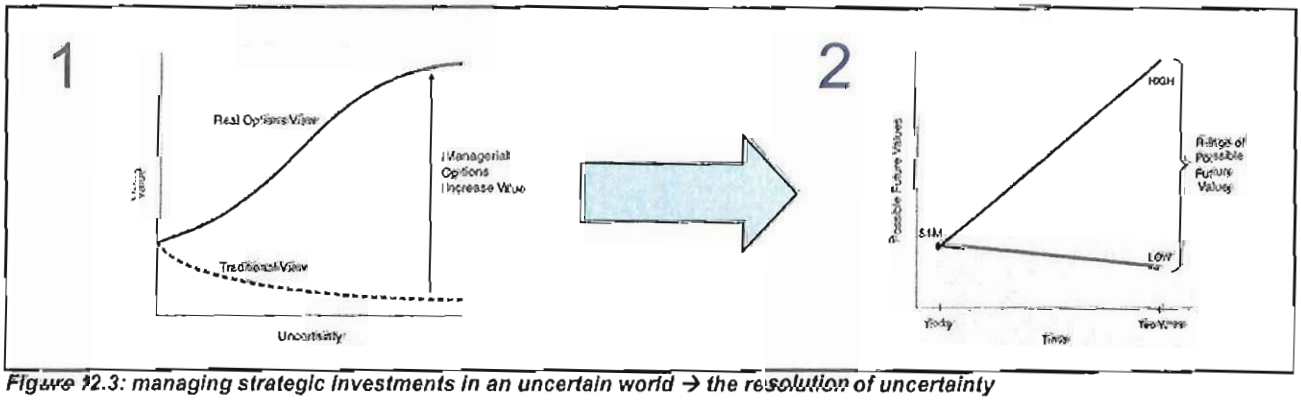


Figure 12.3: managing strategic investments in an uncertain world → the resolution of uncertainty

3: Source: Amram, M. & Kulatilaka, N.; Real Options, Managing Investment in an uncertain world. Boston, Massachusetts, Harvard Business School Press, 1999
4: Source: Decisioneering, Inc.,Real Options Analysis Toolkit™ 2.1, Software and Application User Manual. USA, Denver, Colorado, 2002
5: Source: Peers P.S.: 'Mirror, Mirror, Paul Saffo Peers Into the Future', Red Herring, July 1997

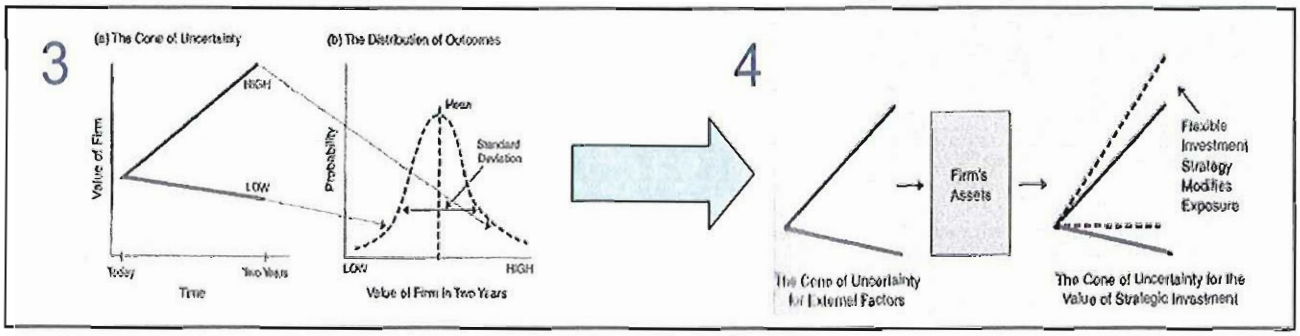


Figure 12.4: the resolution of uncertainty

The cone of uncertainty contains a range of possible future values at the end of two years. This range is part of the distribution of outcomes. The expected value at the end of two years is measured by the mean of the distribution and its standard deviation is a measure of the range of outcomes. This is illustrated in picture 1 of Figure 12.4. The second picture of this figure illustrates the possibility for managers to reduce exposure to bad outcomes and enhance exposure to good outcomes, modifying the exposure to uncertainty and increasing the value of the strategic investment.

A short introduction is given about the possibilities of the real options approach. In order to be able to realise a real options analysis, a strategic application frame is given in the next paragraph. It provides 10 questions that summarise the real options way of thinking.

12.1.2. Strategic application frame for real options analyses[6]

Important questions which have to be answered in the real options approach are defined in the strategic application frame. The first four questions will be examined more in detail in this additional graduation work, the reason for that is because based on these four questions, a basic real options analysis can be made in order to be able to compare the financial impact of building contract forms. The questions 5 to 10 consider the improvement of the strategic decision and the organisational aspects of managing real options.

Strategic application frame:

1. **What are the key decisions to be made?**
   To get started, everyone needs to be "on the same line". It is a necessity to clearly state what the contingent decision is, what observable variable triggers the decision, and who has the authority to execute the decision. The objective of this question is to trace the initial and subsequent decisions.

2. **What sources of uncertainty would cause the decision to change?**
   Managers can think of a hundred sources of uncertainty that affect their jobs and corporate investment decisions. A successful real options application is framed with relatively few (one to four) sources of uncertainty, so it is critical to start the short list based on those sources of uncertainty that will most significantly change investment strategy.

3. **How can financial market information be used?**
   The key thought in this question is whether there is any asset on the financial market that bundles together the uncertainty which is described.

4. **What is the risk profile of the investment and how does it change the firm's exposure to private and market-priced risk?**
   Before an investment strategy is going to proceed, it is important to review the risk profile, and to match it with the company's comparative advantage for bearing the risk.

5. Can the option be obtained more cheaply in the financial markets?
6. Is this valuation result credible?
7. Can the value and risk profile be improved by a redesign?

6: Source: Amram M. & Kulatilaka, N.; Real Options, Managing investment in an uncertain world Boston, Massachusetts, Harvard Business School Press, 1999

8. Who controls the decision rights to the option?
9. What changes in the firm's processes are needed to manage real options?
10. What changes in the organisation are needed to capture the option value?

In Chapter 8 and 10, a detailed description was given about the decision-making process towards an industrial construction project. Although this chapter should be able to be read on its own, a summary of the given chapters of the decision process will not be given. The decision-making process itself will be used as an input to be able to perform the real options theory. To the readers who only read this part, it is recommended to consult the Chapters 3, 5, 8 and 10 of the original complete final report. For now, the decision-making process is considered as a fact and is given in Figure 12.5.

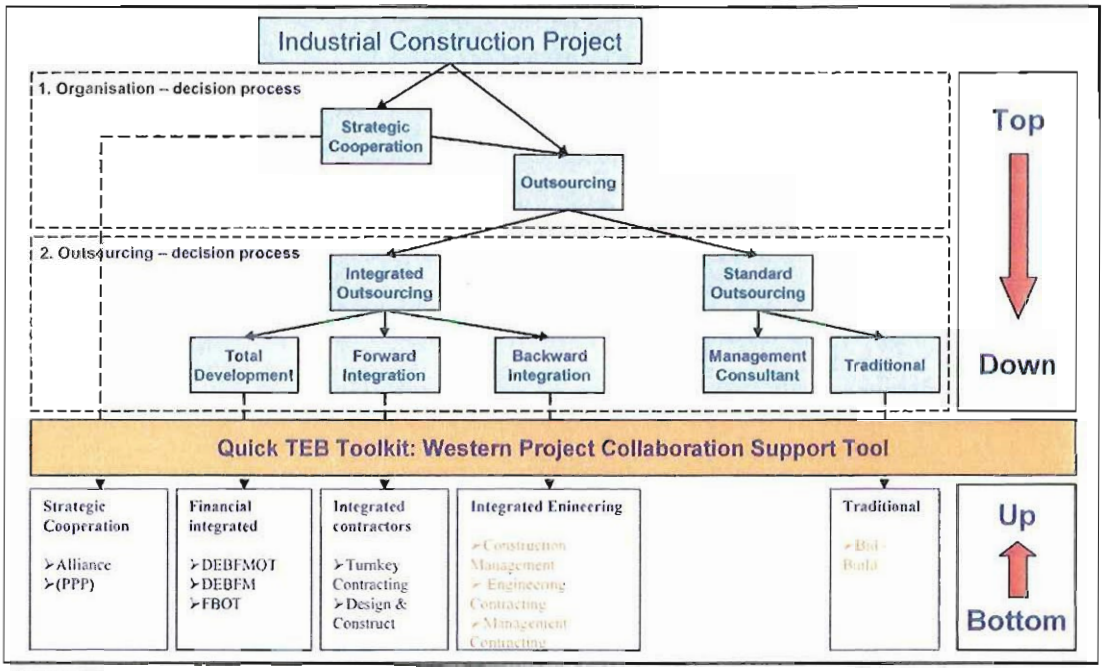


Figure 12.5: decision-making process towards industrial construction project

Two approaches can be briefly described. The top-down approach provides the user with an explanation of the different steps within a collaboration process in order to arrive at a specific collaboration group. The bottom-up approach allows the user to assign specific opinions towards a set of sub criteria via a relative comparison system. With the Quick TEB Toolkit, it is possible to compare several building contract forms all together or within each collaboration group and finally arrive at a building contract form.

The decision-making process is from the point of view of a principal towards an industrial construction project. Although based on organisational and project criteria, a certain building contract form can be the most convenient; there still will remain uncertainties which could have impacts on the chosen contract form. Whether these impacts, expressed in financial values, are of significance have to be defined with the ROAT; Real Option Analysis Toolkit. Basically there are about 40 different real options models, when considering the presented decision-making process together with the characteristics of a construction project (see Figure 12.6); the models to be considered are described in Paragraph 12.1.3.

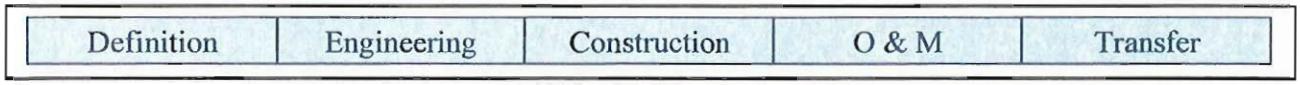


Figure 12.6: construction project chain

12.1.3. Real Option Analysis Toolkit (ROAT)[7]

The future is difficult to predict. One cannot know for certain whether a specific stock will increase or decrease in value. This is the beauty of options: You can maximize your gains while minimizing your losses. The same idea can be applied to assets. A firm's assets might include plants, patents, research and development projects. The Real Options Analysis Toolkit gives analysts and their managers the ability to determine the value of investing in an uncertain future.

Possible models which could be considered with milestones decisions are (see also Appendix K):

- **European Compound Option on Option** (Closed-Form)
  The *European Closed-Form Compound Option* with two phases is applicable for research and development investments or any other investments that have multiple investment stages. That is, management has the ability to decide if Phase II should be implemented after obtaining the results from Phase I. The phases of a European option can only be executed at the end of the time periods assigned.
- **American Sequential Compound Option** (2 Phases)
  The *American Sequential Compound Option* with two phases is applicable for research and development investments or any other investments that have multiple investment stages. That is, management has the ability to decide if Phase II (PII) should be implemented after obtaining the results from Phase I (PI).
- **American Sequential Custom Compound Option** (4 Phases)
  The *American Sequential Custom Compound Option* (with up to four phases) calculates the sequential compound option where, at very phase, there may be different combinations of mutually exclusive options including the flexibility to stop investing, *abandon* and *salvage* the project in return for some value, *expand* the scope of the project into another project, *contract* the scope of the project resulting in some savings, or continue on to the next phase.
- **American Multi-Sequential Compound Option** (10 Phases)
  The *American Multi-Sequential Compound Option* with up to ten phases provides the same types of analysis as the two-phased sequential compound models. The difference here is that the phases are extended to ten. Research has shown that analysis of anything greater than 10 phases provides fairly negligible variances in results, and all future investment phases could be collapsed into the last phase.

12.2. *Functional scope decision-making for ROAT*

When (strategic) investments are going to be considered and implemented, one of the aspects which continuously have to be paid attention to is finance. Until now, the financial part was not considered in the decision-making process in order to arrive at a collaborative group and building contract form. Making a decision based on certain criteria is important, but to be able to forecast the financial impact caused by key uncertainties is even more important. Before the real options analysis can be realised, the financial aspects in relation to a construction project have to be considered within a building contract form. These aspects will be considered in the next paragraph whereas in Paragraph 12.2.2 the different strategies are presented.

12.2.1. Financial aspects in construction projects

The main financial elements in strategic investments can generally be categorised in three main groups (see Figure 12.7):

- **Capital Expenses (CAPEX):** capital expenses in be separated into three different phases. Each of them represents a certain percentage of the total investment amount. In order to be able to make financial analysis, an assumption is made is the percentages.
- **Operational Expenses[8] (OPEX):** operational expenses are costs which have to be incurred during the whole economic life cycle of a construction. Also an assumption is made that nearly 95% of the operational expenses belongs to the phase operations & maintenance. The last 5% of expenses is needed when a construction have to be handed over to the principal in the case of a public – private partnership with operation and transfer activities by the contractor.
- **Income + Return On Investments (ROI):** the income can only be generated after the realisation of the construction project.

7: Source: Decisioneering, Inc.; Real Options Analysis Toolkit™ 2.1, Software and Application User Manual, USA, Denver, Colorado, 2002
8: Assumption: linear distribution of expenses for the operation and maintenance period

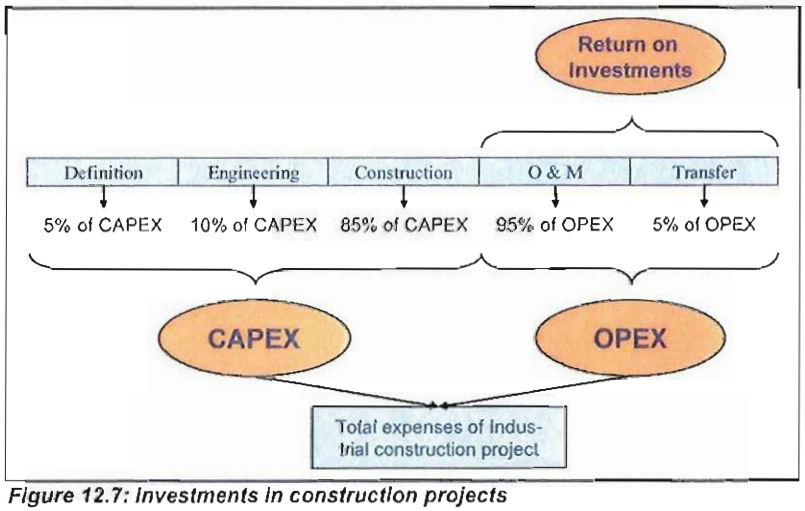


Figure 12.7: Investments in construction projects

From the point of view of decision-making in construction projects, building contract forms can be divided in five main collaborative groups. Four of them are collaborations between principal and contractor(s), whereas one group is based on collaborations between principal and management consultants. The aim of the main thesis was to systematically and logically arrive at a collaborative group and building contract form between Dutch principals / engineering companies and Chinese contractors. Due to this aim, the managerial group of contract forms was not considered. Also for the analysis of the real options, the managerial group will not be taken into account. For this first conceptual approach, four building contract forms will be selected (one of each group) and examined. These are:

- **Traditional Bid – Build:** This is one of the most common building contract forms with a very long history. The principal is responsible for the design and the provision of the tender package and during the construction phase, the principal also supervises the works. The contractor "designs' the method of construction, makes a planning schedule for the works and executes the works in accordance with the contractual obligations, i.e. the technical and administrative conditions.
- **Turnkey:** The principal will let the contracting party develop a total solution on the basis of an integrated design and construction method. An extensive description of the functional requirements is given by the principal. One party is responsible for design and construction --> consultation will take place, but detail engineering and construction is full responsible by the contractor (buy agreement).
- **EPCM:** In this form the Engineering Contractor is responsible for the total design and coordination. (General contracting or Total engineering) Involvement of a construction manager in an early phase makes it possible to consult the design team by the construction manager. A more efficient and better tuning will take place which result in fast tracking, efficient coordination and cost control.
- **DBMOT:** The DBMOT procurement procedure is characterised by extensive integration of the building processes. The development of the project consists of design and construction but also maintenance and operation with a final transfer. Parties work together in a consortium. A condition is that a project is suitable for integration of all the processes from the start until and including operation.

Each building contract form has its characteristics towards: Time, Money and Quality. The financial investments can be compared to these characteristics and are presented in Table 12.1.

Building contract forms	Time (% of construction time)	Money (% of Capital Expenses)	Quality (% of Operational Expenses)
1. Traditional Contract: Bid – Build[9]	100%	100%	100%
2. Forward Integration: Turnkey[10]	85%	90%	100%
3. Backward Integration: EPCM[11]	85%	80%	100%
4. Total Development: DBMOT[12]	75%	70%	125%

Table 12.1: investments vs. building contract forms

9: Traditional contract is set to be standard

10: Due to integration, efficiency and costs saving can be achieved in a turnkey building contract form

11: EPCM is almost the same as turnkey with one major difference, the financial responsibility

12: Due to a full integration of the construction chain, most harmony and efficiency can be achieved between the aspects: Time, Money and Quality. Although the capital expenses can be a little bit higher due to fine tuning and more durable construction methods, the project can be delivered in a shorter time and the operational expenses will be lower.

Not only is it interesting to know what the differences are between the building contract forms related to the characteristics, each form has also a certain amount of flexibility in order to be able to make decisions during the construction project. Each decision moment which is allowed within the considered contract forms is indicated as a milestone. (See Figure 12.8)

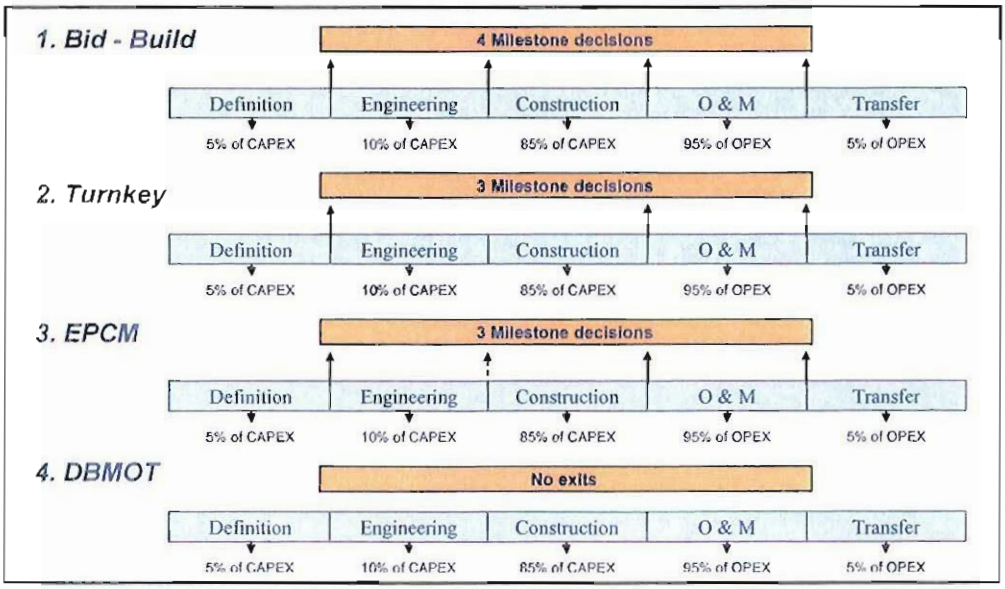


Figure 12.8: decision possibilities for building contract forms

The main financial issues were discussed; also an overview was given of characteristics and decision possibilities. Both of them combined with the top-down decision-making structure results in four decision strategies, each with their own financial consequences.

12.2.2. Decision strategies for construction project

Strategy A: Bid – Build (see Figure 12.9):
With this strategy, principals / managers have the possibility to make key decisions on 4 milestones; financial investments are separated according to the different phases in the construction chain.

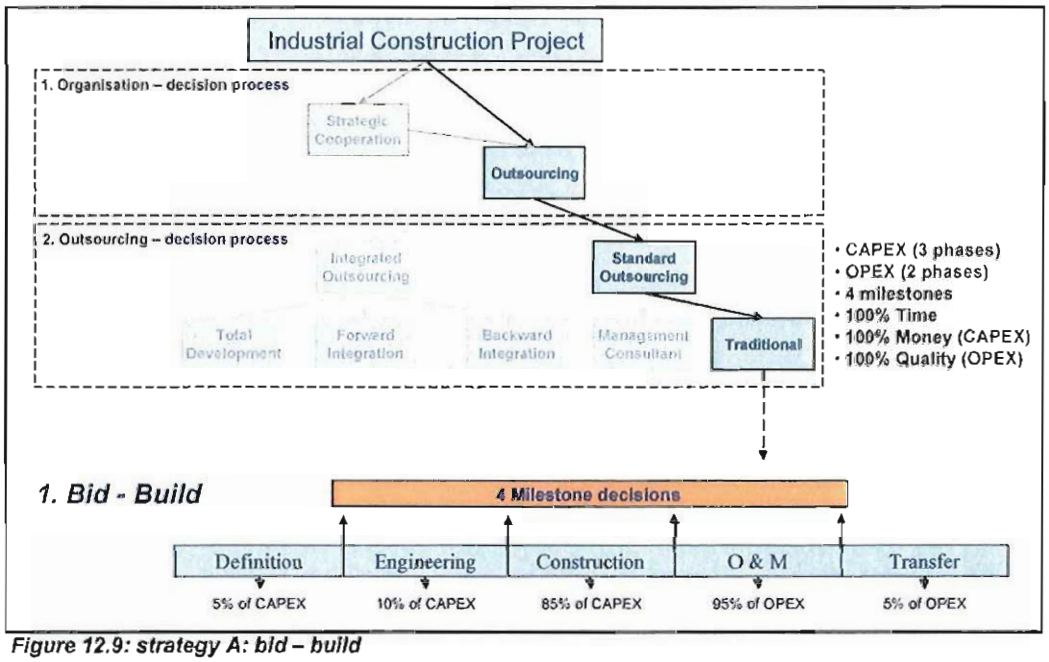


Figure 12.9: strategy A: bid – build

Strategy B: Turnkey (see Figure 12.10):
With this strategy, principals / managers have the possibility to make key decisions on 3 milestones, the engineering and construction phase are integrated together. This results in a bigger initial investment of 95% of CAPEX for the second phase, but in this example it also saves 15% of time and 10% of CAPEX.

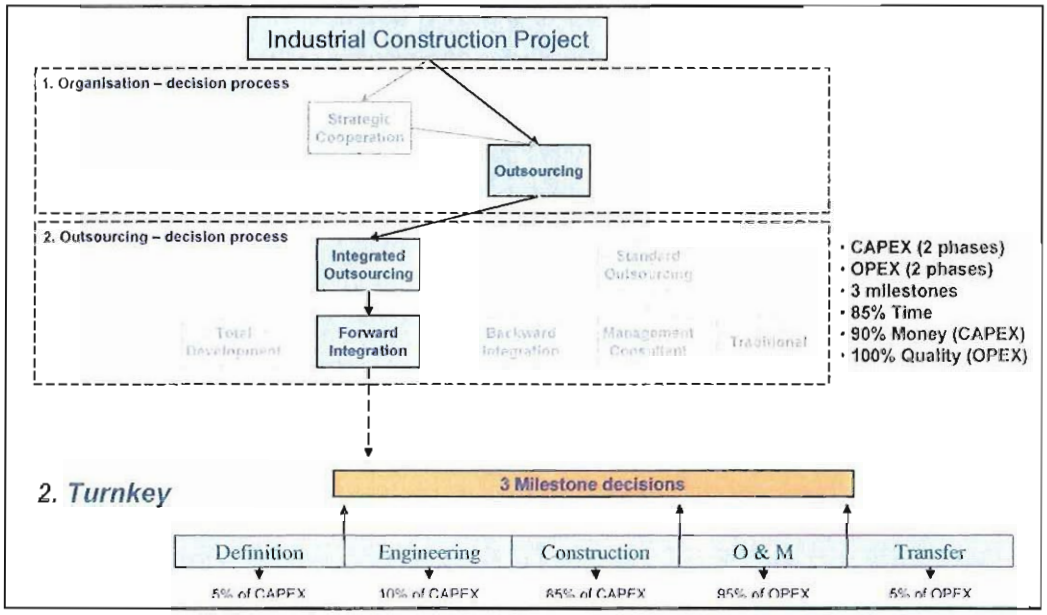


Figure 12.10: strategy B: turnkey

Strategy C: EPCM (see Figure 12.11):
With this strategy, principals / managers have the possibility to make key decisions on 3 (4) milestones, although the engineering and construction phase are integrated together, there still remain a flexibility in the construction phase due to an Engineering Contractor. Also here, this results in a bigger initial investment of 95% of CAPEX for the second phase, but in this example it also saves 15% of time and 20% of CAPEX.

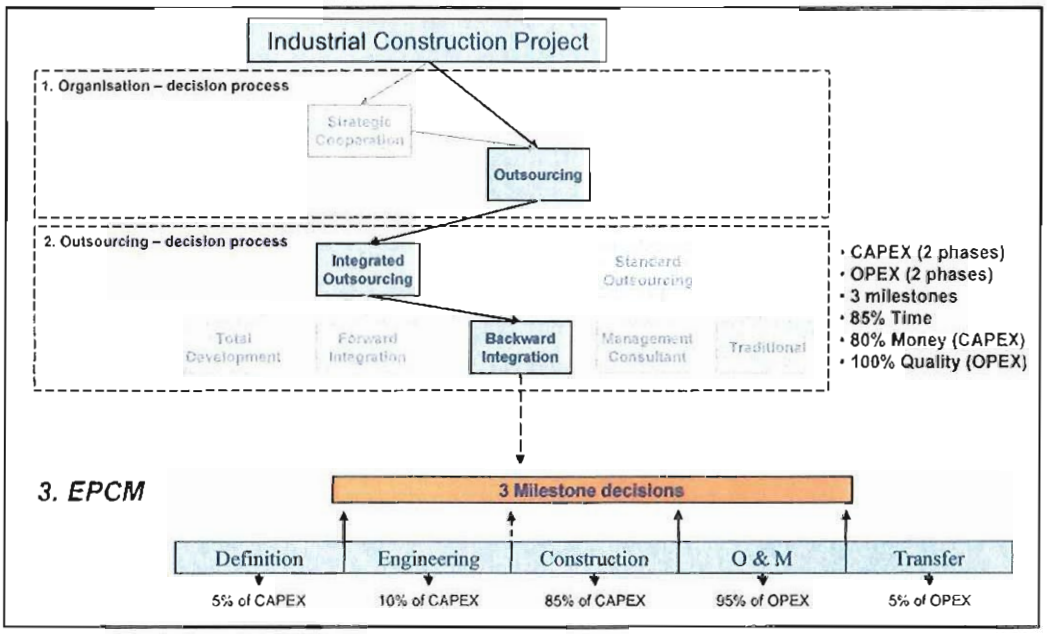


Figure 12.11: strategy C: EPCM

Strategy D: DBMOT (see Figure 12.12):
With this strategy, principals / managers have the possibility do not have the possibility to make decisions during the construction project; all phases of the construction chain are integrated in one contract. Due to the total integration, time up to 25% can be saved and money up to 30%. The advantage of such long term contract is mainly on the operation & maintenance phase. (OPEX)

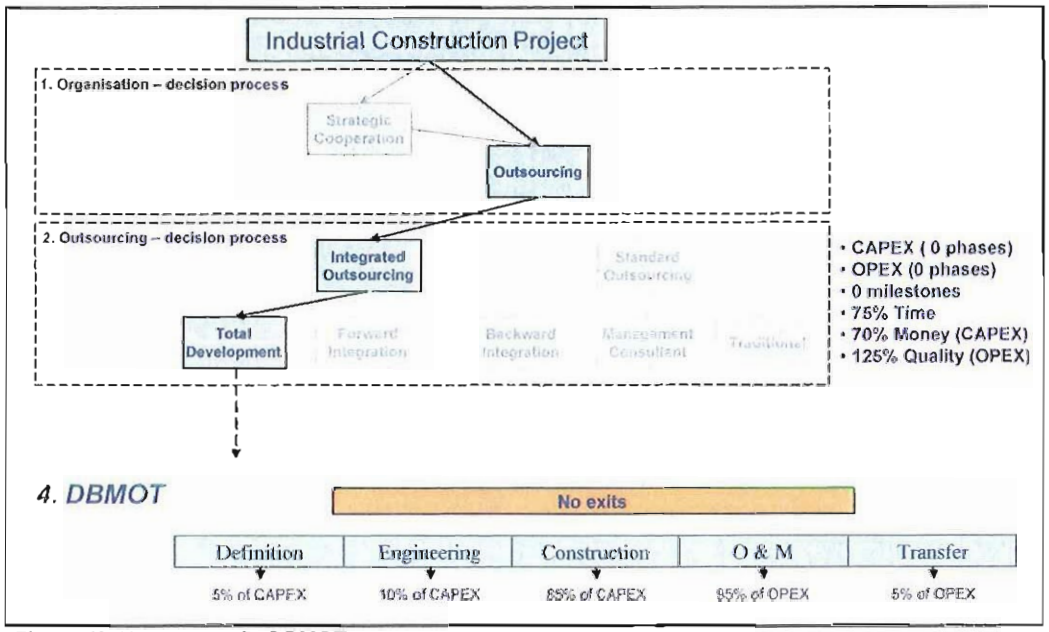


Figure 12.12: strategy D: DBMOT

12.2.3. Real options way of thinking

An application frame of 10 questions was outlined in Paragraph 12.1.2. Four of them are considered important in the approach of real options. Particularly in this chapter, quantitative and concrete aspects will be defined in order to be able to make analysis.

1. **What are the key decisions to be made?**
   An answer to this question can be considered from two points of views. First of all, for each industrial construction project, the principal / manager has to decide in which building contract form he wants to collaborate with its contractors. A selection of a building contract form based on project related criteria and organisational view is possible using the Quick TEB Toolkit (see Chapter 10). On the second place, on top of the building contract form selection, the influence of organisational and external factors are important and have huge financial impact in the final decision whether a project should continue or ended. It has already been presented with milestones decision moments within the construction chain.

2. **What sources of uncertainty would cause the decision to change?**
   Three main categories of sources of uncertainties can be defined which would cause the decision to change:
   - **Change of internal corporate or business strategies:** one can imagine that a change in the management board of an organisation probably will have effects on the corporate and business strategies. Effects such as: the markets to be approached, change in products and services, geographical changes etc. When such a change occurs, it might affect strategic long term investments within the organisation.
   - **Change due to macro economic developments (stability of a country):**
     - *Political and Legal influences* in relation to engineering and construction permits and regulations
     - *Economical developments* are often the trigger for commercial companies to make strategic investments
     - Social developments will result in influences of stakeholders
     - Technological developments is assumed for this thesis not to be a key factor in the realisation of an industrial construction project

- Safety and environmental issues

Two of the macro economic aspects will be taken into account as key sources of uncertainties; political and economical issues. These two aspects are directly related to the progress of a project and its financial components.

3. **How can financial market information be used?**
   This question will not be considered, the aim of the thesis is to look at possible collaboration forms between principal and contractor in the realisation of a "new" industrial construction project.

4. **What is the risk profile of the investment and how does it change the firm's exposure to private and market-priced risk?**
   A risk profile for an industrial construction project is presented in Table 12.2. To be able to make an "easy" analysis and comparison between the building contract forms, the presented chances of occurrence are only values for input and do not represent the reality.

Description of risks	Chance of occurrence	Consequence of risk[13]					Total damage due to risk
Bid - Build		**D**	**E**	**C**	**O & M**	**T**	
Change of internal corporate or business strategy	50%	5% of CAPEX	10% of CAPEX	85% of CAPEX	95% of OPEX	5% of OPEX	Chance x Consequences for each phase
Economical	50%	idem	idem	idem	idem	idem	Idem
Political / Legal	50%	idem	Idem	idem	idem	idem	Idem
Turnkey		**D**	**E + C**		**O & M**	**T**	
Change of internal corporate or business strategy	50%	5% of CAPEX	95% of CAPEX		95% of OPEX	5% of OPEX	Chance x Consequences for each phase
Economical	50%	idem	idem	idem	idem	idem	idem
Political / Legal	50%	idem	idem	idem	idem	idem	idem
EPCM		**D**	**E**	**C**	**O & M**	**T**	
Change of internal corporate or business strategy	50%	5% of CAPEX	10% of CAPEX	85% of CAPEX	95% of OPEX	5% of OPEX	Chance x Consequences for each phase
Economical	50%	idem	idem	idem	idem	idem	idem
Political / Legal	50%	idem	idem	Idem	idem	idem	idem
DBMOT		**D + E + C + O & M + T**					
Change of internal corporate or business strategy	50%	100% of CAPEX + 100% of OPEX					Chance x Consequences for each phase
Economical	50%	idem					idem
Political / Legal	50%	idem					idem

Table 12.2: risk profile towards strategic investment decisions in construction projects

The application has three decision points, three sources of uncertainty for the first three phases of the construction chain and two sources of uncertainty for the last two phases. This stylisation captures the early-stage economic and political risks and the importance of business risk. Based on questions 1 to 4, the input which is needed for the real options analysis is presented in Figure 12.13 with percentage values, and the analysis itself is given in the next paragraph. In this case the CAPEX is assumed to be € 100 million and the OPEX is also € 100 million.

13: financial consequences for each phase in the construction chain

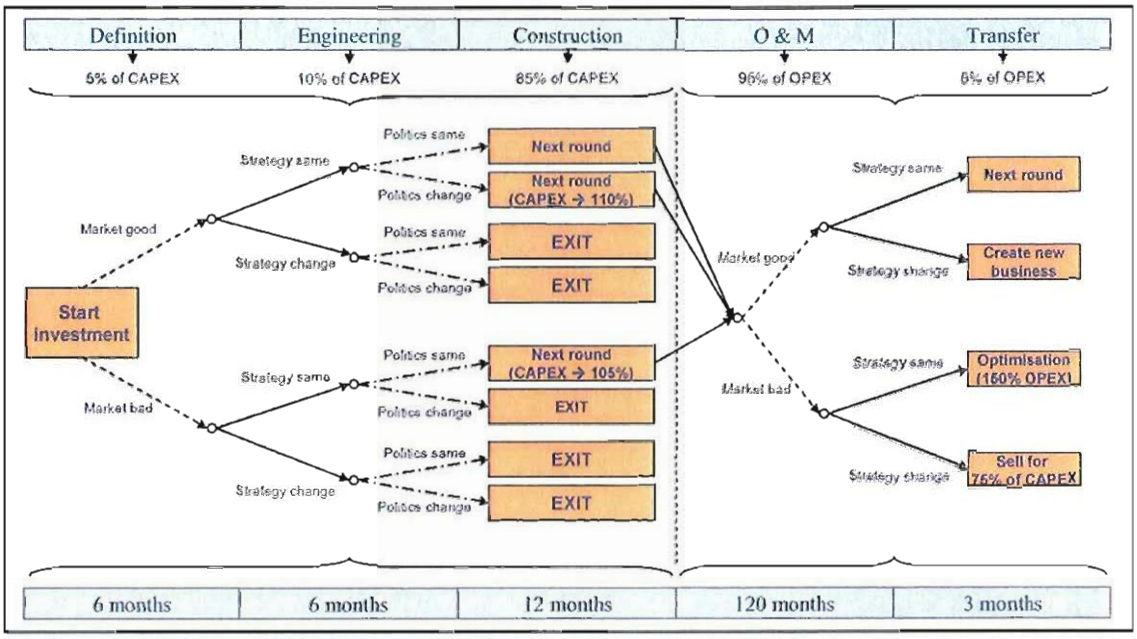


Figure 12.13: Investment opportunities

One can imagine that such a decision structure can occur within each phase of a construction project. Each phase has its own financial impact towards the project, as the building contract form is related to the matter of integration of the construction phases, the choice of a contract form will have different financial impacts on the project due to key uncertainties. In this chapter, it is not the objective to make a thorough analysis for the whole project with all possibilities of uncertainties. For this case, the following demarcations have been made to be able to make an "easy" analysis (see Figure 12.14).

- Aspect of market is 100% good
- Only financial impact on the CAPEX are considered
- Time efficiency due to integration of building processes is not considered
- Quality improvement in operation & maintenance face is not considered
- Earlier return on investments and income due to integration contracts are not considered
- Only the most positive and most negative situation are discussed

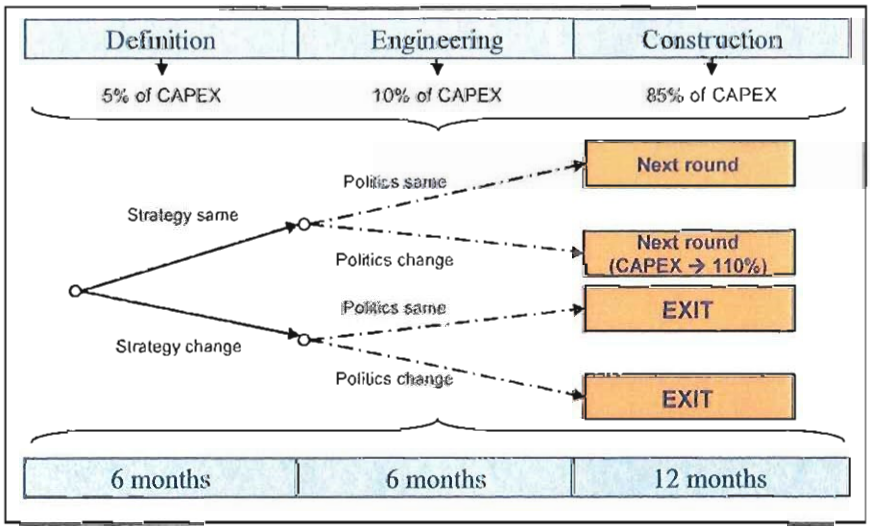


Figure 12.14: selected investment opportunities

If the different financial values will be filled in for each building contract form, five different an overview of strategic investments per phase for the whole life cycle of a construction project can be given. (See Table 12.3)

	Definition	Engineering	Construction
1. Bid – Build			
M+, S+, P+[14]	***Invested € 5 M***	***Invested € 10 M***	***Invested € 85 M***
M+, S+, P-	Invested € 5,5 M	Invested € 11 M	Invested € 93,5 M
M+, S-, P+	Loss € 5 M	Loss € 15 M	Loss € 100 M
M+, S-, P-	***Loss € 5 M***	***Loss € 15 M***	***Loss € 100 M***
2. Turnkey			
M+, S+, P+	***Invested € 4,5 M***	***Invested € 85,5 M***	
M+, S+, P-	Invested € 4,95 M	Invested € 94,05 M	
M+, S-, P+	Loss € 4,5 M	Loss € 90 M	
M+, S-, P-	***Loss € 4,5 M***	***Loss € 90 M***	
3. EPCM			
M+, S+, P+	***Invested € 4 M***	***Invested € 76 M***	
M+, S+, P-	Invested € 4,4 M	Invested € 83,6 M	
M+, S-, P+	Loss € 4 M	Loss € 12 M	Loss € 80 M
M+, S-, P-	***Loss € 4 M***	***Loss € 12 M***	***Loss € 80 M***
4. DBMOT			
M+, S+, P+	***Invested € 70 M***		
M+, S+, P-	Invested € 77 M		
M+, S-, P+	Loss € 77 M		
M+, S-, P-	***Loss € 77 M***		

Table 12.3: overview of strategic investments

With the given demarcations and the possible strategies and possible real options models, an analysis can take place between the considered building contract forms.

12.3. Conceptual model: Quick TEB ROAT

To be able to make a comparison between the four considered building contract forms, they all have to be tested with one model. The model which enables the possibility to embrace the contract forms is the *American Sequential Custom Compound Option* (up to 4 phases). This model allows the user to split its investment up to four phases with different investment periods. For each model the following fixed parameters are used in the analysis:

- Volatility 50%
- PV Asset $ 150 M
- Risk-Free Rate 5%
- Dividend Rate 0%

For each building contract form, it is important to define the option value and possible losses for a certain situation.

12.3.1. Strategy A: Bid – Build – American Sequential Custom Compound Option

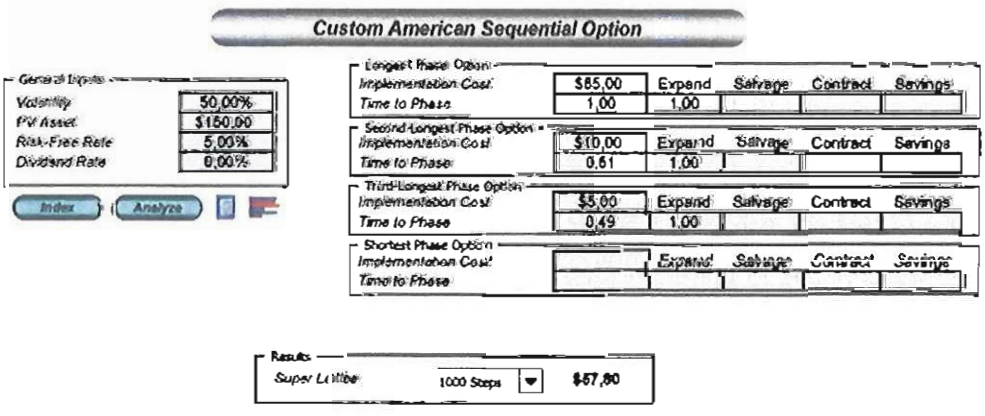


Figure 12.15: output ROAT strategy A

14: M+: market good, S+: strategy same (no change in corporate and business strategy), P+: politics same (no change in political situation)

In strategy A, spend $ 100 M (in present values) quickly over 2 years by implementing the three phases (design, engineering and construction). This approach yields a strategic value of $ 57,80 M where the NPV is $ 50 M ($ 150 (PV) - $ 85 - $ 10 - $ 5). The option value is hence $ 7,80 M ($ 57,80 - $ 50). (See Figure 12.15)

12.3.2. Strategy B: Turnkey – American Sequential Compound Option

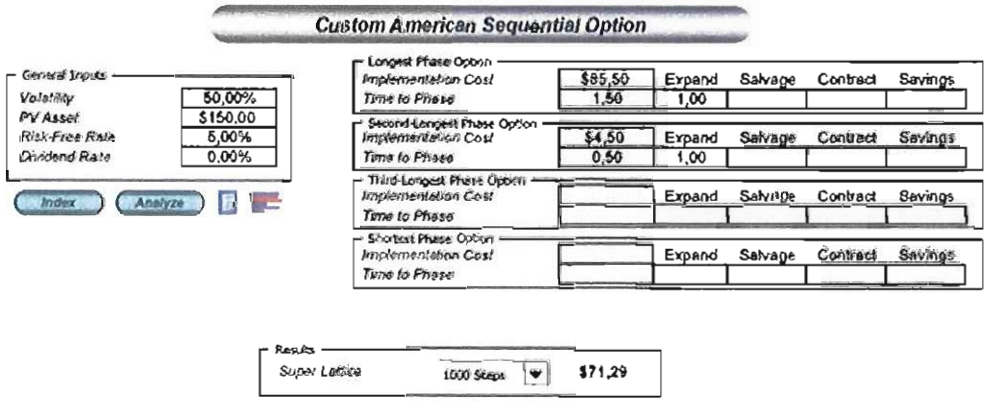


Figure 12.16: output ROAT strategy B

In strategy B, spend $ 90 M (in present values) quickly over 2 years by implementing the two phases (design and engineering & construction). This approach yields a strategic value of $ 71,29 M where the NPV is $ 60 M ($ 150 (PV) - $ 85,50 - $ 4,50). The option value is hence $ 11,29 M ($ 71,29 - $ 60). (See Figure 12.16)

12.3.3. Strategy C: EPCM – European Compound Option on Option

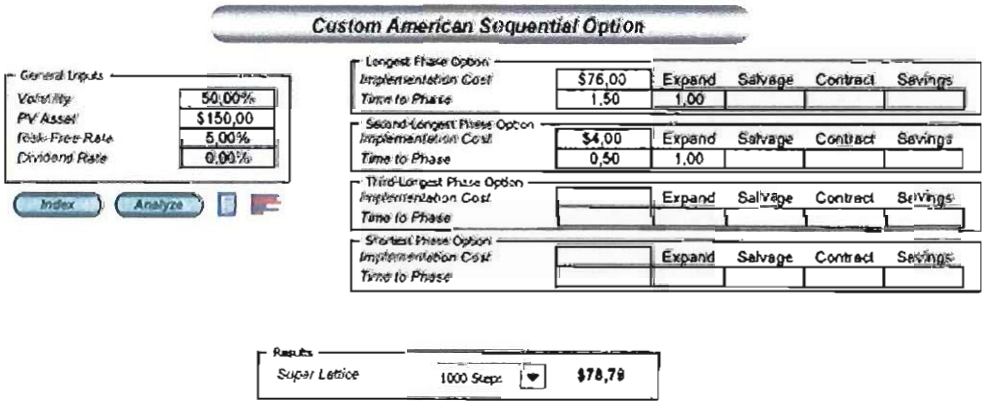


Figure 12.17: output ROAT strategy C

In strategy C, spend $ 80 M (in present values) quickly over 2 years by implementing the two phases (design and engineering & construction). This approach yields a strategic value of $ 78,79 M where the NPV is $ 70 M ($ 150 (PV) - $ 76 - $ 4). The option value is hence $ 8,79 M ($ 78,79 - $ 70). (See Figure 12.17)

12.3.4. Strategy D: DBMOT – American Sequential Custom Compound Option

In strategy D, spend $ 70 M (in present values) quickly over 2 years by implementing one phase (design & engineering & construction). This approach yields a strategic value of $ 90,22 M where the NPV is $ 80 M ($ 150 (PV) - $ 70). The option value is hence $ 10,22 M ($ 90,22 - $ 80). (See Figure 12.18)

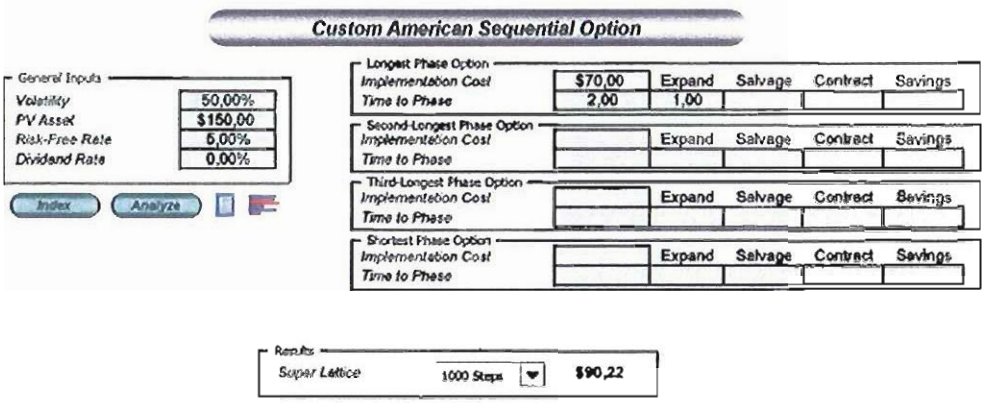


Figure 12.18: output ROAT strategy D

12.3.5. Total comparison strategy A to D

Four analyses have been made (positive situation) with the real options model *American Sequential Custom Compound Option*. In negative situations an exit is required at a milestone decision moment. Table 12.4 gives an overview of the option values in the positive situation and negative financial values in the three phases.

Description	Option Value	Construction phases		
		Design	Engineering	Construction
A. Bid – Build	$ 7,80	Loss € 5 M	Loss € 15 M	Loss € 100 M
B. Turnkey	$ 11,29	Loss € 4,5 M	Loss € 90 M	
C. EPCM	$ 8,79	Loss € 4 M	Loss € 12 M	Loss € 80 M
D. DBMOT	$ 10,22	Loss € 77 M		

Table 12.4: overview comparison strategy A to D

From the results of Table 12.4, it can be concluded that the building contract form turnkey in this case has the highest option value. This means that the probability of success in accordance with the real options theory would be the best. The next step is to calculate the percentage of success of this option value. This part would be nice and is recommended to be a stand-alone graduation work.

From the point of view of possible losses in early exits, the EPCM contract form would fit the best when an exit is to be made after the design phase. When the project is already in the engineering phase, the losses in strategy B and D will be tremendous. What the effect will be when both issues are considered still needs to be surveyed. Also this part is belongs to a separate graduation work.

12.4. Conclusions & Recommendations

Some general assumptions and demarcations have been made during this chapter. The aim of this chapter was also to provide the reader a basic feeling with the real option theory and the possibilities of it. The real options analysis toolkit is a tool to support strategic management decisions with huge investments. This tool is mostly an add-on on risk management with cash flow simulations. Instead of only considering risks like in DCF (discounted cash flow models) ROAT can deal with uncertainties and create advantages using financial option strategies. Although this general introduction of the possibilities of ROAT, still some conclusions and recommendations can be made to finish this chapter.

12.4.1. Conclusions

1. With the discussed real options model, it is possible to make a comparison between building contract forms based on their milestones decision possibilities. Each contract form can be represented with a certain option value. The higher the option value, the better the contract form is for the given situation. This result can than be compared with on the one hand the choice given by the Quick TEB Toolkit which is based on project criteria, and on the other hand the losses due to early exits of a project. A well-founded choice with

impacts on financial investments due to uncertainties provides the principal / manager to be able to make the final decision.

2. The real options theory is a tool to consider a few key decisions with its uncertainties. When a great amount of risks and uncertainties have to be considered, real options should not be used. A better model would be a discounted cash flow model with a risk analysis which is analysed via a Monte Carlo simulation. Not only will the impact of the different risks be taken into account, also the sensitivity of a certain factor is discussed.

12.4.2. Recommendations

1. During the general analyses, a set of demarcations are used to be able to have a quick input. For a more realistic analysis it is recommended to fine-tune several parameters and evaluate the model with some practical existing projects.

2. A general introduction is given about the possibilities of real options towards building contract forms, in this case only one model has been used to analyse the projects. The ROAT provides 40 models for different situation in different markets and different decision possibilities. It is recommended to research more in detail the other possibilities of real options in relation to construction assets investments.

3. A first step is made to calculate the different option values of strategies. In what way these values can be quantified in percentage of success and how this percentage can be raised or decreased has still to be examined. Besides of this, when a percentage is known, a quantitative analysis between the benefits dealing with uncertainties and the possible losses can be combined. It is recommended to look at the total picture of risk management (real options analysis + risk analysis based on Monte Carlo simulations)

4. Real options theory is another way of thinking, principals / managers have to deal with the concept of uncertainties. When expertise in this way of thinking can be created in a couple of markets where huge asset investment with uncertainties will take place, an added value will be created towards principals and managers. It is recommended for Tebodin from the point of view of commercial acquisition activities to develop know-how, skills and experience in this theory in order to be able to advise her clients to deal with uncertainties in strategic asset investments.

13. Conclusions & Recommendations

Finally, one of the most important Chapters of this master thesis is going to be considered. Many topics have been examined and surveyed, relationships between managerial aspects towards project related aspects are pointed out. All together these were translated into practical support tools which have been evaluated. This chapter presents the conclusions and also recommendations in different fields: general as well as specific ones for Tebodin and Delft University of Technology.

OVERALL CONCLUSION

- The objective of this thesis was to develop a systematic and logical decision-support tool for a principal / consultancy & engineering company in order to arrive at a collaborative group and building contract form concerning business, cultural and project related issues.

  Two tools have been developed instead of one: **Quick TEB Toolkit** and **Quick TEB ROAT**. The first tool concerns the project related aspects. With this tool, the principal can be guided to a collaborative group and building contract form for a specific project. The second one considers the business and cultural uncertainty issues. It is a tool that gives analysts and their managers the ability to determine the value of investing in an uncertain future.

  Besides of the two practical tools which are only related to an industrial construction project, a number of practical indications have been summarised concerning "doing business in China". Personal and business relationships are issues which can not be strictly modelled, a certain common sense is a must in these kinds of management decision-making.

  Both supporting tools, **Quick TEB Toolkit** and **Quick TEB ROAT**, are literally tools to support Dutch principals in order to arrive at a collaborative form with their future Chinese partners or contractors.

- As a conclusive presentation, the deliverables of this thesis are summarised and presented in Figure 13.1. (See also Appendix L for a large print-out)

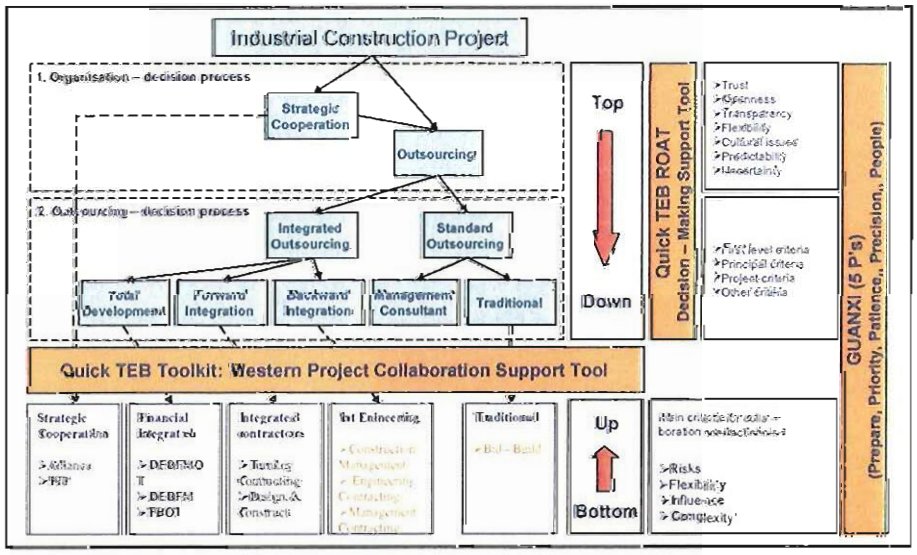


Figure 13.1: overview deliverables master thesis "Bridge to China"

- ***Quick TEB Toolkit: Western Project Collaboration Support Tool***
  - Management decision-making process related to an industrial construction project (top-down – separated in organisational - and outsourcing – decision process)
  - Comparison of considered building contract forms (bottom-up)
  - Top-down and bottom-up approach results in Quick TEB Toolkit
- ***Quick TEB ROAT: Decision-Making Support Tool***

- Business and project related criteria in management decision-making
- Key uncertainties in key decision moments are important
- Each strategy of building contract form can be expressed in an option value in order to be able to compare the contract forms based on uncertainties and their financial impact

- ***Chinese negotiation approach which is of great importance before, during and after a construction project (5 P's; Prepare, Priority, Patience, Precision, People)***

An overall conclusion is given related to the objective of this thesis together with a brief description of the deliverables. A further detailed conclusion of each chapter is given in Paragraph 13.1.

13.1. Conclusions

1. The Western project collaboration support tool towards building contract forms can also be used in relation to Chinese contractors. Building contract forms are more or less the same between The Netherlands and China. This is confirmed by The Chinese government announcing that it will follow the international standards and regulations in several directions.

2. The key performance indicators derived from the developments in the construction industry are **trust**, **performance**, **image**, **predictability** etc. These indicators show resemblances with Chinese aspects in the basis of doing business in China.

3. Demarcations were made to consider the region of Shanghai Delta and to focus on the markets chemicals & pharmaceuticals and food & beverages related to industrial projects. It is often written in literature not to consider China as one country, but to see it as a union of independent states. Although within China, there are specific differences between the Chinese people, all of them have a number of basic attitudes and common thoughts. These attitudes and thoughts were presented in this thesis. When a Dutch principal decides to initiate a construction project in China, it doesn't matter whether it is located in Shanghai, Shenzhen, and Beijing or somewhere in the middle of China, or in which market sector a project is to be realised, a thorough understanding of these basic attitudes and thoughts is a necessity.

4. In China, the basic attitudes (**mianzi**, **lianzi**, **ganqing**, etc.) and thoughts (**Confucius**, **Mencius**, **Taoism** etc.) are derived from the rich Chinese history and philosophy. Each of them represents a special characteristic which describe the behaviour of the Chinese people and all of them are related to the most important concept: **guanxi**, social personal relationship. Western people often make the mistake to underestimate the power and "real" influence of this concept.

5. There is no one "model" of doing business in China. A sound method in approaching Chinese people is to describe a framework and not a rigid model. A framework which has the function to guide and support Dutch principals in the negotiation with the Chinese people. This framework can be drawn up out of five P's: **preparation**, **priority**, **patience**, **precision** and **people**, in which the last one is of fundamental importance.

6. The Chinese society is based on social personal relationships. Based on the analysis carried out, it must be concluded that it is not possible to present a model (ones used often in business context are: e.g. Porter, SWOT, BSC, Risk analysis) that represents the collaboration process among the Chinese people. The approach chosen in this thesis is to present only a framework in negotiating with the Chinese people, pointing out the most important aspects and making managers (people) become aware of them.

7. When considering Dutch industrial construction projects, often the time span of each particular project is only a couple of years. The business and internal processes involved, including the process of creating a (personal) relationship, are far more important than the actual realisation of an industrial plant. Dutch principals or managers are assessed on their managerial skills towards **Time**, **Money**, **Quality**, **Organisation** etc. in a project, whereas the Chinese business people will be thinking of other matters: **guanxi**, **long-term strategy**, **performance** and **success**, all together in terms of **harmony**. Dutch principals or managers should continuously be aware not only of their own interest, but also that of their Chinese partners or contractors. Keeping this in mind is a prerequisite to enable Dutch principals to bridge these gaps and possibly prevent unexpected circumstances.

8. A possibility for dealing with cultural issues can be making use of cross – cultural management. Five principles in relation to the Chinese context then have to be taken into account: **hierarchy**, **collectivism**, **performance**, **flexibility** and **strategy**. Each of them represents a list of characteristics and thoughts that principals or managers will face in the daily practices of doing business in China.

9. A comparison and understanding is possible between the thoughts of The Netherlands and China. Different criteria and issues both in the Western and Chinese context can be merged together and translated into a set of six basic relationship aspects: **learning**, **adaptation**, **trust**, **commitment**, **social interaction** and **social bonds**.

10. The **Quick TEB Toolkit** is a practical support tool focussed on project collaboration selection that combines two approaches. The top-down approach provides the user with an explanation of the different steps within a collaboration process in order to arrive at a specific collaboration group. The bottom-up approach allows the user to assign specific opinions towards a set of sub criteria via a relative comparison system. With this tool, it is possible to compare several building contract forms all together or within each collaboration group and finally arrive at a building contract form.

11. With the **Quick TEB ROAT**, it is possible to make a comparison between building contract forms based on their milestones decision possibilities. Each contract form can be represented with a certain option value. The higher the option value, the better the contract form is for the given situation. This result can than be compared with on the one hand the choice given by the Quick TEB Toolkit which is based on project critera, and on the other hand the losses due to early exits of a project. A well-founded choice with impacts on financial investments due to uncertainties provides the principal / manager to be able to make the final decision.

12. The real options theory is a tool to consider a few key decision with its uncertainties. When a great amount of risks and uncertainties have to be considered, real options should not be used. A better model would be a discounted cashflow model with a risk analysis which is anlysed via a monte carlo simulation. Not only will the impact of the different risks be taken into account, also the sensitivity of a certain factor is discussed.

13.2. Recommendations

13.2.1. General recommendations

1. This thesis report includes a broad range of different subjects dealing with business negotiation in China. A lot of them are familiar due to one's passive knowledge; however others might be too abstract or difficult to understand. To those who are not familiar with these subjects, or do not exactly know how to interpret these aspects, it is recommended to consult Chinese philosophical and cultural literatures as background reading.

2. In order to be able to negotiate with Chinese people, it is recommended to have, or to develop strategic management knowledge and strategic managerial skills. It is at this level that Chinese people do business, for they have a strong sense of long-term strategy, which often surprises Western businessmen during new or existing partnerships.

13.2.2. Recommendations Tebodin

1. The first practical support tool, ***Quick TEB Toolkit***, deals with the general building contract forms at project level. The appraisal and weighting procedure is based on Tebodin internal knowledge and experience. Since the practical support tool has been evaluated using only a few practical projects, it is recommended to evaluate it further with large as well as small projects in different sectors. Furthermore, like many tools, models and systems, it is recommended to continuously update it and improve it.

2. The second practical support tool, ***Quick TEB ROAT***, consider a decision-making process at strategic level for industrial construction projects. With the "new" theory of Real Options, specifically long-term projects and large investments can be analysed. A conceptual approach is presented only in this second support

tool, so therefore the recommendation is made to do further survey in this subject. This is in order to have a better understanding and a good overview about the possibilities of Real Options Analysis and to be able to create another added value.

3. Two independent practical support tools have been realised. Although one of them considers the concrete choice of a building contract form and the other considers the decision-making process with business and cultural aspects leading up to a project, it will be convenient when both tools are merged to form a single unit. It is recommended to do further research to determine whether this merging process is feasible and practical.

4. Real options is another way of thinking, principals / managers have to deal with the concept of uncertainties. When expertise in this way of thinking can be created in a couple of markets where huge asset investment with uncertainties will take place, an added value will be created towards principals and managers. It is recommended for Tebodin from the point of view of commercial acquisition activities to develop know-how, skills and experience in this theory in order to be able to advise her clients to deal with uncertainties in strategic asset investments.

5. It is recommended as a follow up step to extend and expand the cultural knowledge of Tebodin towards other countries. The cultural dimensions which are added as a consultative passive support tool might create an added value for approaching Western principals with the intention to initiate a project in China. If the principal is not only convinced about the consulting and engineering capability of Tebodin at the local level, but also about its knowledge of local cultural aspects, Tebodin creates a competitive advantage.

6. It is recommended to look at the support tools in a "reverse way", meaning that an added value can also be created to attract the attention of the Chinese principals. China is attractive and booming, many companies are investing in China, and not only will foreign companies profit from the economic giant, but local Chinese companies are sure to earn more and more money as time progresses. At a certain moment, Chinese companies will expand their business outside China and then the two tools developed here can be of much use. **NOTE**: the criteria for Chinese principals to invest in a certain area are not just stipulated by price, time and quality. Trust and their relationship with their partners are far more important criteria.

7. Special attention was given to the decision-making process from step 0 to 5 (business + cultural issues together with level 1 and 2 criteria, which finally results in the deliverables) Step 6 to 8 are still remain to be taken further (decision-making itself, contractor selection and execution of the project). In this context, it is recommended to look at differences in the execution phase of a project, how project management is realised in China, what kind of construction methods are used and how they will affect the decision-making processes.

13.2.3. Recommendations Delft University of Technology

1. The research of this thesis was mainly focussed on commercially international clients. It is recommended to also consider public-sector principals and to consider their most important criteria in order to arrive at a form of collaboration. Besides, this research also focussed only on industrial construction projects. These projects mainly have a construction time of about 1 to 3 years. Large complex infrastructure projects, which often occur when cooperating with public or real estate parties, have certainly other factors of influence not considered here.

2. At the moment, many developments can be considered ongoing in the group of strategic cooperation, both nationally as well as international companies and agencies are investing time in (re-) valuing Constructioning, specifically in the Civil Engineering sector. It is recommended to examine the conditions and new key performance indicators which have to be defined as an input for the expansion of this conceptual tool.

3. From the practical experience of Tebodin employees (and her mother company BAM), it was concluded that more often principals are nowadays considering taking the operation and maintenance phase in the whole project life cycle together. Principals have more and more an open mind for sustainable buildings and constructions. What will be the changes in relation to the building contract forms, and what are the new forms to come? It is recommended to continuously look at the existing forms and new forms, and their characteristics to be able to improve the collaboration and building processes in the construction industry.

4. This thesis only considers one of the sixteen mentioned possible collaborations between the main parties in a construction project. It is recommended also to consider other combinations in order to have a total overview and to be able to find similarities or specific differences.

5. The Chinese government strives to enforce the law and create a sound management system, and to concentrate efforts on macro regulation and control, while creating a sound market environment and without directly intervening in enterprises. At the moment, sustainability and maintainability are hot topics in China, and therefore it is recommended to look at the opportunities for Dutch companies (experts in sustainable construction) in order to be able to create added value in relation to China.

6. During the general analyses, a set of demarcations are used to be able to have a quick input. For a more realistic analysis it is recommended to fine-tune several parameters and evaluate the model with some practical existing projects.

7. A general introduction is given about the possibilities of real options towards building contract forms, in this case only one model has been used to analyse the projects. The ROAT provides 40 models for different situation in different markets and different decision possibilities. It is recommended to research more in detail the other possibilities of real options in relation to construction assets investments.

8. A first step is made to calculate the different option values of strategies. In what way these values can be quantified in percentage of success and how this percentage can be raised or decreased has still to be examined. Besides of this, when a percentage is known, a quantitative analysis between the benefits dealing with uncertainties and the possible losses can be combined. It is recommended to look at the total picture of risk management (real options analysis + risk analysis based on monte carlo simulations)

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External	Tebodin (general)	Tebodin (management)
Heineken Technical Services – Mr. Jurjen Joosten	Logistics – Mr. R.J.S. van Oijen	Engineering – Mr. G. Streng
Akzo Nobel Engineering – Mr. Johan Muts	SH&E – Mr. C. Assman	Contract M. – Mr. P. Kelder
SigmaKalon Group – Mr. Arno Buskermolen	E&F – Mr. B. Jansen	Business Devel. – Mr. A. Piek
DSM Engineering – Mr. Peter Starmans & Mr. Ulf Gerold	E&F – Ms. C. Schiphorst	Man. Director – Mr. P. Koolen
Teijin Twaron – Mr. Peter Paping	Procurement – Ms. Mackenbach	Teb. Asia Pacific – Mr. R. He
Zeelandia – Mr. Gerard Janse	Engineering – Mr. M. van Rij	SMEIC – Mr. Y.C. Zhang
Norrit Process Technology – Mr. Jaap Middelkoop	Engineering – Ms. J. Lasseur	
Royal Boon Edam Group – Mr. Niels Huber	CM – Ms. A. van der Gaag	
Ynnovate – Mr. Van Someren & Mrs. Van Someren - Wang	CM – Mr. T. Metz	
Route2China – Mr. Stephen Choi & Ms. Prudence Kwok	Legal – Ms. M. MacInroy	

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List of Figures and Tables

Figures

Tables

Master Thesis "Bridge to China"

Research in the management decision-making process between Dutch principals and Chinese contractors in the realisation of an industrial construction project

APPENDIX GRADUATION REPORT

Master Graduation committee:

Prof. Dr. Ir. H.A.J. de Ridder	Chairman Graduation Committee, Design & Building Processes
K. B. Braat MSc.	Supervisor section Design & Building processes
Dr. Ir. R.J. Verhaeghe	Supervisor section Infrastructure Planning
Ir. W.A. Piek	External supervisor Tebodin, Consultants & Engineers

				Mr. K.B. Braat
	26-01-2006	Appendix Master Graduation Report	Mr. K.T. Lee	Mr. W.A. Piek
	18-02-2006	Appendix Master Graduation Report + Additional Graduation	Mr. K.T. Lee	Mr. W.A. Piek
Rev.	Date	Description	Author	Checked by

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Appendix A: Research Sequence Master Thesis

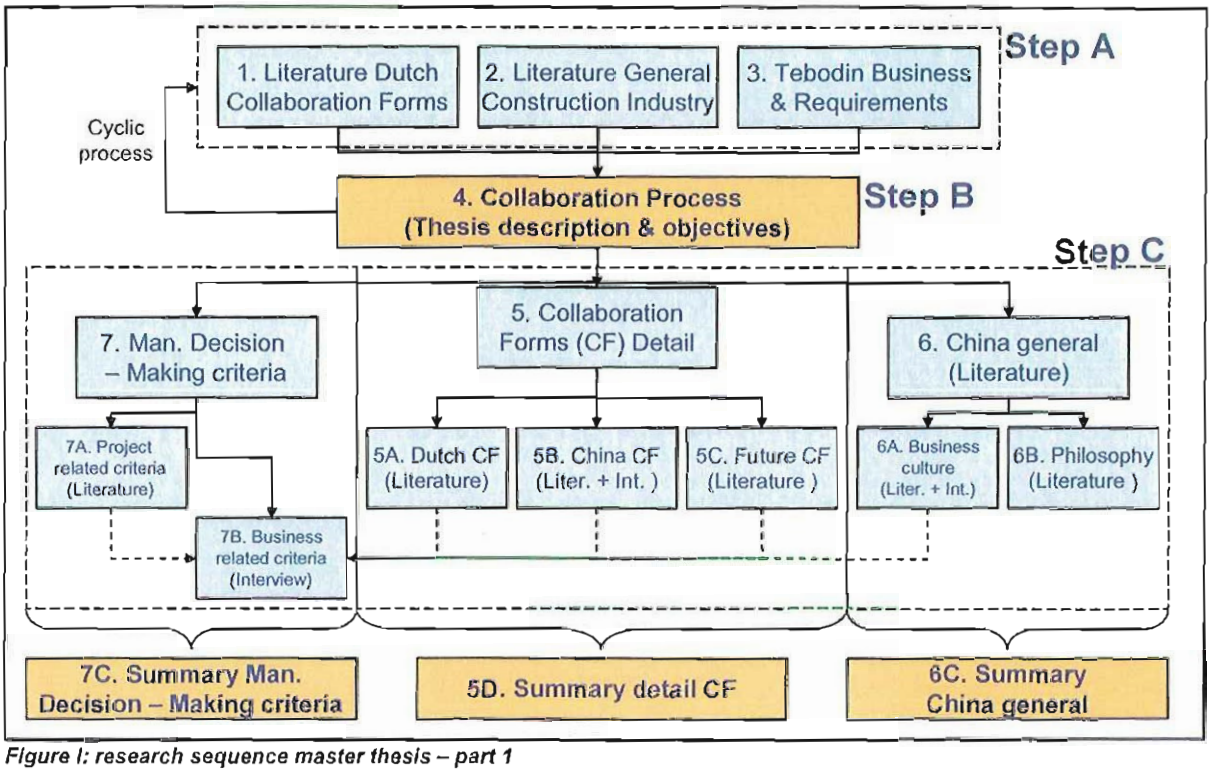


Figure I: research sequence master thesis – part 1

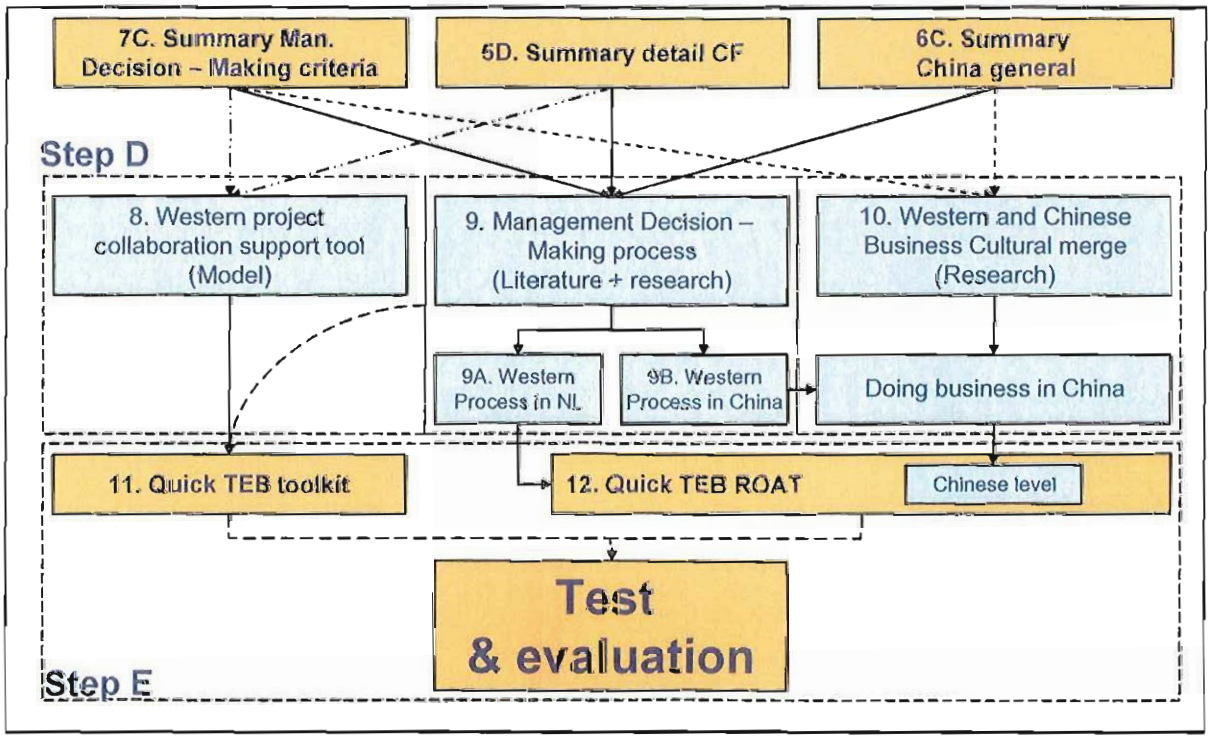


Figure II: research sequence master thesis - part 2

Appendix B: Main Focus Points "Construction Scandal"

In what extend does the traditional tendering procedure contribute to the "construction fraud"? First of all, a simple representation of the traditional tendering procedure with its problem is given in Figure III, second "the solution" used by the contractors is described and finally the recommendations and developments after the whole issue was revealed.

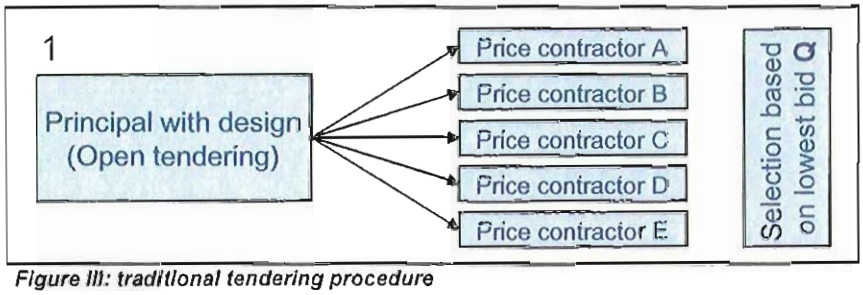


Figure III: traditional tendering procedure

In the case of a traditional tendering system, a principal with its own design (made by him selves or a third party) tender the construction work in an open tendering procedure. Several contractors will subscribe for the open tendering and present their prices to be able to realise the project. Than the principal will select a contractor based on the lowest bid.

Some problems occur due to this system:

- Contractors are more and more in competition on the lowest bid
- This will lead to a profit drop → compensation is done by reducing the quality
- Less margin remain for unforeseen risks → a miscalculation will be disastrous

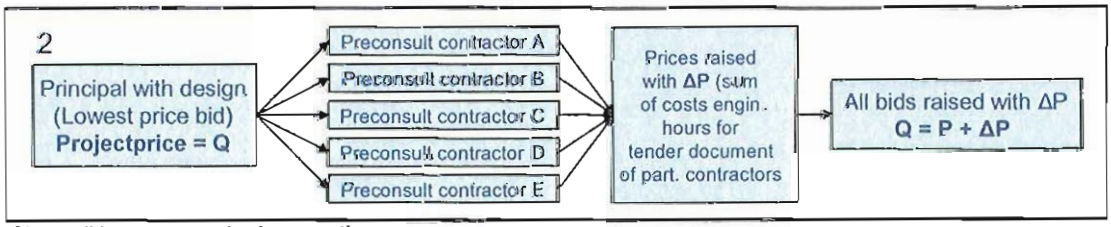


Figure IV: pre- consultation meeting

Figure IV indicates a possible solution to solve the mentioned problems above by organising a pre- consultation meeting. With this system, contractors have the intention to create price stability, reduce their risks, improve company continuity and establish mutual reimbursement. Contractors will have mutual credits with each other and try to balance the credits. Theoretically this system might work, but unfortunately in reality some other problems occur too:

- Continuously different kind of contractors are involved in different projects
- Different kind of projects with big and small scope
- New and old players will tender for the same project

The system became very complicated and non transparent. Instead of balancing the projects, certain other activities took place, like exchange of personnel, equipments, goods, supplies even black money and fake invoices. The whole situation finally resulted in the parliamentary enquiry with the main topic "construction fraud".

After the parliamentary enquiry, the Dutch government came up with some recommendations to solve this lowest bid problem and create more openness and transparency in the tendering procedure for the principal as well as the contractor. Most of the recommendations presented below are also of main importance internationally for the further developments of the construction industry. Recommendations are:

Search for new forms of tendering	Price guarantee
Alternative bids, not only construction, but also method, time, flexible execution, price quality & chain integration	Innovative solution
Transparency	Partnership & collaboration

Table I:main focus points after parliamentary enquiry

Appendix C: Company Profile Tebodin, Consultants & Engineers[1]

Tebodin, Consultants & Engineers is an independent, international firm that serves its Clients in development and realisation of their projects and investments worldwide. Established in the Netherlands now sixty years ago, it has now 2,300 employees in over 42 offices in twenty countries.

Tebodin extensive office network, allows it to offer Clients the best of both: integrated engineering and consultancy expertise combined with local knowledge. This is how Tebodin ensure a smooth execution of projects large and small, single or multidisciplinary. Tebodin's main aim is to partner with our Clients and to improve their competitive position.

Tebodin acts as your strategic partner in decision-making processes with practical and sustainable solutions. Tebodin experts enjoy working together with experts from the Client. With a dedicated person or a group of persons from Tebodin, projects will be performed in close co-operation with the in-house specialist staff of the Client.

Market Sectors:

- Pharmaceuticals and Biotechnology
- Chemicals
- Food and Beverage
- Public sector
- Utilities and Waste
- Oil and Gas
- Automotive
- Commercial buildings
- Agro industry
- Consumer products
- Infrastructure
- Transport, Ports and Airports
- Steel
- Pulp and Paper
- Telecommunications

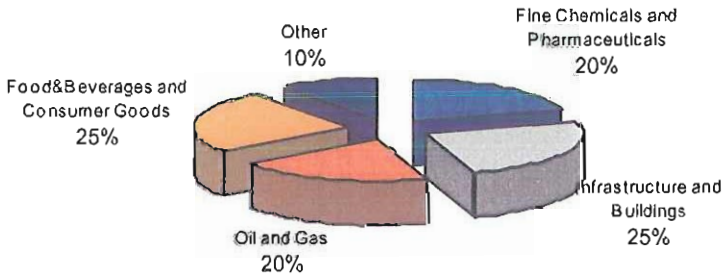


Figure V: distribution market sectors

Vision:

"To serve our Clients as a business partner through a global network"

Mission statement:

"To improve the competitive position of our Clients, to realise profitable growth, and to be an attractive employer for enthusiastic employees with an open mind for changes."

1: Source: Kleistelies, G.J., Gondi, D.G.; Company presentation The Hague: Tebodin, Consultants & Engineers, 2005.

Core Business:

Tebodin's Clients include major international companies, governments and multilateral financing institutes worldwide. They all have at least one goal in common: to realise projects efficiently and successfully. Tebodin offers them the following services from project inception through to completion:

- Consultancy
- Project management
- Design and engineering
- Procurement
- Construction management

Tebodin also undertakes Engineering, Procurement and Construction Management (EPCM) projects over a wide range of industrial sectors based on various commercial lines up to Turnkey.

Tebodin Asia Pacific (Future expectations)

Strategically located across China, Tebodin Asia Pacific offers clients Western expertise combined with local knowledge in a wide range of industries and technological areas. We have successfully implemented critical and complex projects for our clients spread across different market sectors. From feasibility studies up to complete turnkey projects Tebodin Asia Pacific strives to exceed your expectations.

Tebodin Asia Pacific was recently set up as a 50 - 50% joint venture agreement between Tebodin, Consultants & Engineers and Chinese company SMEIC. Tebodin Asia Pacific operates from the office in Shanghai. SMEIC (Shanghai Mechanical and Electrical Installation Company Ltd) is a fully privately owned construction firm with knowledge in mechanical and electrical installation, architecture, civil, structural and construction and professional experience with international clients.

Appendix D: Detailed Overview Project Collaboration Process

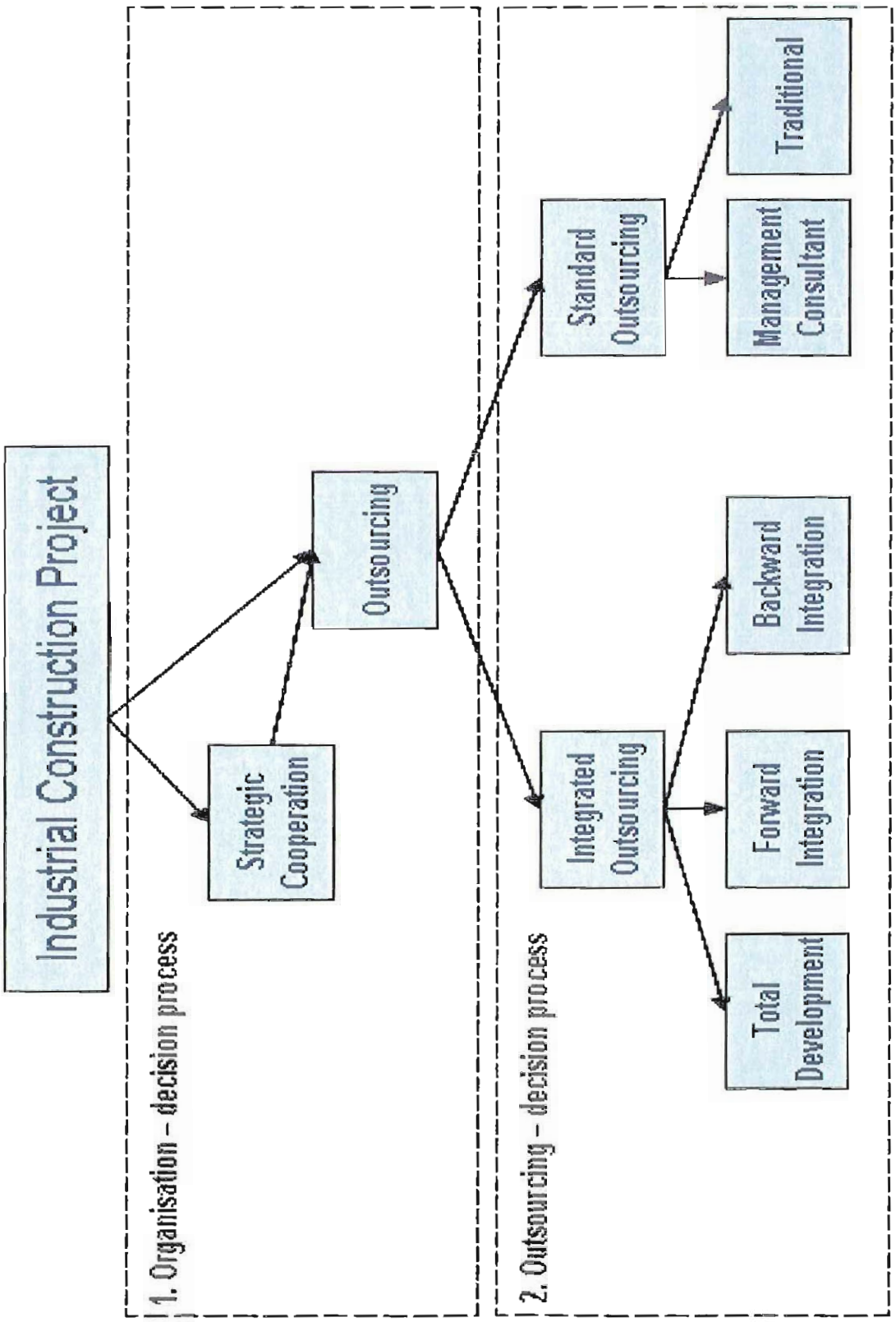


Figure VI: overview project collaboration process

Appendix E: Building Contract Form

A brief overview of the characteristics of the considered building contract forms is presented in Table 5.7.

Traditional		Management	
Bid - Build	Detailed and standard clauses for classical tender procedure, split project phases	Not considered	
Strategic Cooperation		**Total Development**	
Contract Form	***Characteristic***	***Contract Form***	***Characteristic***
Alliance	Shared risks by all partners in the design and construction processes. Defined product output and fit for purpose guarantees. Operate with risk fund.	DBFMOT (Design, Build, Finance, Maintain, Operate, Transfer)	Concession with purchase guarantee of the project for an agreed fixed price for a certain period
PPP	A form of collaboration between public and private parties. Nowadays, PPP represents the building contract forms of Total Development	DBFM (Design, Build, Finance, Maintain)	Concession with maintenance for a certain period
		BOT (Build, Operate, Transfer)	Construction and exploitation risks for the contractor for a certain period
Forward Integration		**Backward Integration**	
Contract Form	***Characteristic***	***Contract Form***	***Characteristic***
Turnkey	One party is responsible for design and construction. Integrated solution based on functional requirements for a fixed price	Engineering Contracting	Engineering contractor is responsible for the total design and coordination plus construction management
Design & Build	Same as turnkey, only the functional and technical requirements and the conceptual design is done with involvement and responsibility of the principal	Management Contracting	Integrated project management, design management and construction management in one contract
		Construction Management	A variant of Management contracting. A construction manager managed the design and construction stage.

Table II: brief overview characteristics considered building contract forms

A complete overview of considered building contract forms (both on 1st and 2nd level) divided in the collaboration groups is presented in Figure VII. Each form[1,2] is presented with its characteristics, advantages & disadvantages, risk profile, their position in the building process and the functional and contractual relationships.

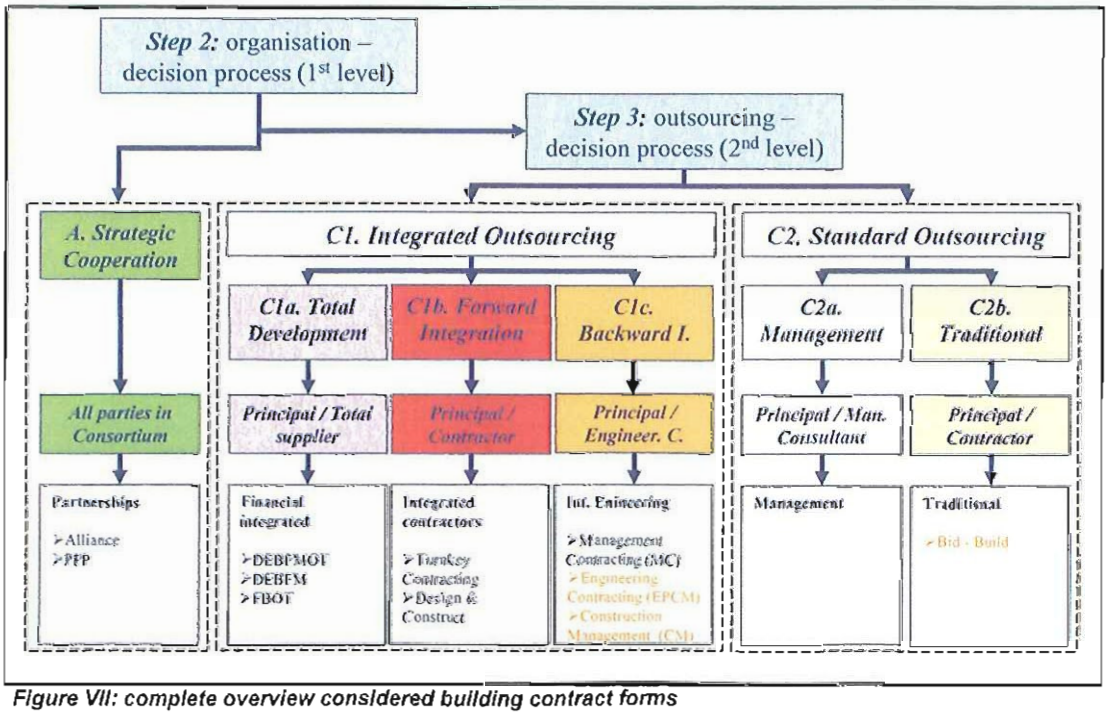


Figure VII: complete overview considered building contract forms

1: Source: Ridder, H.A.J. de; Collaboration and procurement procedures in the civil engineering industry. Delft: TU Delft, college reader CT5981, 2004.

2: Source: Koning, H. de & Sproncken, W.; Contractering bij bouwprojecten. Osborn & Berenschot, 2001.

Traditional Construct / Bid – Build (TC)

Characteristics

This is one of the most common building contract form with a very long history. The principal is responsible for the design and the provision of the tender package and during the construction phase, the principal also supervises the works. The contractor "designs' the method of construction, makes a planning schedule for the works and executes the works in accordance with the contractual obligations, i.e. the technical and administrative conditions.

Time	Money	Quality
Less flexibility and a longer project time	Lowest bid results in more competition	Clearly defined role partitioning
	Good control of budget	Principal has much influence in project process and design
	The project is divided in different phases, reduction of financial risks	Construction responsibility is by main contractor, control is done by advisor / directors
	Price per unit or hour are mostly standard known	Optimal price / quality proportion can be negatively influenced by separation

Table III: characteristics: traditional construct

Advantages and disadvantages

Advantages	Disadvantages
Detailed and standard clauses hardly give any reasons for discussion	Slowdown effect on the building process due to separation of design and construction phases
Parties clearly know their position, tasks etc.	Expertise contractor only in construction phase
Good checking possibilities	Inadequate "tuning" of design and construction causes high chance of additional works

Table IV: advantages: traditional construct

Risk profile and relationships between involved parties

Traditional Construct			
Degree of risk			
	Less		More
Integration design and realisation	■		
Possibility to make changes in the middle			■
The measurement of contractual remedies		■	
Possibility to shorten the project phases	■		
Price guarantee in an early phase		■	

Table V: risk profile: traditional construct

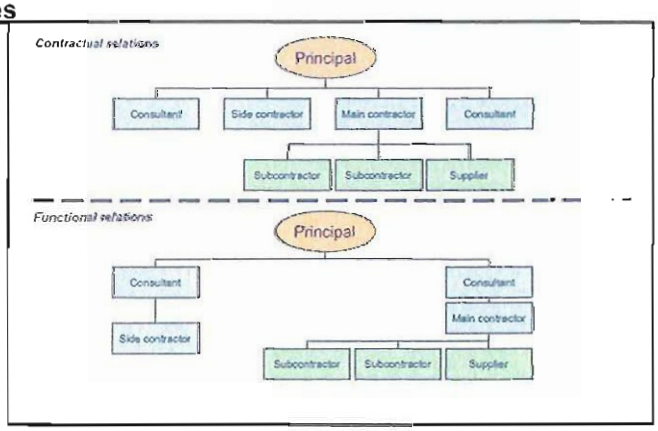


Figure VIII: relationships parties: traditional

Position in building process

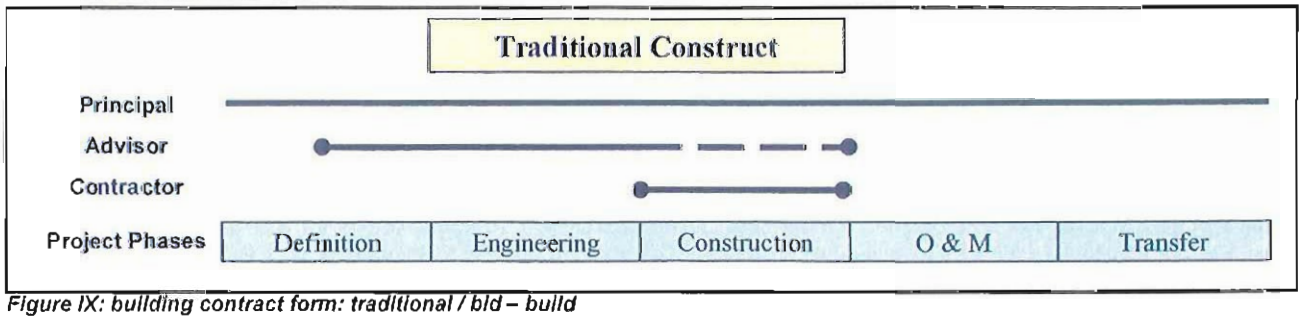


Figure IX: building contract form: traditional / bid – build

Alliance

Characteristics

The purpose of an alliance collaboration model is that parties work together on the basis of equality, in order to reach a single, common result. The essence of this collaboration is that detailed procedures are agreed upon with respect to mutual consultations. Another important aspect is the "open book" determination of costs and the formulation of a detailed declaration of intention.

Time	Money	Quality
Optimal collaboration will shorten the project time	Based on incentives (cost reduction, risk elimination, benefit raising etc)	All collaborating parties have the same purpose
	Sum of all the budgeted prices from involving parties is also the total project budget	Main agreement --> Alliance collaboration, second agreement between the involving parties are the works - contract
	Optimal collaboration will reduce financial risks	Expansion of the Alliance group is possible during the different project stages
		Other main criteria: openness, transparency, trust and common interest

Table VI: characteristics: traditional construct

Advantages and disadvantages

Advantages	Disadvantages
Conflicts diminish in importance	Much time to be invested in consultations
Costs decrease due to less conflicts and duplications	Due to European legislation, it is a less accepted and acceptable collaboration form for public authorities
The atmosphere "on the floor" improves	The degree of price detailing is way beyond the contractor's liking

Table VII: advantages: traditional construct

Risk profile and relationships between involved parties

Alliance			
Degree of risk			
	Less		More
Integration design and realisation		■	
Possibility to make changes in the middle		■	
The measurement of contractual remedies		■	
Possibility to shorten the project phases			■
Price guarantee in an early phase		■	

Table VIII: risk profile: alliance

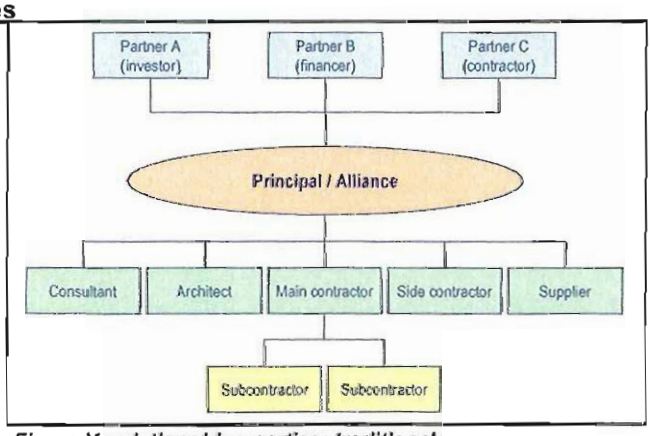


Figure X: relationships parties: traditional

Positions in the building process

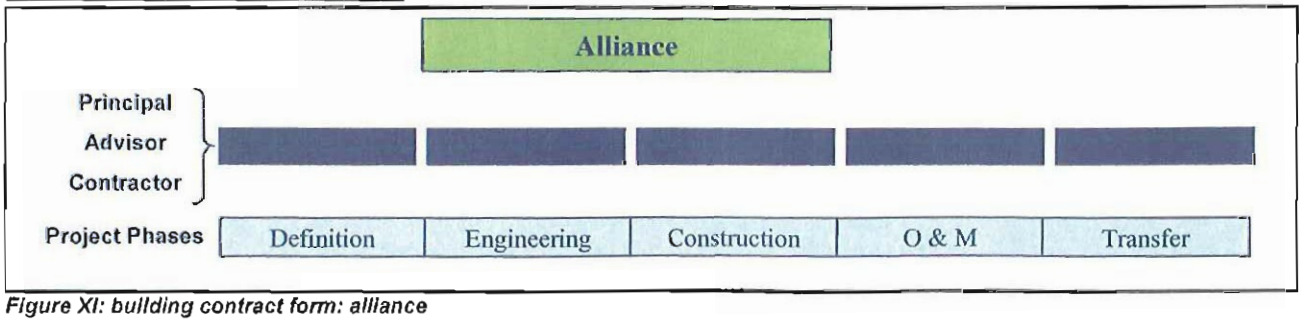


Figure XI: building contract form: alliance

Build, Operate, Transfer (BOT, variant of DBMOT + F) also indicated as PPP

Characteristics

The BOT procurement procedure is characterised by extensive integration of the building processes. The development of the project consists of design and construction but also maintenance and operation with a final transfer. Parties work together in a consortium. A condition is that a project is suitable for integration of all the processes from the start until and including operation. A BOT is an option if there is a financing problem for the owner. Private Financed Initiative (PFI) is the same as BOT, only there is a participation of financial private party. PFI developed, financed and exploit while at the end a transfer will take place with performance conditions

Time	Money	Quality
PFI is European focussed with lot of regulations and permits	Consortium parties will run the full exploitation risks	Forming a consortia with different kind of parties from all markets
	Transfer at the end of the exploitation period	

Table IX: characteristics: Build, Operate, Transfer

Advantages and disadvantages

Advantages	Disadvantages
New public facility without principal's budget	
Traditional interface problems disappear through integration of tasks	Determination and the distribution of risks can sometimes lead to delays or financial problems
Works are taken over without additional costs or for a low price	Dependency of other factors (economy, politics, the environment and the social context)
In case of public partnership, the government can provide social need without carrying the financial burden for it	

Table X: advantages: Build, Operate, Transfer

Risk profile and relationships between involved parties

Build, Operate, Transfer			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table XI: risk profile: Build, Operate, Transfer

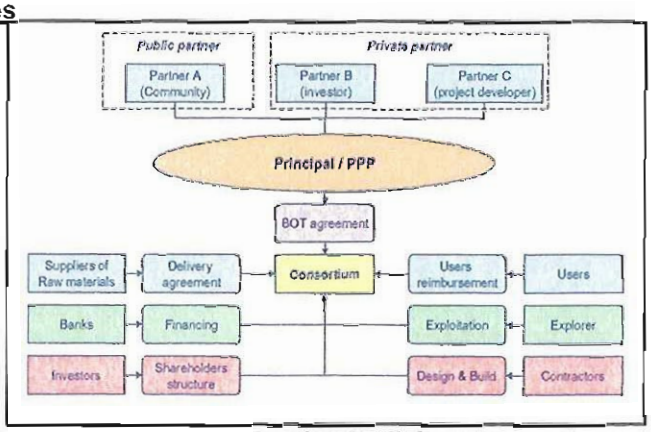


Figure XII: relationships parties: Build, Operate, Transfer

Positions in the building process

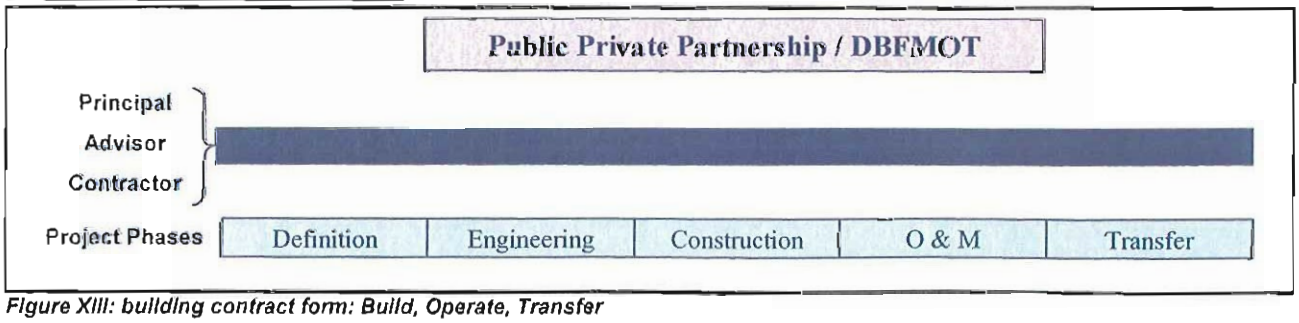


Figure XIII: building contract form: Build, Operate, Transfer

Turnkey

Characteristics

The principal will let the contracting party develop a total solution on the basis of an integrated design and construction method. An extensive description of the functional requirements is given by the principal. One party is responsible for design and construction --> consultation will take place, but detail engineering and construction is full responsible by the contractor (buy agreement).

Time	Money	Quality
Tendering stage can be short, the principal is just dealing with parties who can deliver the whole package based on performance	Total financial risk is laid down by turnkey contractor	The turnkey contractor is fully responsible for damages and mistakes during the design and construction stages
Project time will be reduced to the minimum, due to the fact that the turnkey party is fully responsible for the finance of the project	Commercial risks belongs to the principal	Principal is also responsible for the setup of the TOR, later on the responsibility will move to the turnkey contractor
Project time shortening is possible because of the parallel phase of the different stages managed by one party		Full tendering of the whole project, one TOR with the minimal requirements and performance conditions
		Changes and adaptation should be avoided --> there is no clear set off

Table XII: characteristics: Turnkey

Advantages and disadvantages

Advantages	Disadvantages
Integration design and construction (innovation possible)	Less competitive parties to be able to tender
Unnecessary complexity is avoided	Difficult to attain the desired balance between construction cost and running cost
Consultancy costs can be reduced	

Table XIII: advantages: Turnkey

Risk profile and relationships between involved parties

Turnkey			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table XIV: risk profile: Turnkey

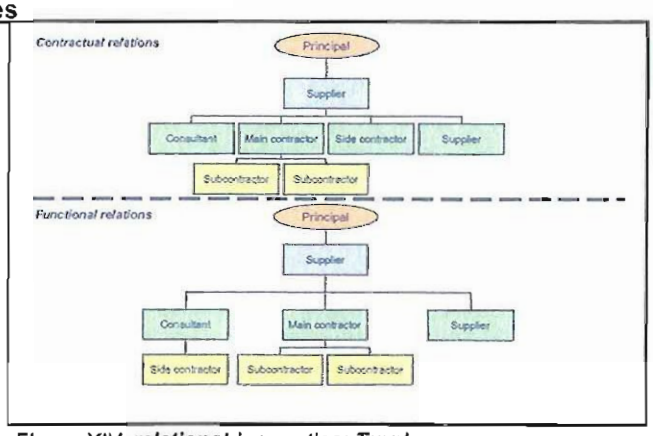


Figure XIV: relationships parties: Turnkey

Positions in the building process

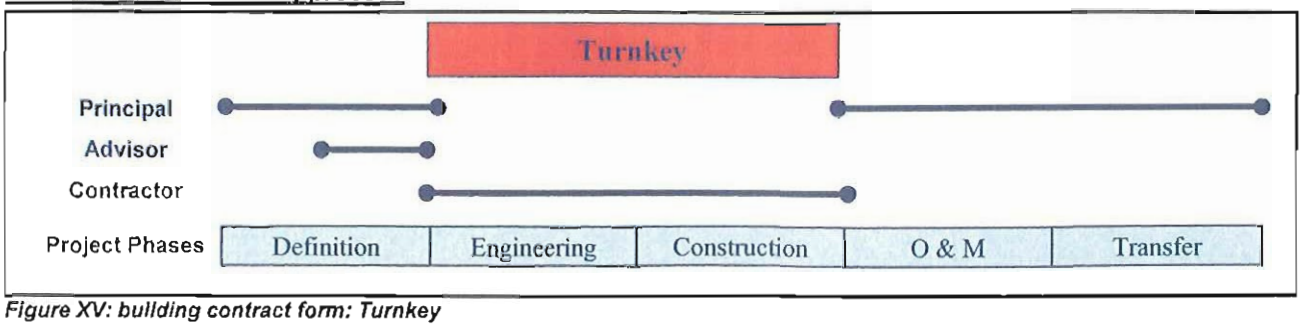


Figure XV: building contract form: Turnkey

Design & Build (D&B)

Characteristics

Design (Engineering) and construction are in one hand. Forward integration in the construction industry chain. With this type of procurement there is no traditional form of supervision from the side of the principal, although the contractor shall allow him a general authorisation for inspection to make sure of compliance with the contract.

Time	Money	Quality
Shorter cycle time in the stages design and construction	D&B implies a risk repurchase from the point of view of the principal. This often will lead to a less favourable price alternative	The design is coordinated with the construction method.
	Everything about the scope of delivery which is not explicit mentioned in the contract can be a discussion point	Changes and variants form the side of the principal are hardly to realise unless it's written in contractual matter
	Competitive forces are small, qualitative and quantitative comparison of tendering documents is difficult --> long negotiation time	D&B means to think and act in performance and results instead of descriptions and specifications

Table XV: characteristics: Design & Build

Advantages and disadvantages

Advantages	Disadvantages
Principal has to deal with only one party	Limitation of D&B contractors
Fewer discussions about responsibilities and liabilities	Contractor responsible for the estimated costs
Execution of the works and "harmony" is improved	
Design and works preparation are fully defined by the construction processes	Difficult to attain the desired balance between construction cost and running cost
Design is aimed at efficient methods of construction (standardisation, less complex etc.)	Principal is legally bound to adhere to contractual conditions

Table XVI: advantages: Design & Build

Risk profile and relationships between involved parties

Design & Build			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table XVII: risk profile: Design & Build

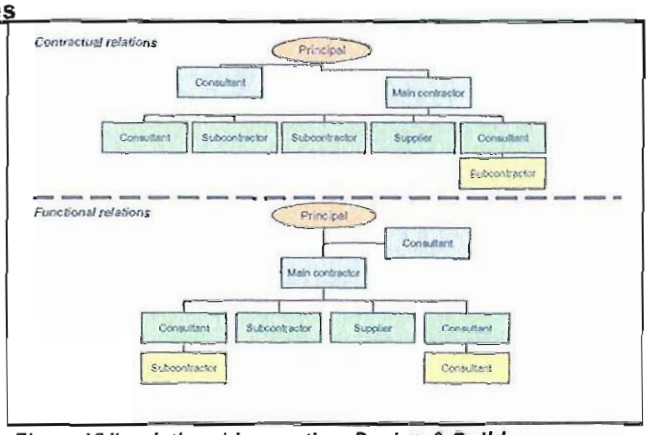


Figure XVI: relationships parties: Design & Build

Positions in the building process

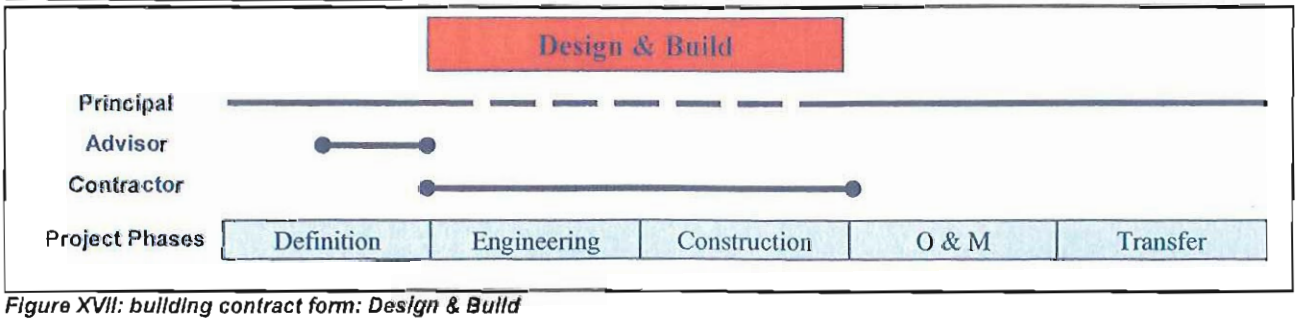


Figure XVII: building contract form: Design & Build

Management Contracting (MC)

Characteristics

Involvement of a construction manager in an early phase makes it possible to consult the design team by the construction manager. A more efficient and better tuning will take place which result in fast tracking, efficient coordination and cost control.

Time	Money	Quality
Integration of design and construction without dealing with one contractor	Risk rises is eliminated, these costs are now divided by the principal and management contractor	Technically less complex project with a clear definition of risk profile for design and construction
Subcontracting will result in price and time advantages. The management contractor is an objective party towards the construction stage	Maybe cheaper to realise the construction due to subcontractors, but the principal is responsible for all direct damages	Focus on production, use of standard methods and materials, create more efficiency
Subcontracting could also lead to capacity problems in overheated construction market	Construction management applicable in a rising economic situation, risk - rises will be fully calculated. In recession time, the margin will be very small	Less compatible for innovative design and construction methods, usage of different kind of materials

Table XVIII: characteristics: Management Contracting

Advantages and disadvantages

Advantages	Disadvantages
Working with subcontractor instead of one main contractor lead to diminishing risk rises by principal	Extensive coordination by management contractor is necessary
	Principal is responsible for the whole project

Table XIX: advantages: Management Contracting

Risk profile and relationships between involved parties

Management Contracting			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table XX: risk profile: Management Contracting

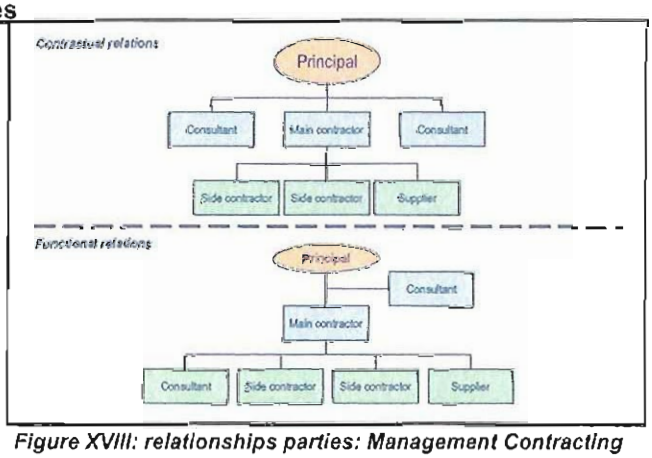


Figure XVIII: relationships parties: Management Contracting

Positions in the building process

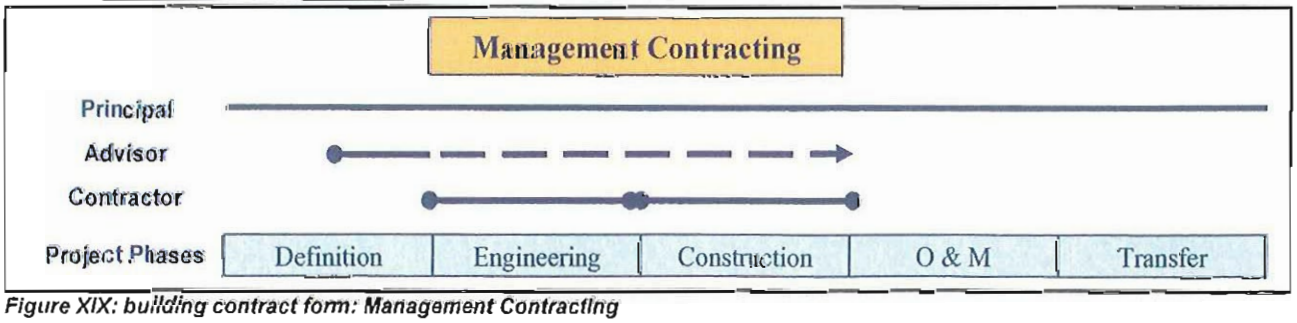


Figure XIX: building contract form: Management Contracting

EPCM / Engineering Contracting (EC)

Characteristics

In this form the Engineering Contractor is responsible for the total design and coordination. (General contracting or Total engineering)

Time	Money	Quality
Gaining time is possible due to the EPCM coordination	A comparable price shaping like the traditional form	Engineering contracting is drive by design
	Engineering contractor will procure on behalf of the principal. Clear agreements are necessary to define the project	There is a chance that quality risks will be moved to the procured parties. This can lead to complex claim situations

Table XXI: characteristics: Engineering Contracting

Advantages and disadvantages

Advantages	Disadvantages
Working with subcontractor instead of one main contractor lead to diminishing risk rises by principal	Principal is responsible for the whole project
Integration between design & engineering and execution of a project, while flexibility is maintained	

Table XXII: advantages: Engineering Contracting

Risk profile and relationships between involved parties

Engineering Contracting			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table XXIII: risk profile: Engineering Contracting

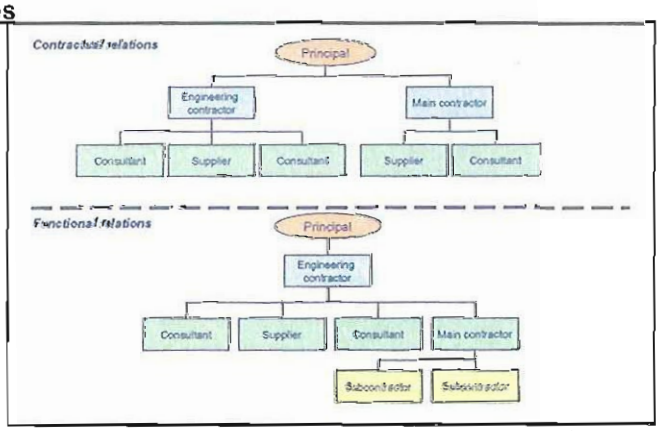


Figure XX: relationships parties: Engineering Contracting

Positions in the building process

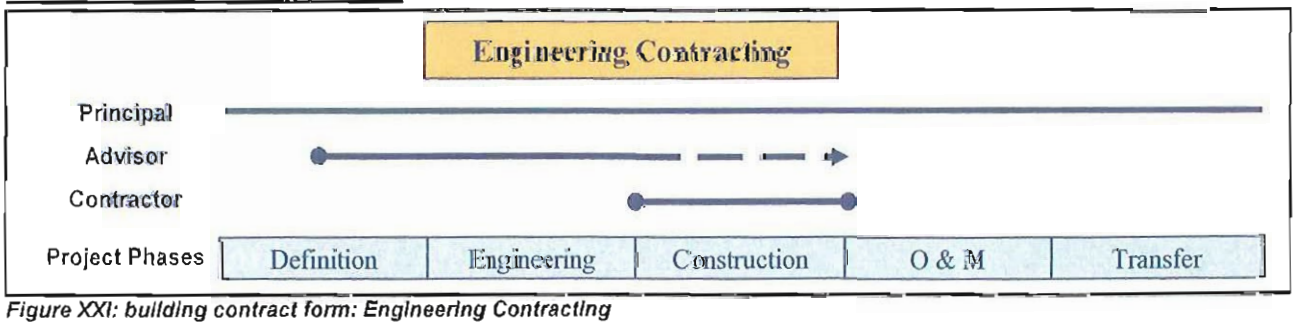


Figure XXI: building contract form: Engineering Contracting

Construction Management (CM)

Characteristics

A variant of Management contracting. A construction manager managed the design and construction stage. The principal is directly in contact with all his suppliers and subcontractors.

Time	Money	Quality
Maximal flexibility concerning several involving parties --> fast tracking	Maximum transparency regarding to subcontractors and sub suppliers, more certain price expectations	Most flexible CF concerning quality aspects --> principal maximum of influence
	Less risk rises due to separateness of contractors and suppliers --> no fixed price in an early stage	Extensive and professional management is needed for all the parties involved
		Separation of responsibility of design and project management

Table XXIV: characteristics: Construction Management

Advantages and disadvantages

Advantages	Disadvantages
Maximum flexibility in the whole project, besides contractors experiences can be used in an early stage	

Table XXV: advantages: Construction Management

Risk profile and relationships between involved parties

Construction Management			
Degree of risk			
	Less		More
Integration design and realisation			
Possibility to make changes in the middle			
The measurement of contractual remedies			
Possibility to shorten the project phases			
Price guarantee in an early phase			

Table XXVI: risk profile: Construction Management

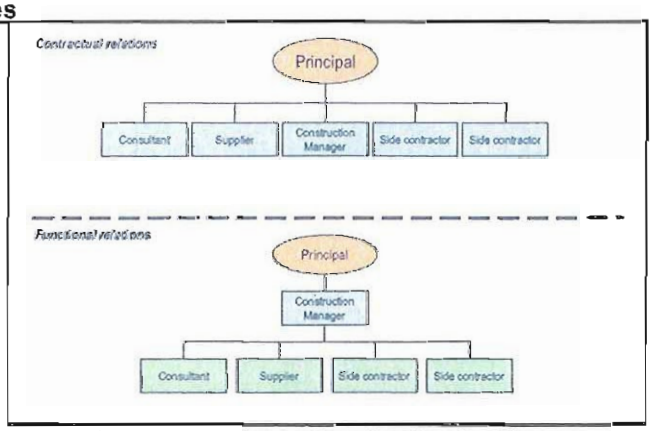


Figure XXII: relationships parties: Construction Management

Positions in the building process

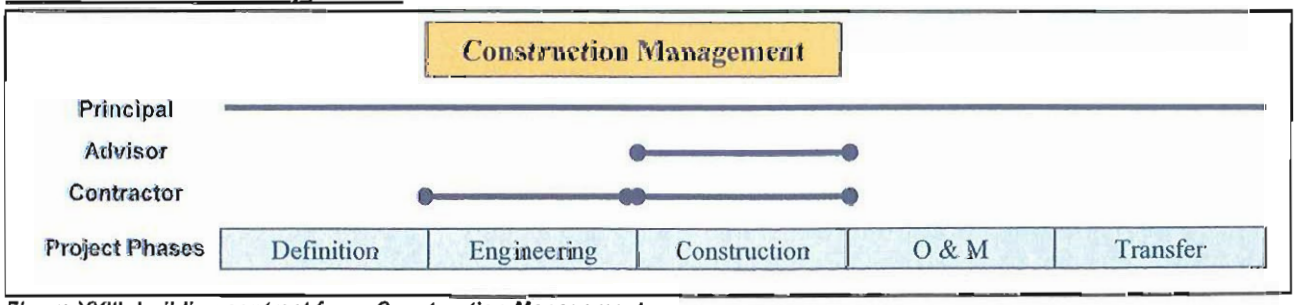


Figure XXIII: building contract form: Construction Management

Overview Building contract Forms Characteristics

Time	Money	Quality
	TRADITIONAL CONSTRUCT	
Less flexibility and a longer project time	Lowest bid results in more competition	Clearly defined role partitioning
	Good control of budget	Principal has much influence in project process and design
	The project is divided in different phases, reduction of financial risks	Construction responsibility is by main contractor, control is done by advisor / directors
	Price per unit or hour are mostly standard known	Optimal price / quality proportion can be negatively influenced by separation
	ALLIANCE	
Optimal collaboration will shorten the project time	Based on incentives (cost reduction, risk elimination, benefit raising etc)	All collaborating parties have the same purpose
	Sum of all the budgeted prices from involving parties is also the total project budget	Main agreement --> Alliance collaboration, second agreement between the involving parties are the works - contract
	Optimal collaboration will reduce financial risks	Expansion of the Alliance group is possible during the different project stages
		Other main criteria: openness, transparency, trust and common interest
	BUILD, OPERATE, TRANSFER (PPP)	
PFI is European focussed with lot of regulations and permits	Consortium parties will run the full exploitation risks	Forming a consortia with different kind of parties from all markets
	Transfer at the end of the exploitation period	
	TURNKEY	
Tendering stage can be short, the principal is just dealing with parties who can deliver the whole package based on performance	Total financial risk is laid down by turnkey contractor	The turnkey contractor is fully responsible for damages and mistakes during the design and construction stages
Project time will be reduced to the minimum, due to the fact that the turnkey party is fully responsible for the finance of the project	Commercial risks belongs to the principal	Principal is also responsible for the setup of the TOR, later on the responsibility will move to the turnkey contractor
Project time shortening is possible because of the parallel phase of the different stages managed by one party		Full tendering of the whole project, one TOR with the minimal requirements and performance conditions
		Changes and adaptation should be avoided --> there is no clear set off
	DESIGN & BUILD	
Shorter cycle time in the stages design and construction	D&B implies a risk repurchase from the point of view of the principal. This often will lead to a less favourable price alternative	The design is coordinated with the construction method.
	Everything about the scope of delivery which is not explicit mentioned in the contract can be a discussion point	Changes and variants form the side of the principal are hardly to realise unless it's written in contractual matter

	Competitive forces are small, qualitative and quantitative comparison of tendering documents is difficult –> long negotiation time	D&B means to think and act in performance and results instead of descriptions and specifications
MANAGEMENT CONTRACTING		
Integration of design and construction without dealing with one contractor	Risk rises is eliminated, these costs are now divided by the principal and management contractor	Technically less complex project with a clear definition of risk profile for design and construction
Subcontracting will result in price and time advantages. The management contractor is an objective party towards the construction stage	Maybe cheaper to realise the construction due to subcontractors, but the principal is responsible for all direct damages	Focus on production, use of standard methods and materials, create more efficiency
Subcontracting could also lead to capacity problems in overheated construction market	Construction management applicable in a rising economic situation, risk - rises will be fully calculated. In recession time, the margin will be very small	Less compatible for innovative design and construction methods, usage of different kind of materials
ENGINEERING CONTRACTING (EPCM)		
Gaining time is possible due to the EPCM coordination	A comparable price shaping like the traditional form	Engineering contracting is drive by design
	Engineering contractor will procure on behalf of the principal. Clear agreements are necessary to define the project	There is a chance that quality risks will be moved to the procured parties. This can lead to complex claim situations
CONSTRUCTION MANAGEMENT		
Maximal flexibility concerning several involving parties --> fast tracking	Maximum transparency regarding to subcontractors and sub suppliers, more certain price expectations	Most flexible CF concerning quality aspects --> principal maximum of influence
	Less risk rises due to separateness of contractors and suppliers --> no fixed price in an early stage	Extensive and professional management is needed for all the parties involved
		Separation of responsibility of design and project management

Appendix F: Chinese Philosophy[1]

Pre – Confucian China & The Five Classics

At the heart of Chinese thought stand the five great classics, the traditional, time-honoured works that define and originate Chinese culture and history. Chinese history, as the Chinese narrate it, blazes into existence with the great, partly divine heroes who teach the early Chinese all the arts of civilization: writing, law, architecture, art, and so on. These blatantly mythical figures are followed by three great sage kings, Yao, Shun, and Yü; the latter stands as the foundation of the first ruling dynasty in China, the Hsia. During the various cycles of dynastic change, from the Hsia to the Shang to the Chou, the **Five Classics**, or the Confucian Classics (even though they are not written by Confucius), were written down, or supposedly written down. These Five Classics constituted the program of learning for anyone in the upper classes, the ruling classes, or the educated classes. The Classics not only recorded early Chinese history infallibly, they also completely contained all the ethics and wisdom of China.

1. Out of early divination practices from the Shang Dynasty comes the first classic, or what is traditionally considered the first classic, the ***I ching*** , or *The Book of Changes* . Divination utilized stalks of milfoil laid out on the ground; the *I ching* is a manual on reading the various diagrams resulting from laying out these stalks. The most important aspect of the work are the "**wings**," a set of additional texts that explain the metaphysical aspects of these diagrams. Although traditionally regarded as the work of Confucius, these wings were probably written down in the **Han period**. The I ching throughout Chinese history has been regarded as the fullest description of the metaphysical structure and dynamics of the universe.

2. The second Classic is *The Book of History* ; or *Shu ching* , which is a set of documents (speeches, laws, etc.) from the Hsia to the Chou dynasties. In China, this book is regarded as a relatively infallible collection of documents; in the West, the book is considered mainly a collection from the middle or late Chou period and so relatively unreliable as a source for the earlier dynasties. Confucius, according to tradition, had a hand in this book as well, assembling, editing, and commenting on the documents. The Book of History has served throughout Chinese history as a repository of political wisdom, as the source book of exemplary models of government.

3. The Classic traditionally ascribed the third position is the *Shih ching* , the *Book of Odes* ; this book is a collection of three hundred poems from the Chou dynasty. Confucius, again, is traditionally regarded as the editor and compiler of the book.

4. Fourth comes the *Ritual* , which is actually several books on philosophy, rituals, and even table manners. The most important of these books is the *Li chi* , or *The Book of Rites* , which catalogs the many rituals that make up ancient Chinese life.

5. Finally comes the *Ch'un ch'iu* , or *The Spring and Autumn Annals* , a history of a single Chinese province from about 700 to 500 B.C. Confucius, again, lived in this province and supposedly assembled these annals himself.

What were the salient features of early Chinese thought? First, the Chinese believed that heaven, ***t'ien*** , governed the world in its entirety, including human affairs; in fact, heaven was especially and scrupulously attentive to all things human, especially government. As a result of this interest, heaven frequently intervened in governmental affairs: when a dynasty grew corrupt, heaven intervened and overthrew that dynasty and replaced it with a new one. This concept was called the "**mandate of heaven**," *t'ien ming* ; rulers were put in place by heaven and could continue to rule as long as they did so with justice and wisdom. When they ceased to rule in the best interests of their subjects, the mandate of heaven required that they be overthrown by someone else. Finally, the ancient Chinese believed that their ancestors continued to live among them and so needed to be consulted, prayed to, appeased, and placated.

1: Source: http://www.wsu.edu/~dee/CHPHIL/CHPHIL.HTM

Confucius

Confucius laid down a pattern of thinking followed by more people for more generations than any other human being on the face of the earth. No matter what religion, no matter what form of government, the Chinese (and most other East Asian civilizations) and their way of thinking can in some way be shown to have Confucian elements about them. But Confucius was no religious leader nor did he claim any special divine status (nor was any divine status claimed for him). He was, in fact, a relatively ordinary person; his family was from the lesser aristocracy that had fallen on extremely hard times when he was born in 551 B.C. in the province of Lu. He was born into the family of K'ung and was given the name Ch'iu; in later life he was called "Master Kung": K'ung Fu-tzu, from which the Latin form, Confucius, is derived. He began a startlingly successful early political career as a young man, rising quickly in the administrative ranks, but fell out of favor fast. Although his intense personal goal was to restore peace and orderliness to the province, he found himself dismissed from government early on. He never returned to public life. Instead he turned to teaching, hoping that he could change the world by changing its leaders at a young age. We have many accounts of his teaching and all his students praise his natural talent for brilliant teaching. These students recorded these teachings and this is what comes down to us as the *Analects*. The Confucian method characterizes just about all Chinese learning down to the present day; its fundamental tenet is the unwavering belief in the perfectibility of human beings through learning.

Confucius had one overwhelming message: if we are to achieve a state of orderliness and peace, we need to return to traditional values of virtue. These values are based entirely on one concept: *jen* , which is best translated as "humaneness," but can also mean "humanity," "benevolence," "goodness," or "virtue." This humaneness is a relatively strange concept to Western eyes, because it is not primarily a practicable virtue. Rather, the job of the "gentleman," *ch'ün tzu* , was to concentrate on the highest concepts of behaviour even when this is impractical or foolish. Like his contemporaries, Confucius believed that the human order in some way reflected the divine order, or the patterns of heaven. More than anything, according to Confucius, the ancients understood the order and hierarchy of heaven and earth; as a result, Confucius established the Chinese past as an infallible model for the present.

What is incumbent on individual people is to determine the right pattern to live and govern by; this can be achieved by studying the sage-kings and their mode of life and government and by following rituals scrupulously, for the pattern of heaven is most explicitly inscribed on the various rituals, *li* , prescribed for the conduct of everyday life. Neglecting ritual, or doing rituals incorrectly, demonstrated a moral anarchy or disorder of the most egregious kind. These heavenly patterns were also inscribed in the patterns of music and dance, *yüeh* , so that order in this life could be attained by understanding and practicing the order of traditional and solemn music and dance. Music and dance are talked about constantly in the Confucian writings. Why? Because traditional music and dance perfectly embody the humaneness and wisdom of their composers, who understood perfectly the order of the world and heaven; one can create within oneself this wisdom by properly performing this music and dance.

Mencius

One cannot discuss **Confucianism** without at least mentioning the man the Chinese call "The Second Sage," Meng Tzu, or, in Latinized form, **Mencius** (372-289 B.C.) Mencius, like Confucius and Mo Tzu before him, concerned himself entirely with political theory and political practice; he spent his life bouncing from one feudal court to another trying to find some ruler who would follow his teachings. Like Confucius and Mo Tzu before him, he was largely unsuccessful in his endeavour. In fact, China had degenerated precipitously in Mencius's time: individual states were preying on and conquering others and the rulers of the time had no patience for what they considered prattling about the ancients and their ways. Also, rival schools, especially the Moist schools (see "Mo Tzu" below), were putting up a good fight as far as bending the ears of rulers are concerned.

As a Confucian, Mencius based his entire system of thought on the concept of ***jen*** : "humaneness," "humanity," "benevolence," etc. To this basic doctrine he added the concept of *i:* "righteousness," or "duty." What does this mean? Mencius believed that the "humaneness" or "benevolence" that you show to individuals should in some way be influenced by the type of personal relationship you have to that person. One displayed *jen* to a person based on that person's position (as well as your own) and the obligations you owe to that person, so that you owe more jen to your immediate family than you do, say, to the Prime Minister of Canada. *I* , then, means that we have obligations to people that arise from social relations and social organization, not because there is some divine law mandating these obligations.

Mencius several times throughout Chinese history has been regarded as a potentially "dangerous" author, leading at times to outright banning of his book. This is because Mencius developed a very early form of what was to be called in modern times the "social contract." Mencius, like Confucius, believed that rulers were divinely placed in order to guarantee peace and order among the people they rule. Unlike Confucius, Mencius believed that if a ruler failed to bring peace and order about, then the people could be absolved of all loyalty to that ruler and could, if they felt strongly enough about the matter, revolt.

Taoism

We begin our short discussion of **Taoism** with the following warning: as all the Taoist writers tell us, it is in the nature of the Tao that it cannot be spoken of. Talking about Taoism in a clear and rational way is, in fact, not to talk about Taoism.

That aside, Taoism is, along with Confucianism, the most important strain of Chinese thought through the ages. It is almost entirely different from Confucianism, but not contradictory. It ranges over entirely different concerns, so that it is common for individuals, philosophers, Chinese novels or films, etc., to be both Confucianist and Taoist. The Taoist has no concern for affairs of the state, for mundane or quotidian matters of administration, or for elaborate ritual; rather Taoism encourages avoiding public duty in order to search for a vision of the transcendental world of the spirit.

Taoism is based on the idea that behind all material things and all the change in the world lies one fundamental, universal principle: the Way or **Tao**. This principle gives rise to all existence and governs everything, all change and all life. Behind the bewildering multiplicity and contradictions of the world lies a single unity, the Tao. The purpose of human life, then, is to live life according to the Tao, which requires passivity, calm, non-striving (***wu wei***), humility, and lack of planning, for to plan is to go against the Tao. The text of Lao Tzu is primarily concerned with portraying a model of human life lived by the Tao; later writers will stress more mystical and magical aspects. But Lao Tzu was, like Confucius, Mo Tzu, and Mencius, also concerned with the nature of government; he believed unquestioningly in the idea that a government could also exist in accordance with the Tao. What would such a government look like? It would not wage war, it would not be complex, it would not interfere in people's lives, it would not wallow in luxury and wealth, and, ideally, it would be inactive, serving mainly as a guide rather than as a governor. There were people who tried to translate Lao Tzu into real political action during the Han dynasty; these were, as you might imagine, spectacular failures.

Taoism is frequently called in China, "The Teachings of the Yellow Emperor and Lao Tzu," or "The Teachings of Lao Tzu and Chuang Tzu." Now, **Chuang Tzu** (369-286 B.C.) was a real person; his teachings come down to us in a short collection of his sayings. The Yellow Emperor is entirely mythical. This **Lao Tzu**, however, we know nothing about; we cannot say with certainty if he existed and when; on the other hand, we cannot say with certainty that he did not exist. All we know is that we have a very short book, the Lao Tzu (or Tao te ching), whose author is supposed to be Lao Tzu. The book is hard to read (as is Chuang Tzu), for one of the underlying principles of Taoism is that it can not be talked about. Hence, Lao Tzu uses non-discursive writing techniques: contradiction, paradox, mysticism, and metaphor.

Mo Tzu

Mo Tzu (470-391 B.C.) is a curious figure among the early giants of Chinese thought. Unlike most of the other names he is associated with (Confucius, Lao Tzu, Mencius, Chuang Tzu, etc.), Mo Tzu, born Mo Ti, seems to have been of low birth, possibly the son of a slave. He was a thoroughgoing eccentric, as famous for his dress and manners as his thought. His direct legacy, Moism, died out fairly quickly; in spite of this, his thought is enormously influential for all Chinese thought to follow. He despised Confucians with a passion, regarding them as uptight, egotistical, pretentious, upper class, and characterized by a mindless devotion to empty rituals. Despite this animosity, Mo Tzu shared with Confucius an overwhelming concern with government; his life was literally spent moving from feudal court to feudal court trying to talk some ruler or other into living by his philosophical teachings.

Unlike Confucius, Mo Tzu did not shy away from talking about religion and heaven. At the heart of his thinking was the belief that all human beings were fundamentally equal in the eyes of heaven; differences between human beings, such as status, wealth, or position, were artificial and man-made distinctions. The equality of humans before heaven mandated an overriding ethical principle for people to live by: universal love, to love every human being

equally. This universal love is not sentimental mush; love for Mo Tzu was a practical thing, closely related to Confucius's **jen**. To love people was to take care of them, to feed them when hungry, to clothe them when naked, to house them when they are homeless. Universal love also meant avoiding any activity that might hurt another person, such as war or profiteering; universal love also meant avoiding any activity that did not directly take care of someone–for this reason, Mo Tzu rejected all the music and rituals that the Confucians were so fond of. This moral obligation to take care of fellow human beings applied to all human beings; you are responsible not only for your family and your friends, you are equally responsible for people you don't even know, such as the homeless in Spokane. If you take care of only a few people that you are intimately related to, you are practicing partial love rather than universal love. It is partial love that is responsible for all the calamities that human beings suffer:
"Humane men are concerned about providing benefits to the world and eliminating its calamities. . . . When we come to ask about the causes of the calamities (war, poverty, etc.) that people suffer, from what do these calamities arise? Do they arise from people loving others and benefiting others? Certainly not. We should say that they arise from people hating and injuring others. If we should classify one by one all those who hate and injure others, will we find that they are partial or universal in their love? Certainly, we'll find them partial in their love. Therefore, partial love is the cause of all the human calamities in the world. Partial love is wrong."

Universal love confers "righteousness" on a person; "righteousness" for Mo Tzu is merely living one's life in accordance with heaven, which after all regards all humans as equal: "One who obeys the will of heaven will practice universal love; one who disobeys the will of heaven will practice partial love." When people live their lives in accordance with heaven, the world is ordered and peaceful; when they don't live their lives in accordance with heaven, the world becomes disorder, violent, and chaotic.

Legalism

Though they are largely considered the great Satans of Chinese history, the group of philosophers and administrators known as the **Legalists** represent a first in Chinese government: the application of a philosophical system to government. And despite their dismal failure and subsequent demonization throughout posterity, the philosophical and political innovations they practiced had a lasting effect on the nature of Chinese government.

The basic starting point for the early Confucianists (Confucius and Mencius) was that human beings were fundamentally good; every human was born with *te* , or "moral virtue." The third great Confucianist of antiquity, Hsün Tzu (fl. 298-238 B.C.), believed exactly the opposite, that all human beings were born fundamentally depraved, selfish, greedy, and lustful. However, this was not an entirely dark and pessimistic view of humanity, for Hsün Tzu believed that humans could be made good through acculturation and education (which is the basic view of society in Europe and America from the eighteenth to the twentieth centuries: humans are fundamentally base and vulgar but can be taught to be good and refined). His pupil, Han Fei Tzu, began from the same starting point, but determined that humans are made good by state laws. The only way to check human selfishness and depravity was to establish laws that bountifully rewarded actions that benefit others and the state and ruthlessly punish all actions that harmed others or the state. For Confucius, power was something to be wielded for the benefit of the people, but for Han Fei, the benefit of the people lay in the ruthless control of individual selfishness. Since even the emperor cannot be counted on to behave in the interests of the people, that is, since even the emperor can be selfish, it is necessary that the laws be supreme over even the emperor. Ideally, if the laws are written well enough and enforced aggressively, there is no need of individual leadership, for the laws alone are sufficient to govern a state.

When the Ch'in gained imperial power after decades of civil war, they adopted the ideas of the Legalists as their political theory. In practice, under legalists such as Li Ssu (d. 208 B.C.) and Chao Kao, the Legalism of the Ch'in dynasty (221-207) involved a uniform totalitarianism. People were conscripted to labor for long periods of time on state projects, such as irrigation projects or the series of defensive walls in northern China which we know as the Great Wall; all disagreement with the government was made a capital crime; all alternative ways of thinking, which the Legalists saw as encouraging the natural fractiousness of humanity, were banned. The policies eventually led to the downfall of the dynasty itself after only fourteen years in power. Local peoples began to revolt and the government did nothing about it, for local officials feared to bring these revolts to the attention of the authorities since the reports themselves might be construed as a criticism of the government and so result in their executions. The emperor's court did not discover these revolts until it was far too late, and the Ch'in and the policies they pursued were discredited for the rest of Chinese history.

But it is not so easy to dismiss Legalism as this short, anomolous, unpleasant period of totalitarianism in Chinese history, for the Legalists established ways of doing government that would profoundly influence later governments.

First, they adopted Mo Tzu's ideas about utilitarianism; the only occupations that people should be engaged in should be occupations that materially benefited others, particularly agriculture. Most of the Ch'in laws were attempts to move people from useless activities, such as scholarship or philosophy, to useful ones. This utilitarianism would survive as a dynamic strain of Chinese political theory up to and including the Maoist revolution. Second, the Legalists invented what we call "rule of law," that is, the notion that the law is supreme over every individual, including individual rulers. The law should rule rather than individuals, who have authority only to administer the law. Third, the Legalists adopted Mo Tzu's ideas of uniform standardization of law and culture. In order to be effective, the law has to be uniformly applied; no one is to be punished more or less severely because of their social standing. This notion of "equality before the law" would, with some changes, remain a central concept in theories of Chinese government. In their quest for uniform standards, the Ch'in undertook a project of standardizing Chinese culture: the writing system, the monetary system, weights and measures, and the philosophical systems (which they mainly accomplished by destroying rival schools of thought). This standardization profoundly affected the coherence of Chinese culture and the centralization of government; the attempt to standardize Chinese thought would lead in the early Han dynasty (202 B.C.-9 A.D.) to the fusion of the rival schools into one system of thought, the so-called Han Synthesis.

The Han Synthesis

After the disastrous period of totalitarian government during the Ch'in dynasty (221-207 B. C.), the early Han dynasty (207 B.C.-9 A.D.) returned to older forms of imperial government. However, they adopted from the Ch'in the idea of an absolutely central government and spent most of their period in power trying to regain the same level of centrality that the Ch'in and the **Legalists** had so ruthlessly accomplished. This ideology of central government, along with the Legalists' attempts to standardize Chinese culture and Chinese philosophy, led thinkers of the Han to attempt to unify all the rival schools of Chinese thought and philosophy that had developed over the previous three hundred years. This unification of Chinese into a single coherent system is the most lasting legacy of the Han dynasty. Earlier, the Legalists attempted to standardize Chinese thought by burning the books of rival schools and by making it a capital crime to speak of **Confucius**, **Lao Tzu**, or **Mo Tzu**. The Han thinkers, who thoroughly despised the Legalists and their methods while adopting many of their goals, took a different approach. Rather than reject alternate ways of thinking, they took a **syncretic** approach and attempted to fuse all the rival schools of thought into a single system. This syncretic project of the early Han is known as the **Han synthesis**. In many ways it was similar to the larger project of unifying Chinese government.

The Han philosophers concentrated specifically on the Five Classics, attempting to derive from them, particularly the *I ching* , or Book of Changes, the principle of the workings of the universe, or Tao. This new theory of the universe they appended to the *I ching* ; this appendix explains the metaphysical workings of the entire universe. Once the overall workings of the unverse were understood, then every form of thought could be directly related to each other by appealing to the basic principles of the universe.

The essentials of the Han synthesis are as follows: the universe is run by a single principle, the Tao, or Great Ultimate. This principle is divided into two opposite principles, or two principles which oppose one another in their actions, **yin and yang**. All the opposites one perceives in the universe can be reduced to one of the opposite forces. In general, these forces are distinguished by their role in producing creation and producing degeneration: yang is the force of creation and yin the force of completion and degeneration. The yin and yang are further differentiated into five material agents, or **wu hsing** , which both produce one another and overcome one another. All change in the universe can be explained by the workings of yin and yang and the progress of the five material agents as they either produce one another or overcome one another. This is, I need to stress, a **universal explanatory principle**. All phenomena can be understood using yin-yang and the five agents: the movements of the stars, the workings of the body, the nature of foods, the qualities of music, the ethical qualities of humans, the progress of time, the operations of government, and even the nature of historical change. All things follow this order so that all things can be related to one another in some way: one can use the stars to determine what kind of policy to pursue in government, for instance.

Since the Han thinkers had come up with a tool to explain historical and political events, the writing of history took off exponentially during the early Han and later. History became more than a repository of good and bad examples of government, as it had for the ancient Chinese, it became the working out of the yin-yang or five agents system as it applied to human affairs. This meant that the writing of history demanded accuracy, that the facts be laid out with great precision and indifference so that the workings of yin-yang could be followed precisely. The Han, then, developed a rigorously factual approach to history at a very early time in Chinese history. In government, the Han thinkers essentially adapted the Legalist attitude that human beings fundamentally behave badly, but they changed

the doctrine significantly. The Han thinkers believed that people behaved in a depraved way because they had no choice; economic and social conditions forced them to behave badly. For at heart, all human beings desire only material well-being; in order to make people behave virtuously, the government should make it possible that the ends of virtue (the well-being of others) and the pursuit of individual well-being should be coterminous, that is, material benefits should accrue to virtuous acts (that's one-half of the Legalist formula). The emperor would bring this about through two means. First, the emperor and the government is responsible for setting up conditions in which people can derive material benefit from productive labor; the stress on productivity, of course, is derived from the Legalists and Mo Tzu. Second, the emperor can provide an example. It is the job of the emperor to care for the welfare of his people (Confucianism), yet at the same time, the Emperor should withdraw from active rule (Taoism). How did the Emperor rule then? By providing a living example of benevolence. This model of Chinese government would remain dominant well into the twentieth century.

Yin and Yang

The early Han dynasty (207 B.C.-9 A.D.) devoted itself to regaining the same level of central government as the Ch'in (221 B.C.-207 B.C.) and the Legalists had so ruthlessly accomplished. This ideology of central government, along with the Legalists' attempts to standardize Chinese culture and Chinese philosophy, led thinkers of the Han to attempt to unify all the rival schools of Chinese thought and philosophy that had developed over the previous three hundred years.

The Legalists attempted to standardize Chinese thought by burning the books of rival schools and by making it a capital crime to speak of Confucius, Lao Tzu, or Mo Tzu. The Han thinkers, who thoroughly despised the Legalists and their methods while adopting many of their goals, took a different approach; rather than reject alternate ways of thinking, they took a syncretic approach and attempted to fuse all the rival schools of thought into a single system. This syncretic project of the early Han is known as the Han synthesis.

The Han philosophers concentrated specifically on the Five Classics, attempting to derive from them, particularly the *I ching* , or Book of Changes, the principle of the workings of the universe, or Tao. This new theory of the universe they appended to the *I ching* ; this appendix explains the metaphysical workings of the entire universe and is the origin of what is called the **yin-yang** or **Five Agents** school of Chinese thought.

The essentials of the yin-yang school are as follows: the universe is run by a single principle, the Tao, or Great Ultimate. This principle is divided into two opposite principles, or two principles which oppose one another in their actions, yin and yang. All the opposites one perceives in the universe can be reduced to one of the opposite forces. The yin and yang accomplish changes in the universe through the five material agents, or *wu hsing* , which both produce one another and overcome one another. All change in the universe can be explained by the workings of yin and yang and the progress of the five material agents as they either produce one another or overcome one another. Yin-yang and the five agents are, I need to stress, a **universal explanatory principle**. All phenomena can be understood using yin-yang and the five agents: the movements of the stars, the workings of the body, the nature of foods, the qualities of music, the ethical qualities of humans, the progress of time, the operations of government, and even the nature of historical change. All things follow this order so that all things can be related to one another in some way: one can use the stars to determine what kind of policy to pursue in government, for instance.

The yin and yang represent all the opposite principles one finds in the universe. Under yang are the principles of maleness, the sun, creation, heat, light, Heaven, dominance, and so on, and under yin are the principles of femaleness, the moon, completion, cold, darkness, material forms, submission, and so on. Each of these opposites produce the other: Heaven creates the ideas of things under yang, the earth produces their material forms under yin, and vice versa; creation occurs under the principle of yang, the completion of the created thing occurs under yin, and vice versa, and so on. This production of yin from yang and yang from yin occurs cyclically and constantly, so that no one principle continually dominates the other or determines the other. All opposites that one experiences—health and sickness, wealth and poverty, power and submission—can be explained in reference to the temporary dominance of one principle over the other. Since no one principle dominates eternally, that means that all conditions are subject to change into their opposites.

This cyclical nature of yin and yang, the opposing forces of change in the universe, mean several things. First, that all phenomena change into their opposites in an eternal cycle of reversal. Second, since the one principle produces the other, all phenomena have within them the seeds of their opposite state, that is, sickness has the seeds of health, health contains the seeds of sickness, wealth contains the seeds of poverty, etc. Third, even though an opposite may not be seen to be present, since one principle produces the other, no phenomenon is completely

devoid of its opposite state. One is never really healthy since health contains the principle of its opposite, sickness. This is called "presence in absence." Once you have this principle down, the particular Chinese view as expressed in literature.

Wu Hsing – The Five Material Agents

The thinkers of the early Han dynasty attempted to fuse many of the strains of Chinese thought to come up with a syncretic and systematic explanation of the universe, the changes that occur in the universe, and the relation of the human world to the physical and divine worlds. Their thought focused on two inventions, both designed to explain the changing world in much the same way Aristotle's four causes were designed as a universal explanatory framework for explaining change. The first of these inventions, the principles of yin and yang, opposite forces of change which complement and cyclically give rise to one another, operated through the physical mechanism of "the five material agents," or *wu-hsing* .

These five material agents are wood-fire-earth-metal-water and are grouped either in the order by which they produce one another (wood gives rise to fire, fire gives rise to earth, earth gives rise to metal, metal gives rise to water, water gives rise to earth, etc.) or the order by which they are conquered by one another: fire is conquered by water, water is conquered by earth, earth is conquered by wood, wood is conquered by metal, and metal is conquered by fire, etc. Each of these orders can be used to explain the progression of change in just about everything. When the modern western physicist talks about the unification of the five forces (electromagnetic force, strong force, weak force, gravity, color force), that person is not conceiving these five forces as spilling into or conquering one another; this physicist would consider it absurd to apply any of these forces to anything other than mechanical or atomic physics. The five agents, however, is a metaphysical explanation of the progression of change that is meant to be applied to every phenomenon one encounters in this changing universe: politics, ethics, music, biology, time, seasons, history, etc.

Associated with the agent wood is the season spring, fire is summer, metal is autumn, and water is winter. The color green is the color of the wood agent, red the color of fire, yellow the color of earth, white the color of metal, and black the color of water. In human anatomy, the spleen is ruled by wood, the lungs by fire, the heart by earth, the liver by metal, and the kidneys by water. If one has a disease of the liver, it is because the liver is being overcome by a fire agent or pathogen—since fire is overcome by water, one would treat the liver pathogen with a water agent. See how the system works?

One could endlessly list how the various categories of phenomenon fit into this schema. What is important to understand is that the five agents **explain everything** including the progress of change in the universe. And the progress that interests most human beings is history since human history paradoxically appears to be both in human control and out of human control. The Han thinkers began to reinterpret Chinese history and dynastic successions by reverting to this model of the five agents; dynastic successions could be explained by using *either* the order by which the agents produce one another *or* the order by which they are overcome by one another. In the early Han the latter model was adopted, which aligned the Han dynasty with the agent earth. Since the color associated with earth as yellow, the Han emperors adopted yellow as their imperial color. With the overthrow of the Han by Wang Mang, the former model was adopted and lasted as the standard model to this day. Every dynasty associated itself with a particular agent according to this model and adopted the colors appropriate to that agent. What this system did was make history a coherent whole; it also made the future predictable.

Neo - Confucianism

In the Sung dynasty (960-1279), Confucianism became a powerful force of thought in what is generally called the Sung Confucian Revival. In the centuries preceding, Buddhism was the dominant force in China; the intellectual centers of China were the Buddhist temples. But in the Sung, the center of intellectual activity again devolved on the scholar. The most important of these new scholars was Hu Yüan (993-1059) who almost single-handedly is responsible for the revival of Confucianism at this time. Like Confucius and his followers, Hu Yüan is primarily concerned with ethics rather than abstract religious or metaphysical speculation; his overwhelming concern lies in the concerns of government and the ethics of day to day living. As a result of this Confucian revival, the government itself undertook massive reforms according to Confucian principles; part of this reform was the extension of the examination system for choosing government officials (see your textbook).

Eventually, this revival would split into two central Confucian schools, the **School of Mind or Intuition**, whose greatest thinker was Wang Yang-ming, and the **School of Principle**, which culminated in the great thought of **Chu Hsi** (1130-1200). Both schools agreed that the world consisted of two realms: the realm of **principle** (*li*) (which we might call "laws") and the realm of **material force**(*ch'i*). Principle governs material force and material force makes manifest principle; the ultimate origin of principle is in a single principle, called the **Great Ultimate** (*tao ch'i*), which emanates from Heaven. The School of Mind, founded by Ch'eng Hao (1032-1085), emphasized that the human mind is completely unified and reflects perfectly in itself the principle of the universe. Since the human mind is perfectly identical with the Universal Mind or the Ultimate Principle, the duty of any philosopher is to investigate the nature of the human mind to the exclusion of all other investigations. The School of Principle believed that there was an immaterial and immutable principle or law that inheres in all things, giving them form, motion, and change. The mind of humanity is essentially the same as the mind of the universe and can be perfected to reflect that higher mind; however, the principle inhering in the human mind applied to everything, so that any investigation into any phenomenon whatsoever would reveal the principle of the human and the Universal mind. Studying the heavens or an insect will lead you eventually to that same principle which characterizes the human mind and the Universal mind. The scholars of the School of Principle believed in empirical investigation, for they believed that to find the principle of any material process was to find the principle inherent in all material and intellectual processes.

Appendix G: Working Out of Interviews

The following interviews have been taken with commercially international clients:

- Heineken Technical Services
- Akzo Nobel Engineering
- SigmaKalon Group
- DSM Engineering
- Norrit Process Technology
- Teijin Twaron
- Zeelandia
- Royal Boon Edam Group Holding

Example: Interview Western Principals

This interview which will be taken with you is a part of the masters thesis project "Bridge to China". The purpose of this interview is to create a list of important criteria and aspects which will be considered in the way to get in a collaboration form, particularly focussed on the collaboration with Chinese contractors. Several criteria and aspects are dealt within the decision – making process. From different levels of an organisation, criteria and aspects can be split up in organisational and project issues.

Not only are the criteria and aspects important. The relations between these factors and the degree of important ness will also be considered. After the taken interviews, the gathered information will be analysed and structured. Combined with the characteristics of existing and expectations of future collaboration forms, a concept decision – making model will be set up.

More detailed questions will be asked during the interview in relation to several questions mentioned here. The reason for not mentioning all questions is to have a clear and objective view from your organisation how the process to get in collaboration is done.

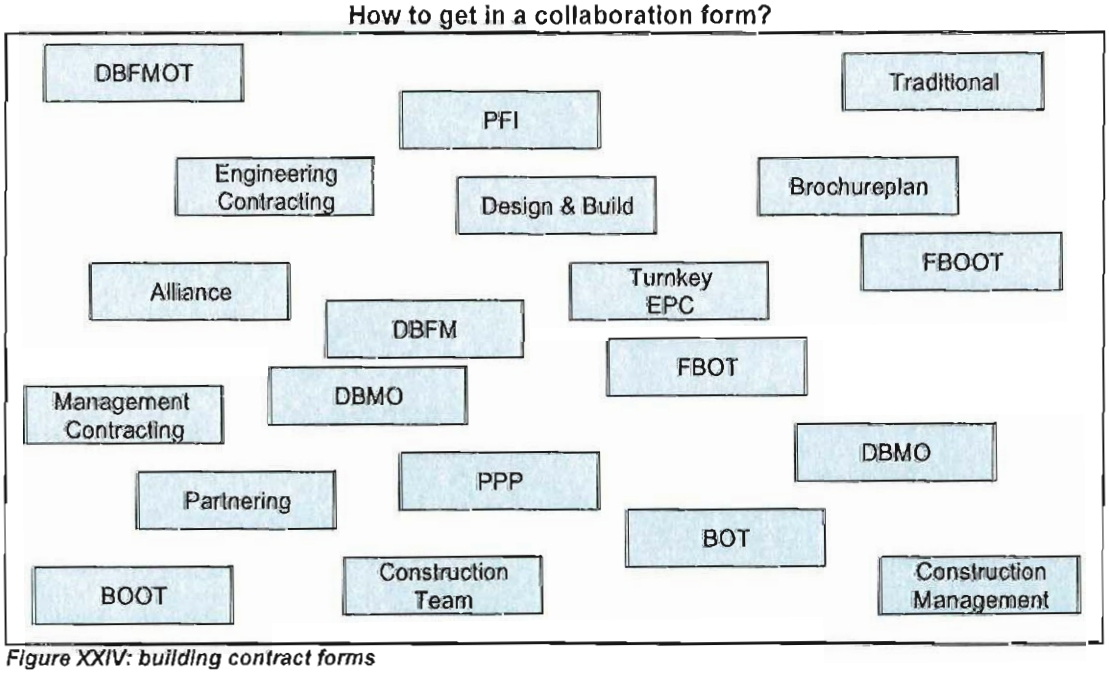


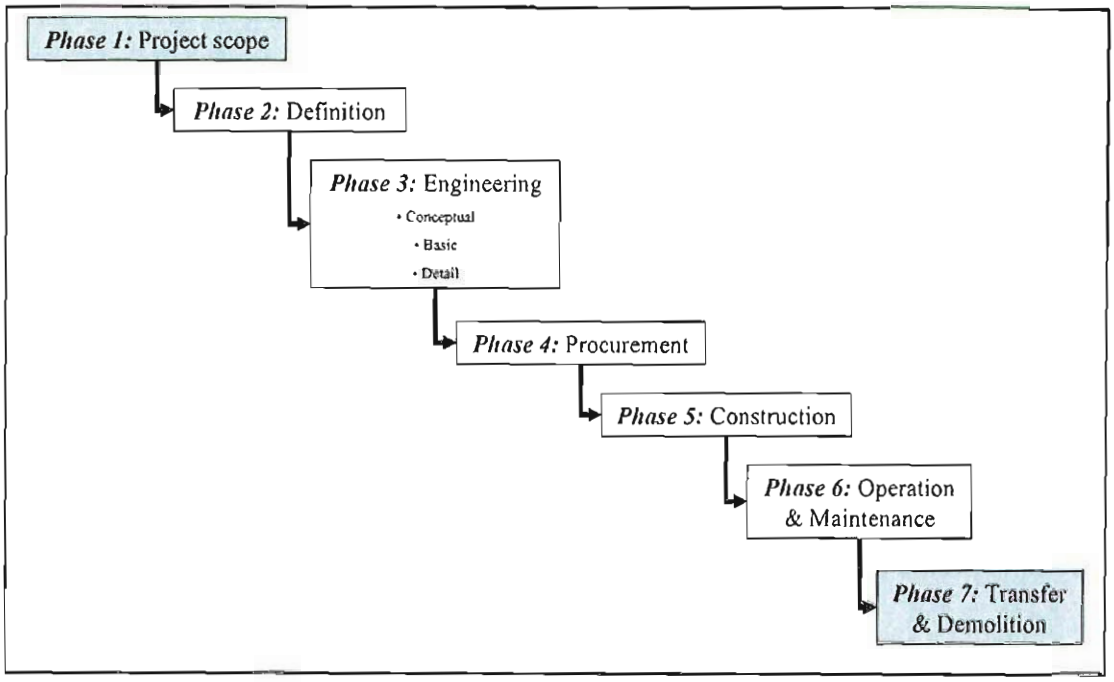
Figure XXIV: building contract forms

Note: when there is an empty cell within the table, It often means that the question is not relevant in the situation of the principal.

Organisation related questions

1	**What kind of collaboration forms are used in projects?**	Construction Team Turnkey, EPC Construction Management
2	**What is the procedure and sequence to get in a collaboration form?**	Dependant on project size, location, scope, risks, in - house expertise etc. No systematic approach, more Ad hoc decisions
3	*Organisational level*	-
4	*Project level*	-
4	*International level*	-
5	*Others?*	-
6	**What are the relations between the criteria and aspects in relation to the chosen collaboration form?**	Strict fragmentation of project phases, criteria are mainly based on engineering and construction phase, where as the financial part is the most important
7	**How is the decision - making process?**	Quite informal, based on solid assessment of project characteristics, and discussion with management
8	**How will the important ness of criteria be translated in a collaboration form?**	Ad hoc and based on experience Money most important, than Time (due to short term strategy of Capital investor)
9	**What kinds of impact will the new development in the construction industry influence your projects?**	-
10	**Will there be changes in relation to:**	
11	*Innovation*	-
12	*Life Cycle Analysis (LCA)*	-
13	*Value - Benefit - Cost model*	-
14	*Chain integration*	Design & Build

DSM Engineering



Interview

Respondent(s)	Mr. Peter Starmans & Mr. Ulf Gerold
Place of interview	DSM - Urmond
Interviewnumber	4
Interviewed by	K.T. Lee
Date interview	16/09/2005

Project

1	**How would you describe the projects of your company? (sector, origin, size e.g.)**	Plants for different Business Units
2	**What is your role in the project & within your organisation?**	Project Manager (Capital Projects)

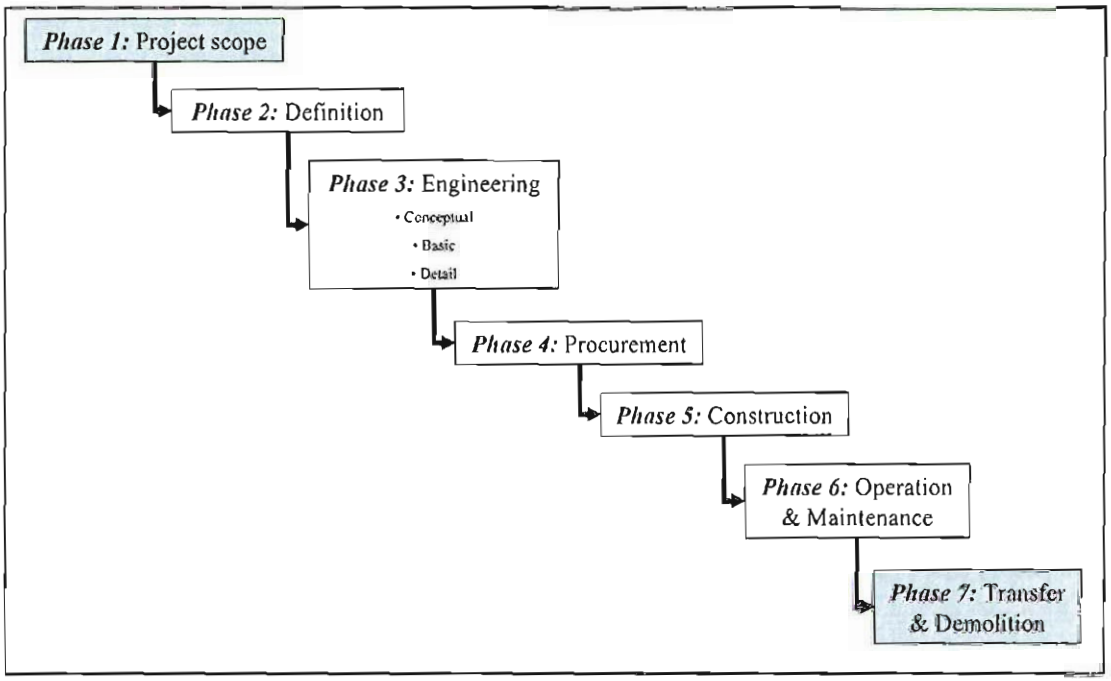
Project related questions

1	**Can you describe the initiation of a project within your company?**	Initiation: - Business Unit - DSM Headquarter
2	**What are the several activities of you and your organisation within a project?**	Preliminary analysis / feasibility (by BU) After Go --> DSM Engineering Project definition and planning, Project Management Contractor Selection, Construction Support, Financials
3	*Initiative phase*	Market feasibility studies, conceptual designs
4	*Definition phase*	Project definition; objectives, scope, resources Projectmanagement
5	*Engineering phase (conceptual, basic, detail)*	Conceptual mostly within DSM EPC / EPCm
6	*Procurement*	EPC / EPCm
7	*Construction*	EPC / EPCm (civil is sometimes past to JV)
8	*Operation & Maintenance*	Operation: BU contracts with contractor or internally Maintenance: BU contracts with contractor or internally
9	**What are important criteria in relation to projects? (Time, Money, Quality, Information, Organisation e.g.)**	Scope delivery (Quality) Within Budget (Money) Schedule (Time) Safety
10	**Are there new criteria from the point of view of your organisation?**	Trust / belief --> evidence Predictability --> accuracy of risks Feeling
11	**What kind of reimbursement system is usually used in projects?**	Reimbursable Lumpsum services Lumpsum turnkey
12	**When and how is a reimbursement system involved in the project?**	Parallel, depends on the information and risks distribution to contractor
13	**What are important criteria for prequalification of a contractor?**	Experience / own business References in China Size projects (complexity, logistics) Preselection from long list to short list
14	**What are important criteria particularly for international projects? (formal & informal)**	Cultural differences, how to check & control the objectives Intellectual Property interpretor in the right industry a lot of effort to bridge the cultural gap

Organisation related questions

1	**What kind of collaboration forms are used in projects?**	Construction Team Alliance Turnkey Reimbursable, Lumpsum services
2	**What is the procedure and sequence to get in a collaboration form?**	Dependant on project size, location, scope, risks, in - house expertise etc. No systematic approach, more Ad hoc decisions
3	*Organisational level*	-
4	*Project level*	-
4	*International level*	-
5	*Others?*	-
6	**What are the relations between the criteria and aspects in relation to the chosen collaboration form?**	Fulfill 4 main objectives Keep competitive market, else to much knowledge Reduce interfaces Skip tendering time
7	**How is the decision - making process?**	Based on: Risks Predictability & control Feeling & trust
8	**How will the important ness of criteria be translated in a collaboration form?**	All 4 main objectives must be fulfilled
9	**What kinds of impact will the new development in the construction industry influence your projects?**	-
10	**Will there be changes in relation to:**	
11	*Innovation*	Done by contractor during basic engineering phase
12	*Life Cycle Analysis (LCA)*	-
13	*Value - Benefit - Cost model*	Reduction of time or money depends on contract form
14	*Chain integration*	-

Teijin Twaron



Interview

Respondent(s)	Mr. Peter T.M. Paping
Place of interview	Tebodin The Hague
Interviewnumber	5
Interviewed by	K.T. Lee
Date interview	25/10/2005

Project

1	**How would you describe the projects of your company? (sector, origin, size e.g.)**	Plants for the Armide industry, polymer, processing e.g. (ca. 300 - 400 Euro per plant)
2	**What is your role in the project & within your organisation?**	Manager Investment Projects

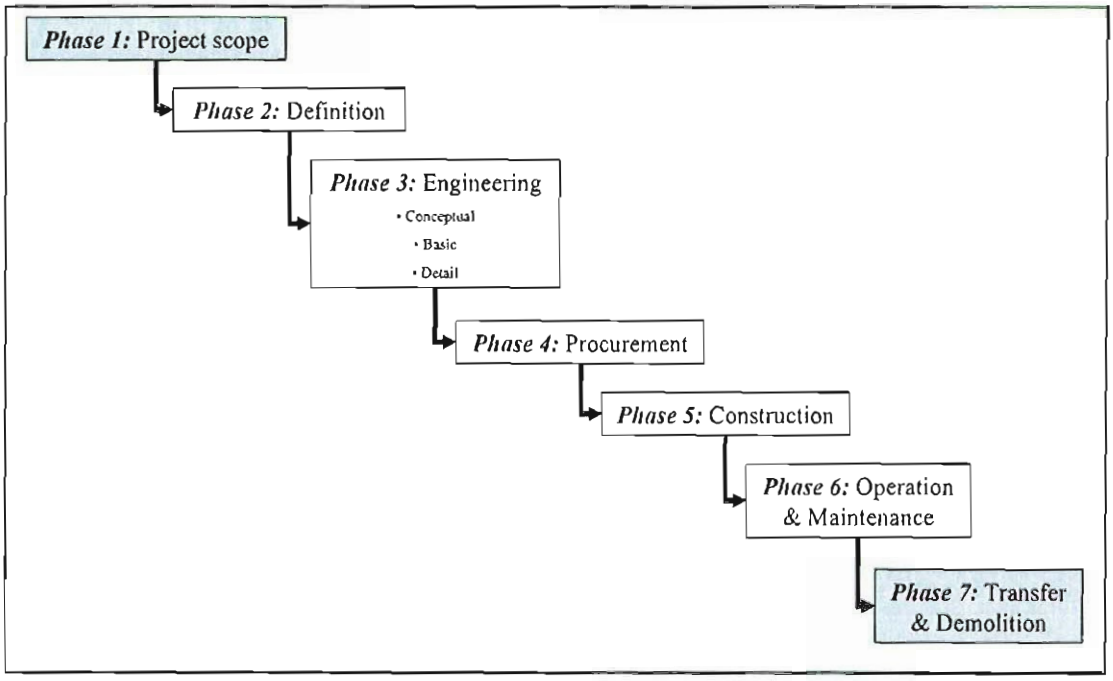
Project related questions

1	**Can you describe the initiation of a project within your company?**	Teijin Twaron is a business unit from Teijin (Japanese multinational), projects are generated due to Twaron's Fifth - Year plan. Market situation --> prognoses --> growth & needs
2	**What are the several activities of you and your organisation within a project?**	Teijin has their own engineering group, but Twaron is working seperately with other engineering companies. Market feasibility studies, investment plan
3	*Initiative phase*	Market feasibility studies, conceptual designs
4	*Definition phase*	Project definition; objectives, scope, resources Projectmanagement
5	*Engineering phase (conceptual, basic, detail)*	EPCm done by engineering company, at the moment a close relation with Ake Caverne
6	*Procurement*	EPCm done by engineering company, at the moment a close relation with Ake Caverne
7	*Construction*	EPCm done by engineering company, at the moment a close relation with Ake Caverne
8	*Operation & Maintenance*	Done by themselves
9	**What are important criteria in relation to projects? (Time, Money, Quality, Information, Organisation e.g.)**	Safety (during construction, operation and also environment) High Quality Within Budget (Money, Schedule (Time), --> ROI
10	**Are there new criteria from the point of view of your organisation?**	Relation --> Trust / belief --> evidence Openess & Transparency Predictability --> accuracy of risks Creation of WIN - WIN situation
11	**What kind of reimbursement system is usually used in projects?**	Reimbursable Lumpsum services Lumpsum turnkey
12	**When and how is a reimbursement system involved in the project?**	Parallel, depends on the information and risks distribution to contractor
13	**What are important criteria for prequalification of a contractor?**	At the moment working with fixed partner, but indeed prequalification will be one of the future's activities
14	**What are important criteria particularly for international projects? (formal & informal)**	Language bariere (don't hear, don't understand the language, don't understand the meaning) Cultural differences, how to check & control the objectives Intellectual Property

Organisation related questions

1	**What kind of collaboration forms are used in projects?**	EPCm Lump Sum Turnkey
2	**What is the procedure and sequence to get in a collaboration form?**	Market & Functional study are continuously improved, after defining the need of a new plant or expansion, an external engineering party will be involved to setup the project
3	*Organisational level*	-
4	*Project level*	-
4	*International level*	-
5	*Others?*	-
6	**What are the relations between the criteria and aspects in relation to the chosen collaboration form?**	Fulfill 4 main objectives Build on relationship --> creat trust & openess in the way of doing business --> WIN - WIN situation
7	**How is the decision - making process?**	Based on: Risks Predictability & control Feeling & trust
8	**How will the important ness of criteria be translated in a collaboration form?**	All 4 main objectives must be fulfilled
9	**What kinds of impact will the new development in the construction industry influence your projects?**	At the moment, it's not a point of issue. Industrial projects have often two parts, civil part and equipment installation part. Civil part is ca. 10% of investment, selection is often done via EPCm contractor
10	**Will there be changes in relation to:**	
11	*Innovation*	Done by contractor during basic engineering phase
12	*Life Cycle Analysis (LCA)*	-
13	*Value - Benefit - Cost model*	WIN - WIN situation with partner, parallel ways to shorten the construction time
14	*Chain integration*	Civil contractor often comes up with benefits like, optimal design, no double engineering and faster solution. But the main point is, how can the contractor be selected without any project information

Norrit Process Technology



Interview

Respondent(s)	Mr. Jaap Middelkoop
Place of interview	The Hague (interview taken via phone)
Interviewnumber	7
Interviewed by	K.T. Lee
Date interview	18/11/2005

Project

1	**How would you describe the projects of your company? (sector, origin, size e.g.)**	Design & construction of installations in the liquid food industry (ca. 2 - 6 M Euro per plant)
2	**What is your role in the project & within your organisation?**	Project Manager

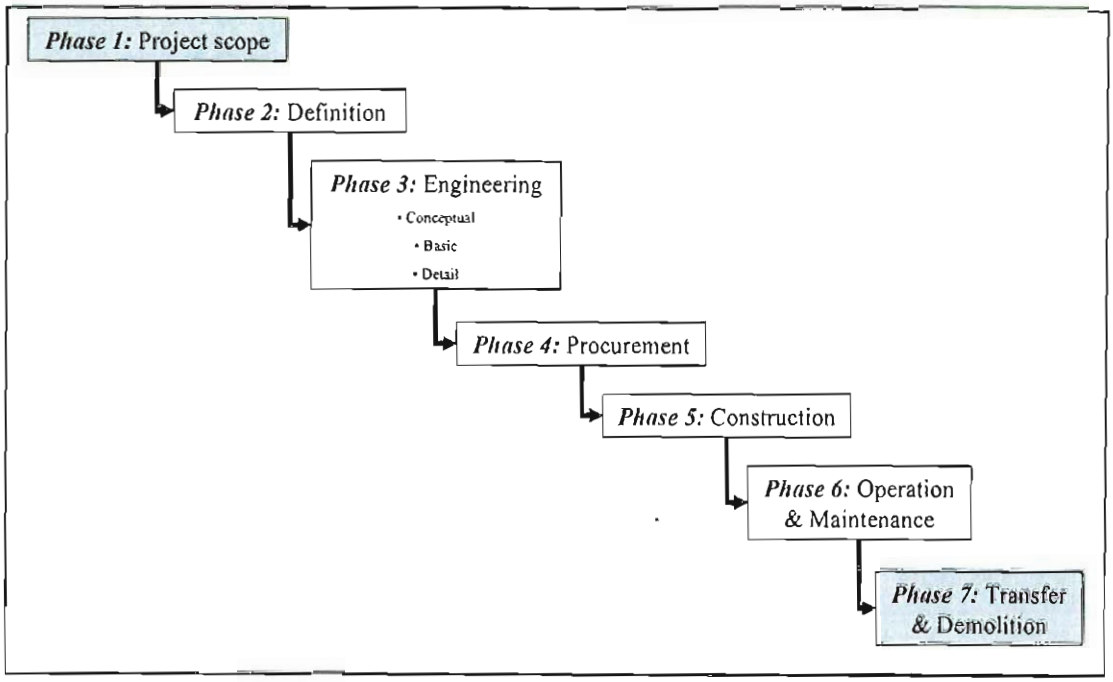
Project related questions

1	**Can you describe the initiation of a project within your company?**	A technical document will be prepared by the clients. This document considers aspects of the project; like quality, equipment, functionality etc. After the hand over the design phase will be done by Norrit Engineering.
2	**What are the several activities of you and your organisation within a project?**	Note: Norit Engineering is an engineering company providing services for clients, they also work together with subcontractors.
3	*Initiative phase*	Done by client
4	*Definition phase*	Done by client
5	*Engineering phase (conceptual, basic, detail)*	Norit Engineering for brewery itself, the civil part is done by design institutes
6	*Procurement*	Procurement with locally in China
7	*Construction*	Main construction will be done internally, other activities done by subcontractor. Civil part via subcontracting
8	*Operation & Maintenance*	Done by client
9	**What are important criteria in relation to projects? (Time, Money, Quality, Information, Organisation e.g.)**	Price and Quality are often the most important aspects to be considered by the clients
10	**Are there new criteria from the point of view of your organisation?**	Training and education of local subcontractors is a point of interest
11	**What kind of reimbursement system is usually used in projects?**	Lumpsum Turnkey for equipment and process installation
12	**When and how is a reimbursement system involved in the project?**	Not discussed
13	**What are important criteria for prequalification of a contractor?**	Not discussed
14	**What are important criteria particularly for international projects? (formal & informal)**	Pride and face loss to be used as a tool to maintain relationship, Flexibility, Gain trust, Respect for each other, language barrier, hierarchical levels, interpretation and understanding of each other

Organisation related questions

1	**What kind of collaboration forms are used in projects?**	Turnkey and traditional tendering
2	**What is the procedure and sequence to get in a collaboration form?**	
3	*Organisational level*	Create one's own guanxi network is very important
4	*Project level*	Regular projects are realised with fixed partners / contractors
4	*International level*	Not available
5	*Others?*	Not available
6	**What are the relations between the criteria and aspects in relation to the chosen collaboration form?**	Effort, time and patience are needed to maintain contact. Partners in China more often have a lack of planning and organisation, coordination from the side of Norit is a must.
7	**How is the decision - making process?**	Norit Process Technology do not initiate projects by themselves, criteria are formulated by the client
8	**How will the important ness of criteria be translated in a collaboration form?**	Norit Process Technology do not initiate projects by themselves, criteria are formulated by the client
9	**What kinds of impact will the new development in the construction industry influence your projects?**	Not discussed
10	**Will there be changes in relation to:**	Not discussed
11	*Innovation*	-
12	*Life Cycle Analysis (LCA)*	-
13	*Value - Benefit - Cost model*	-
14	*Chain integration*	-

Zeelandia



Interview

Respondent(s)	Mr. Gerard Janse
Place of interview	Zeelandia
Interviewnumber	6
Interviewed by	K.T. Lee
Date interview	11/11/2005

Project

1	How would you describe the projects of your company? (sector, origin, size e.g.)	
2	What is your role in the project & within your organisation?	Corporate Manager Operations

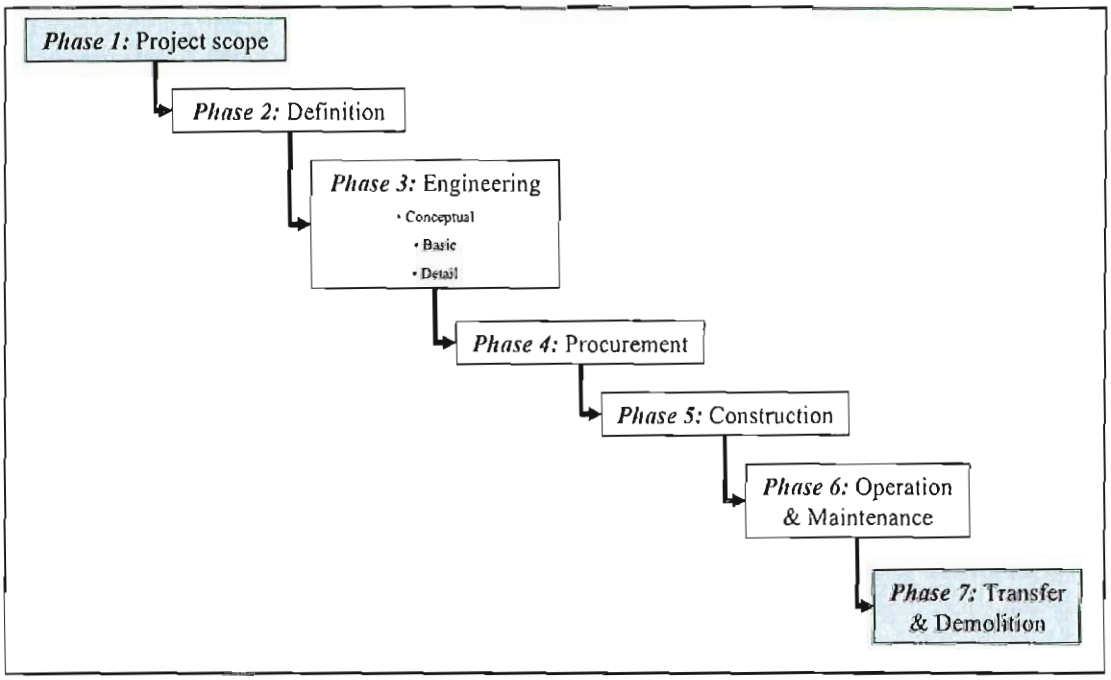
Project related questions

1	**Can you describe the initiation of a project within your company?**	Projects are initiated due to market circumstances, economic stability, growth potentials etc.
2	**What are the several activities of you and your organisation within a project?**	Project initiation and functional design for new or existing plants
3	*Initiative phase*	In house
4	*Definition phase*	Functional plant lay-out with future expectatioins
5	*Engineering phase (conceptual, basic, detail)*	EPCm done by engineering company (project management from western companies)
6	*Procurement*	EPCm done by engineering company
7	*Construction*	EPCm done by engineering company
8	*Operation & Maintenance*	Done by themselves
9	**What are important criteria in relation to projects? (Time, Money, Quality, Information, Organisation e.g.)**	Safety (during construction, operation and also environment) High Quality Within Time & budget negotiation
10	**Are there new criteria from the point of view of your organisation?**	Respect to each other Relation --> Trust / belief --> evidence Openess, Transparency & Fairness Creation of WIN - WIN situation
11	**What kind of reimbursement system is usually used in projects?**	Civil part, mostly EPCm or Turnkey Equipment --> traditional tendering
12	**When and how is a reimbursement system involved in the project?**	
13	**What are important criteria for prequalification of a contractor?**	N.A.
14	**What are important criteria particularly for international projects? (formal & informal)**	Language bariere Spend time to create relationship, respect and understanding Invest time & effort to understand the culture

Organisation related questions

1	**What kind of collaboration forms are used in projects?**	EPCm Lump Sum Turnkey
2	**What is the procedure and sequence to get in a collaboration form?**	First of all, it is important to know if the collaboration is for a long time period or for once. Depending on this fact, several activities can be done to create a relationship
3	*Organisational level*	Long term: respect & understanding, improve openess & transparency Short term: only look at project scope to fulfil objectives
4	*Project level*	-
4	*International level*	-
5	*Others?*	-
6	**What are the relations between the criteria and aspects in relation to the chosen collaboration form?**	Fulfill 4 main objectives Build on relationship --> creat trust & openess in the way of doing business --> WIN - WIN situation
7	**How is the decision - making process?**	Based on: Risks Predictability & control Feeling, trust & good relationship
8	**How will the important ness of criteria be translated in a collaboration form?**	All 4 main objectives must be fulfilled
9	**What kinds of impact will the new development in the construction industry influence your projects?**	-
10	**Will there be changes in relation to:**	The functional design is continuously optimized to improve effectiveness & efficiency
11	*Innovation*	-
12	*Life Cycle Analysis (LCA)*	-
13	*Value - Benefit - Cost model*	-
14	*Chain integration*	-

Royal Boon Edam Group Holding



Interview

Respondent(s)	Mr. Niels Huber
Place of interview	Boon Edam
Interviewnumber	8
Interviewed by	K.T. Lee
Date interview	14/12/2005

Project

1	**How would you describe the projects of your company? (sector, origin, size e.g.)**	Manufacturing, engineering and installation of doors (revolving doors, sliding doors, security doors, security barriers and perimeter security)
2	**What is your role in the project & within your organisation?**	Chairman Royal Boon Edam Group Holding B.V.

Project related questions

1	**Can you describe the initiation of a project within your company?**	Not many construction projects, factories in China, The Netherlands and the USA. When a new production plant is to be realised, it will be decided from the HQ together with the Joint Venture partner in the local country.
2	**What are the several activities of you and your organisation within a project?**	Project initiation and functional design for new or existing plants by HQ. Before a plant is to be realised, trust and partnership will be build with local distributor.
3	*Initiative phase*	In house
4	*Definition phase*	In house, Terms of Requirements together with the joint venture partner
5	*Engineering phase (conceptual, basic, detail)*	Outsourced to external party. The choice of the contractor is primarily done by the local partner
6	*Procurement*	Outsourced to external party. The choice of the contractor is primarily done by the local partner
7	*Construction*	Outsourced to external party. The choice of the contractor is primarily done by the local partner
8	*Operation & Maintenance*	Done by themselves
9	**What are important criteria in relation to projects? (Time, Money, Quality, Information, Organisation e.g.)**	Balance between Time, Money and Quality
10	**Are there new criteria from the point of view of your organisation?**	Respect to each other and business attitude Build up relationship --> Trust / belief --> evidence, Involvement of local shareholders Create WIN - WIN situation
11	**What kind of reimbursement system is usually used in projects?**	Not discussed during meeting
12	**When and how is a reimbursement system involved in the project?**	Not available
13	**What are important criteria for prequalification of a contractor?**	Compliance of agreements Attitude of financial payments Experience of partner
14	**What are important criteria particularly for international projects? (formal & informal)**	Spend time to create relationship, respect and understanding Invest time & effort to understand the culture Continuous process in maintaining relationship

Organisation related questions

1	**What kind of collaboration forms are used in projects?**	Traditional tendering with different parties, architect, general contractor, construction manager and several subcontractors for installations and equipment
2	**What is the procedure and sequence to get in a collaboration form?**	Selection of distribution partner based on business feelings and local market presence --> build up trust and relationship --> when local market grows, setup of joint venture with distribution partner.
3	*Organisational level*	Continuous process to build and strengthen the trust and relationship between HQ and partner, local contacts is organised by local partner
4	*Project level*	-
4	*International level*	-
5	*Others?*	-
6	**What are the relations between the criteria and aspects in relation to the chosen collaboration form?**	Build on relationship --> creat trust & openess in the way of doing business --> WIN - WIN situation
7	**How is the decision - making process?**	Based on: Reduction of risks Increase of predictability & control Feeling, trust & good relationship
8	**How will the important ness of criteria be translated in a collaboration form?**	Balance between the objectives of the HQ and local partner. Requirements translated into project which mainly will be managed by local partners
9	**What kinds of impact will the new development in the construction industry influence your projects?**	Because of the small amount of construction projects, there is less attention to the development in this industry
10	**Will there be changes in relation to:**	
11	*Innovation*	-
12	*Life Cycle Analysis (LCA)*	-
13	*Value - Benefit - Cost model*	-
14	*Chain integration*	-

Appendix H: Detailed Characteristics Derived from Relationship Aspects

Learning in the Chinese context	
Positive:	never say no
Compromise:	turning everything into something good
Personal:	understanding the person as much as the company
Assistance:	making use of local employees
Adaptability of firms	
Willingness:	finding common working methods
Cooperation:	combining and maintaining with local behaviour
Structure:	local organisation different from parent organisation
Respect:	understanding and sensitivity to local culture
Patience:	taking the time to wait
Finesse:	indirect rather than direct approach
Trust in Chinese context	
History:	acting right and through recommendation and friends
Continuity:	not abondoning things
Track record:	delivering on promises
Forthcoming:	offering help
Cultural awareness:	behaving continuously to partners expectations
Personal:	the individual instead of the organisation
Commitment of foreign firms	
Presence:	locally rooted
Continuity:	few changes of personnel
Mutuality:	strong personal relationship
Long - term:	sticking through bad times
Focus:	interest in the individual
Management:	employing local people
Social relationship in the Chinese context	
Character:	personal chemistry and characteristics
Commonalities:	finding common interests
Eating:	important social function
Borderless:	mix of formal and informal
Continuity:	commitment for a long time
Hierarchies:	maintaining relationships on many levels
Social bonds in the Chinese context	
Fourth dimension:	issues of sensitive nature
Paperless:	written contracts are not needed
Harmony:	not a winning - losing mentality
Face:	problem solving and offering help
Informality:	social events
Availability:	should be reachable at all times

Table XXVII: overview detailed relationship aspects[1]

1: Source: Ramström, J.; West Meets East. Finland: Akademi University Press, 2005

Appendix I: Management by Relationships and Relationship Processes[1]

Western companies use systems to control relationships. Chinese organisations use relationships to control systems. Western companies use a legalistic framework of procedures and controls to police relations. This legalistic and financial control framework is confusing for Chinese managers who feel mistrusted and do not know how they stand in relationship to the boss. Chinese managers believe that one of their key tasks is to maintain harmony within the organisation, both between people and between work units. This is particularly the case where Confucian values are strongly extant.

Leadership anywhere in the world operates on the basis of respect. On the one hand, leaders are certainly expected to develop a relationship with their employees. On the other hand, a tactical plan is needed to be drawn up, practical decisions need to be made, and resources need to be in place and not diverted. The coming two sub paragraphs give an impression of the relationship processes in The Netherlands and in China.

Relationship process in a Dutch context[2]

Previous research has established that the relationship process in a Western context can be divided into separate stages.[3] Although this development process is divided into stages, in reality there is no clear separation between the different stages. It is also important to realise that relationships do not move into each stage in a pre – determined way. Business relationships are not linear processes that move in one direction towards the ideal state. Instead developing a business relationship is about coping with different circumstances at different times and with varying aims. Figure 10.2 represents the relationship processes in the Dutch context.

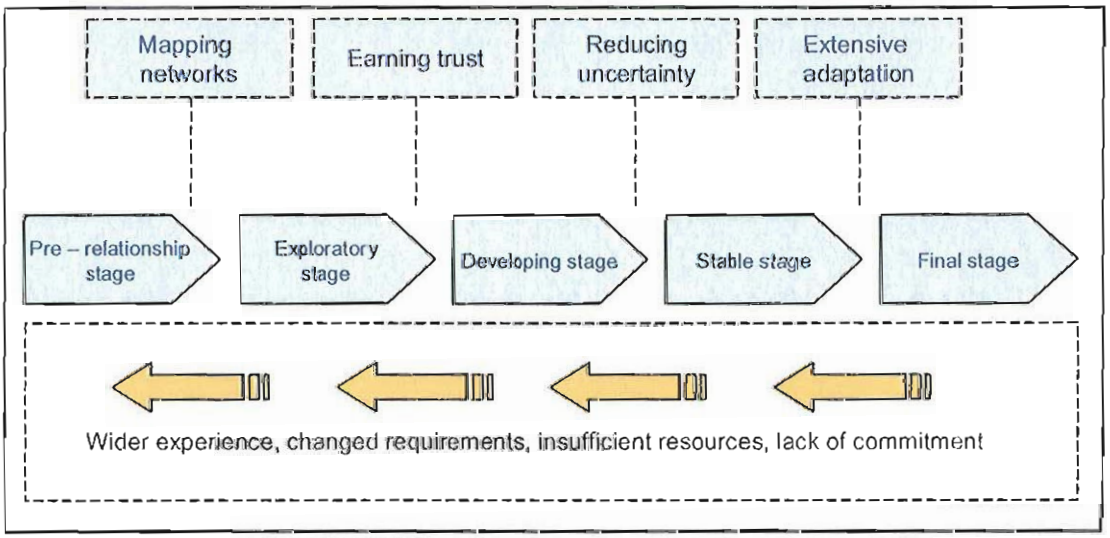


Figure XXV: Western relationship process

A detailed description of the different stages is given below:

- ***Pre-relationship stage:*** the first stage in the development process is a preparatory stage. The companies have had some prior contact with each other. This first stage takes up marketing activities before the relationship begins. Most of the work done during this stage evolves around evaluating partner alternatives. One or both of the partners will attempt making a network map in order to learn more about the position, strength, dependencies, etc. Among the actors. Looking for a new partner takes a great deal of time and effort, because the uncertainty is high, there is no commitment and adaptation is zero.
- ***Exploratory stage:*** With networks mapped and relationships identified exploration of these start. Focus in this stage is on specific actors, and both partners are engaged in serious discussions or negotiations.

1: Source: Ramström, J.; West Meets East. Finland: Akademi University Press, 2005
2: Source: Ramström, J.; West Meets East. Finland: Akademi University Press, 2005
3: Source: Ford et al., 1998; Jansson, 2005

Commitments are made to focus on specific partners in order to reduce the considerable distance between them. There is a lack of trust as well as concern about the other's commitment and there is also great uncertainty about future benefits of the relationship. It is of great importance that initial trust is established and demonstrating commitment is a way of earning trust. This stage is a mutual learning process and although adaptations are few, the amount of learning is greatest at this stage. There is also exchange of information, which is critical because commitment is vital if the relationship is to go to the next stage.

- ***Developing stage:*** business and communication between actors starts to grow, because relationships between actors become deeper and broader. This leads to intensive mutual learning which in turn leads to increased experience for both partners. As the partners learn more about each other uncertainty is reduced and trust and commitment increases. They also increasingly share resources and hence, business grows in volume.

  At this stage most uncertainties about ambitions and abilities has been reduced, when trust is build on action rather than promises. Both companies are keener on finding out about adaptations. Adaptations become important, because they are a way to show that a company can be trusted. There is not only formal but also informal adaptation, which means that both are attempting to change social behaviour of personnel to fit the other's expectations. A willingness to adapt demonstrates commitment, and informal adaptations and either party can consciously or not cause development to slow or even revert to previous stage.

- ***Stable stage:*** the long term or stable stage is characterised by continuous interaction between the partners. This stage occurs when the companies have reached certain stability in the learning about each other. It is not possible to place a time scale on reaching this stage, and some relationships will never reach this. The partners have learnt to know and trust each other and the relationship becomes more and more a routine. There is extensive adaptation and partners exhibit common thought styles, mutually accepted norms of conduct, standard operating procedures and they demonstrate both formal and informal adaptations. Common to this stage is that distance is low and commitment high, which combined with extensive adaptations leads to low handling costs.

  The aim of building relationships is to reach this long-term stage. But this stage can lead to problems, because routines may not be questioned and might therefore become less suited for companies' evolving requirements. This process is referred to as institutionalisation. Other potential problems are that one partner can become over dependent on the other, and stability could also give impression to one that the other is no longer committed. If an ongoing long-term relationship is not accomplished, the relationship may retract to an earlier stage, even to the pre-relationship stage.

- ***Final stage:*** in this final stage the relationship is extensively institutionalised, with commitment even being taken for granted. The relationship is more of a habitual relationship, than one based on fulfilment of needs and demands. There is great risk that partners become complacent because of the high level of trust between them. Although distance as well as uncertainty between partners is low, there is a great risk that the partners are not attentive to changes in the environment. Therefore the relationship is sensitive to being broken due to changes in the companies' environments, or attacks by competitors. There might therefore be a need to de – institutionalise the relationship.

Relationship process in a Chinese context[4]

It is perceived in Chinese culture that one's existence is largely influenced by one's relationship with others. An individual is fundamentally a social or relational being, and developing a cultivating relationship is a common preoccupation and a form of social investment.[5] While Western business tends to focus on relationships between an individual business and customer, the Chinese tend to prefer long – term and personalised and mutual cooperation as the basis for most of their business dealings. Figure 10.3 represents the relationship processes in the Chinese context.

4: Source: Ramström, J.; West Meets East. Finland: Akademi University Press, 2005
5: Source: Yau, Lee, Chow, Sin & Tse, 2000

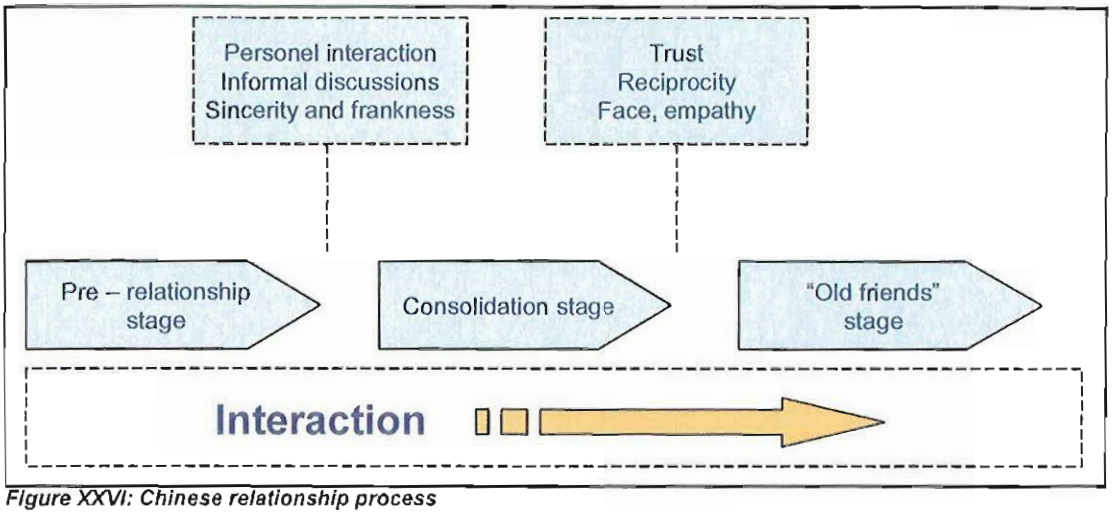


Figure XXVI: Chinese relationship process

A short description of the different stages also will be given here:

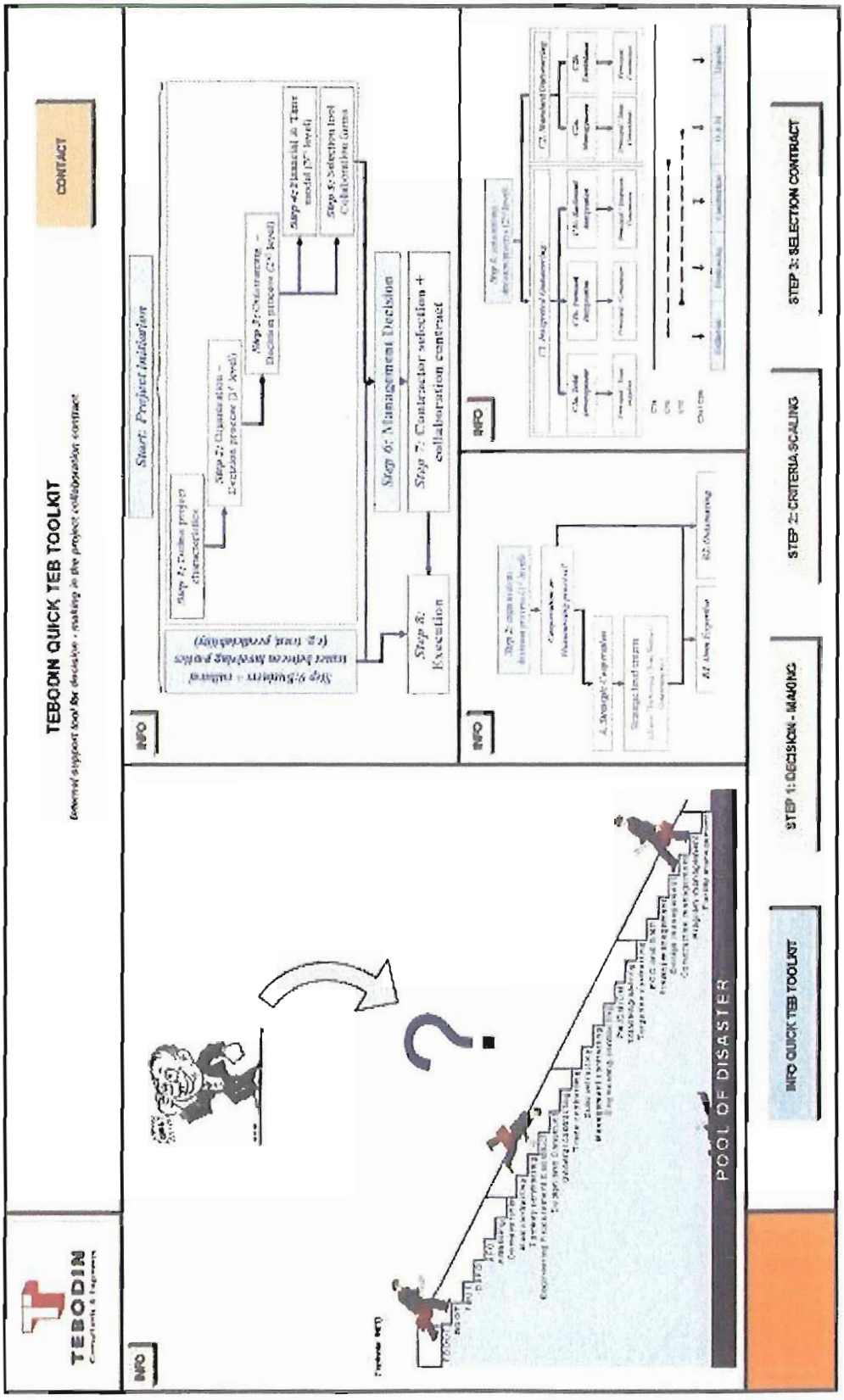
- ***Pre-relationship stage:*** the pre-relationship stage concerns how to find some common relationship basis. A basis of commonality or familiarity has to be constructed to bridge the gap between two parties by becoming part of the inner circle. This may include such activities as sharing a group identity, or identifying common interests that come from working together. It is important in the early stages of the relationship to identify and find an appropriate network catalyst. These catalysts might be external, such as some regulatory agencies, for instance the Asian Development Bank or internal in the form of another network member. The pre-relationships stage is guanxi dominated, and the relationship starts with guanxi. To establish guanxi, an introduction by a third party is merely the first step in constructing a relationship.

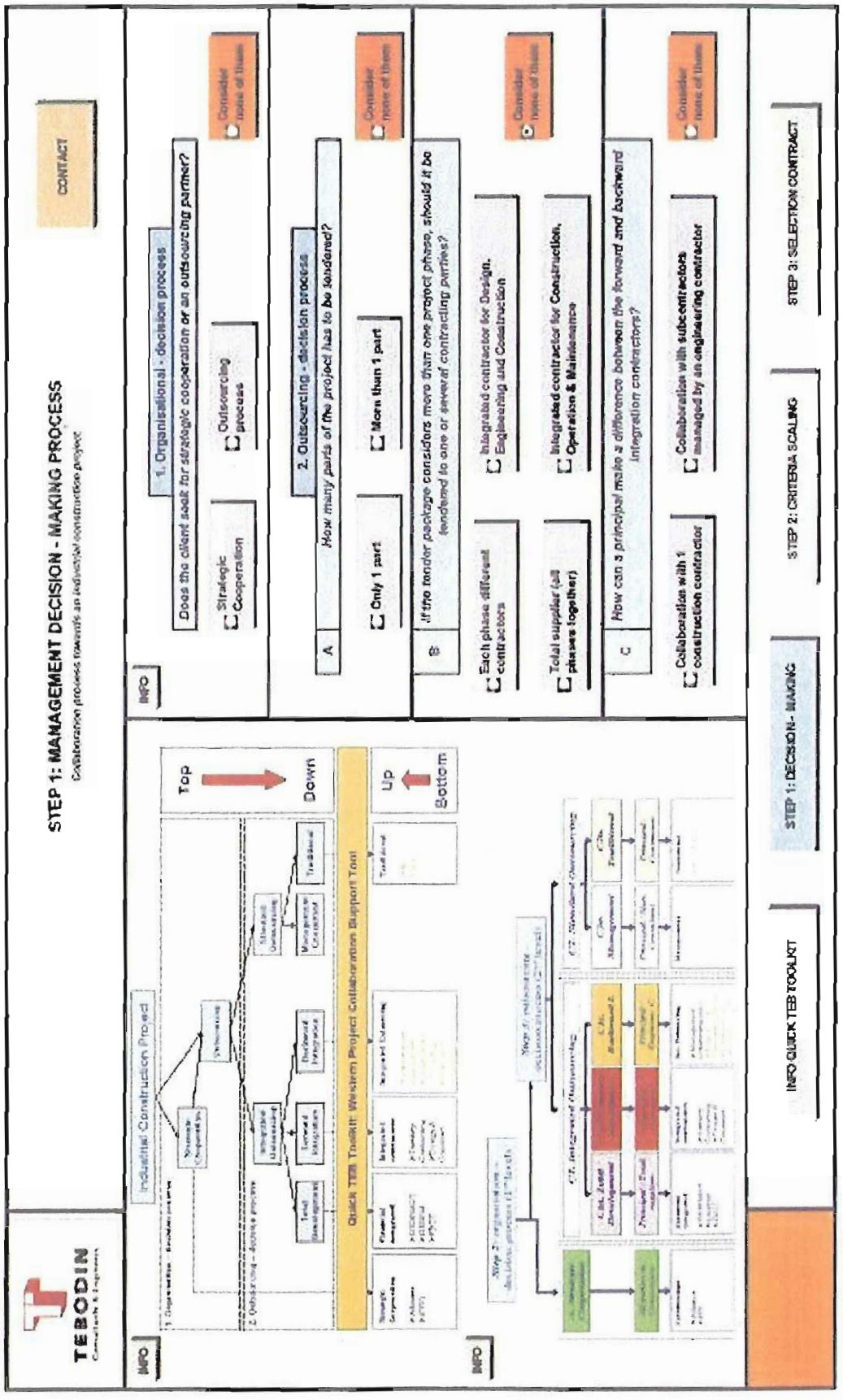
- ***Consolidation stage:*** consolidation involves addressing various relationship issues (social interactions, information discussion, gift giving, non-business favours and building trust) in order to consolidate the four dimensions in a working relationship (bonding, reciprocity, trust and empathy). While developing social relationships, one has to construct a personal relationship. One way of doing this is through informal discussions, during which both parties may share inner feelings and disclose personal secrets, indicating sincerity and frankness. Gift-giving is an indication of goodwill and respect and it is a way of building long-term relationships, not a fee-for-service. Social interactions is not only limited to gift-giving, it can also extend to emotional or affective responses. When one has difficulties, acquaintances are expected to render substantial assistance.

- ***"Old friend's" stage:*** during the "old friends" both parties are bonded by trust and partners maintain the relationship by addressing important relationship issues. Gradually a relationship may extend from a social level to the business level. Building trust is extremely important, especially if there is high uncertainty in market exchanges. To the Chinese, friendship leading to business is more attractive than business leading to friendship. They are more willing to honour a deal as long as the friendship is more valuable than the deal itself. The final stage is characterised by mutual commitment of the relationship partners, although it may have been achieved through a different process.

- ***Interaction:*** through interaction, a positive or negative flow determines whether the relationship moves up, down or laterally. Getting to the "old friends" stage, which also can be regarded as becoming an "insider", usually takes considerable time and effort. Maintaining trust is vital. Even if there is a binding between two parties, the Chinese may continue to work together, but will treat the other party as an outsider.

Appendix J: Print – out Quick TEB Toolkit





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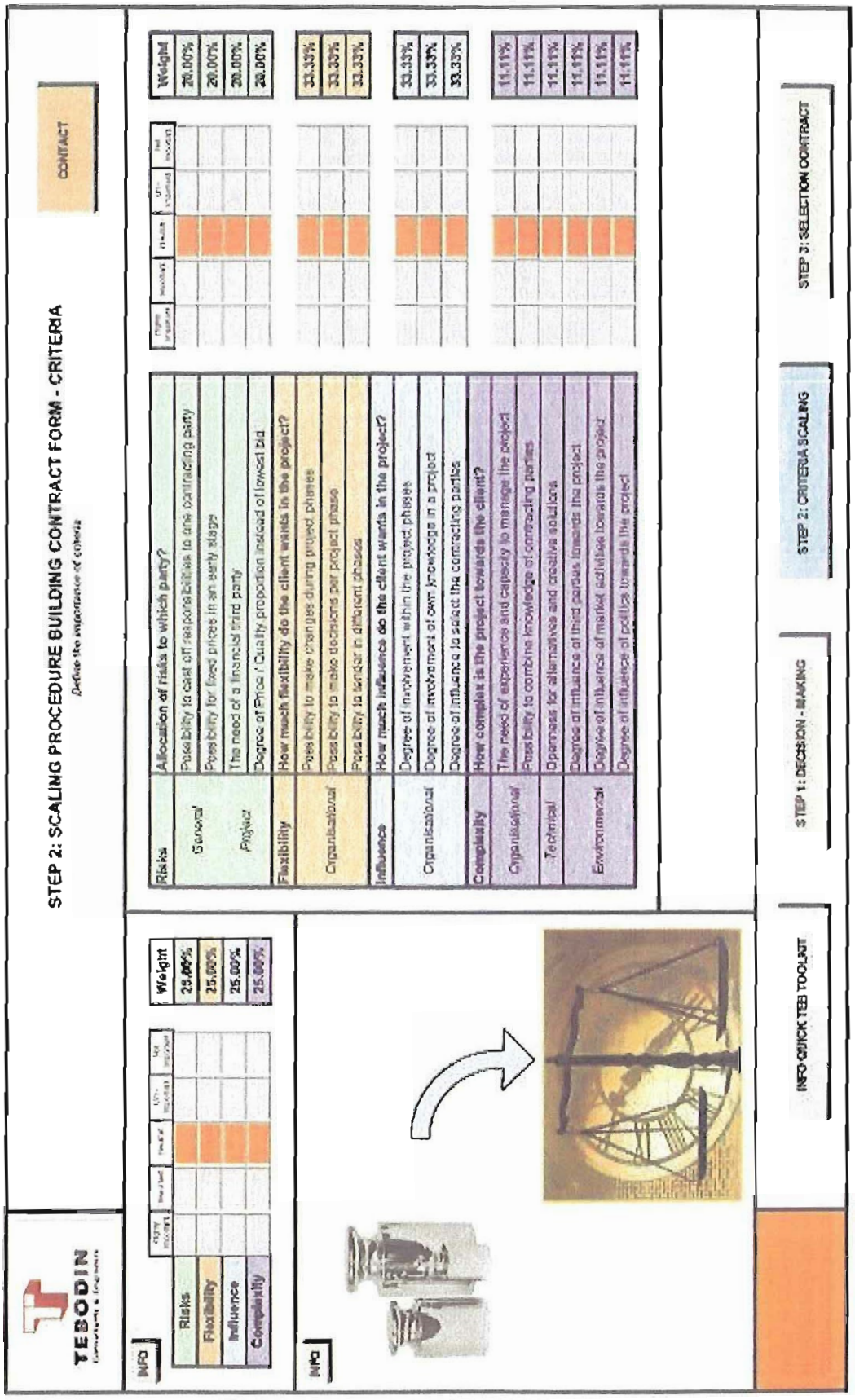
TEBODIN
INFO
Risks
Flexibility
Influence
Complexity
Weight
25.00%
25.00%
25.00%
25.00%
STEP 2: SCALING PROCEDURE BUILDING CONTRACT FORM - CRITERIA
CONTRACT
Risks
General
Project
Allocation of risks to which party?
Possibility to cast off responsibilities to one contracting party
Possibility for fixed prices in an early stage
The need of a financial third party
Degree of Price / Quality proportion instead of lowest bid
Flexibility
Organisational
How much flexibility do the client wants in the project?
Possibility to make changes during project phases
Possibility to make decisions per project phase
Possibility to tender in different phases
Influence
Organisational
How much influence do the client wants in the project?
Degree of involvement within the project phases
Degree of involvement of own knowledge in a project
Degree of influence to select the contracting parties
Complexity
Organisational
Technical
Environmental
How complex is the project towards the client?
The need of experience and capacity to manage the project
Possibility to combine knowledge of contracting parties
Openness for alternative and creative solutions
Degree of influence of third parties towards the project
Degree of influence of market activities towards the project
Degree of influence of politics towards the project
Weight
20.00%
20.00%
20.00%
20.00%
33.33%
33.33%
33.33%
33.33%
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33.33%
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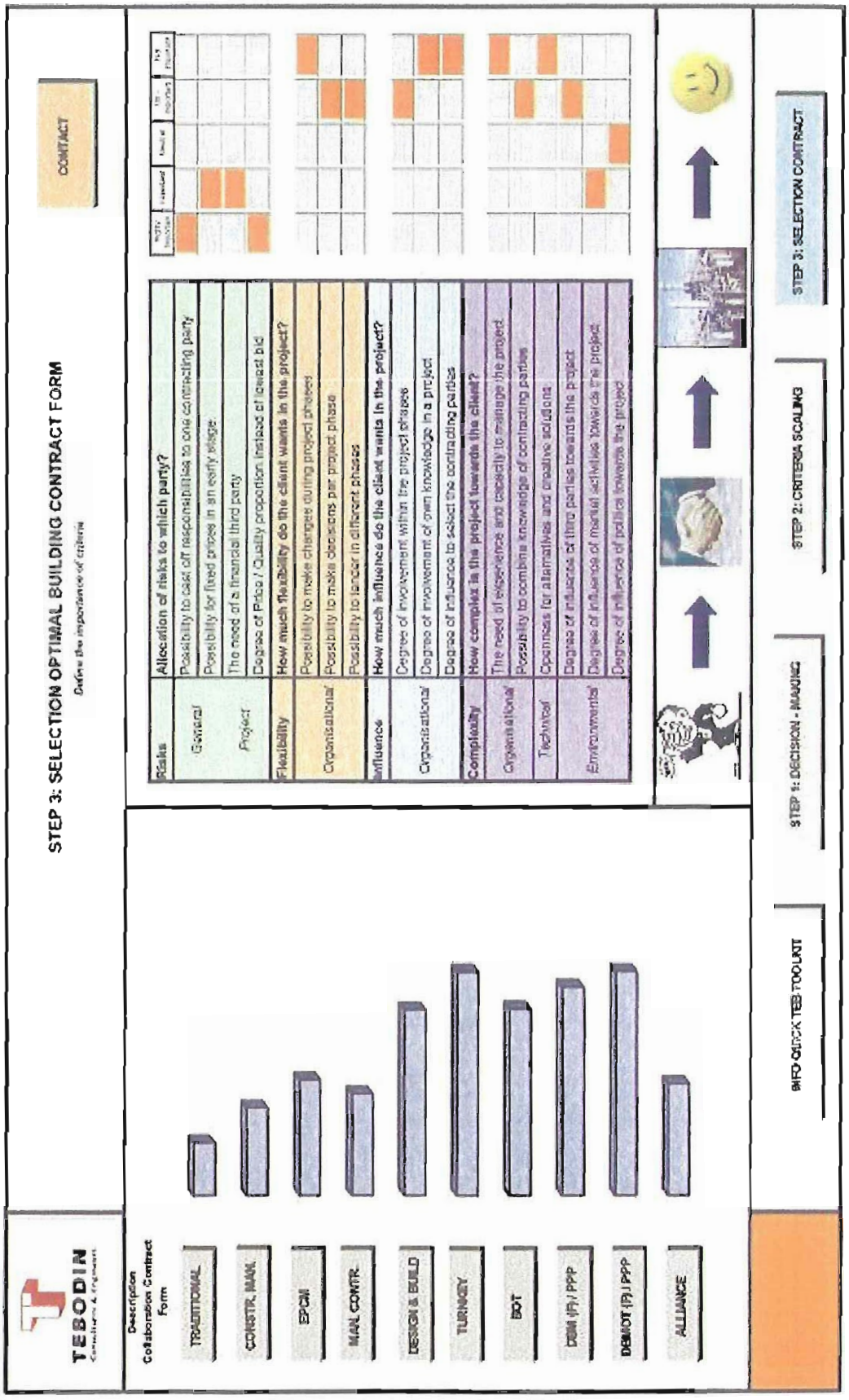
INFO QUICK TEB TOOLKIT
STEP 1: DECISION - RANKING
STEP 2: CRITERIA SCALING
STEP 3: SELECTION CONTRACT



Appendix J: print – out Quick TEB Toolkit

Appendix K: detailed description considered Real Options models[1]

European Compound Option on Option (Closed-Form)

The *European Closed-Form Compound Option* with two phases is applicable for research and development investments or any other investments that have multiple investment stages. That is, management has the ability to decide if Phase II should be implemented after obtaining the results from Phase I (e.g., market research in PI indicates that the market is not yet ready for the product, hence PII is not implemented. All that is lost is the PI sunk cost, not the entire investment cost of both PI and PII). An example below illustrates how the option is analyzed. Recall that this is simply a European option, which means that the phases can only be executed at the end of the time periods assigned. For American type compound options, use the *American Sequential Compound Option modules* (2 phase, 10 phase, and custom phases) instead. This module is solved using a closed-form mathematical approach rather than binomial lattices. The *American Sequential Compound Options* are solved using binomial lattices. See the *American Sequential Compound Option (2 Phases)* for details on solving this example. A *Call on Call Compound Option* provides management the ability to invest a little now, wait and see, and then invest more later. Conversely, the *Put on Call Compound Option* provides management the ability to sell this ability to a counterparty in order to invest more in the future, subject to both the uncertainty and risks as measured by the project's volatility.

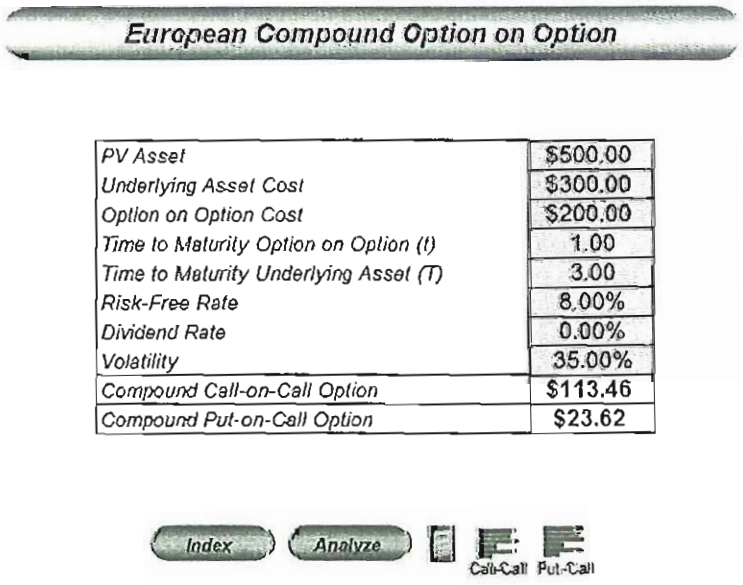


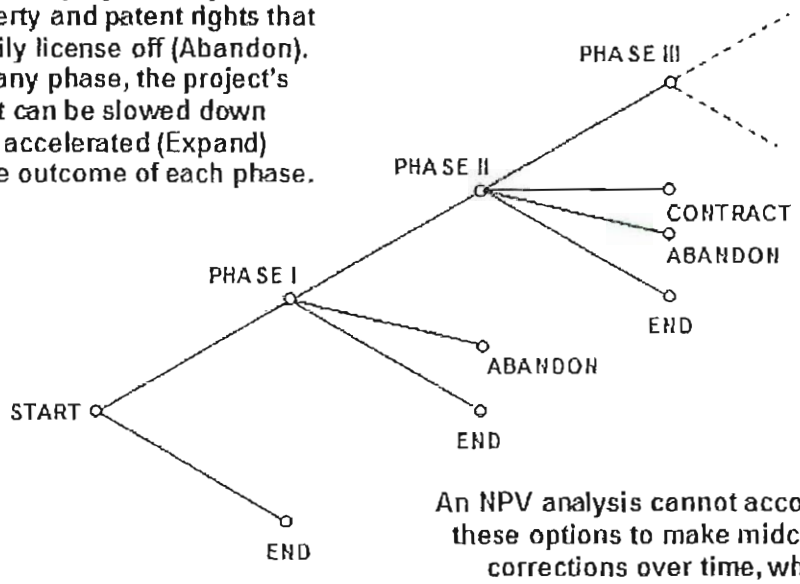
Figure XXXI: European compound option on option (closed-form)

1: Source: Real Options Analysis Toolkit 2.1, Software and Applications User Manual

American Sequential Custom Compound Option (4 Phases)

The *American Sequential Custom Compound Option* (with up to four phases) calculates the sequential compound option where, at every phase, there may be different combinations of mutually exclusive options including the flexibility to stop investing, *abandon* and *salvage* the project in return for some value, *expand* the scope of the project into another project (e.g., spin-off projects and expand into different geographical locations), *contract* the scope of the project resulting in some savings, or continue on to the next phase. The figure below provides a graphical representation of the strategies. (See the *American Sequential Compound Option* module's *Analyze* report for details on a simple sequential compound option analysis).

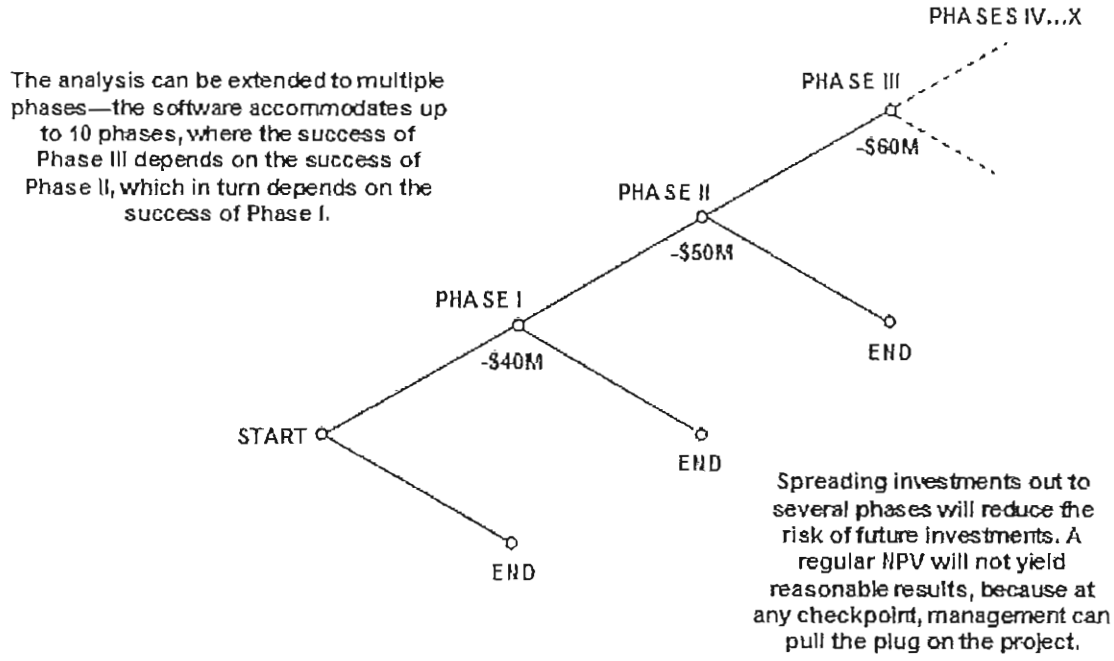
In reality, an R&D project will yield intellectual property and patent rights that the firm can easily license off (Abandon). In addition, at any phase, the project's development can be slowed down (Contract) or accelerated (Expand) depending on the outcome of each phase.



An NPV analysis cannot account for these options to make midcourse corrections over time, when uncertainty becomes resolved.

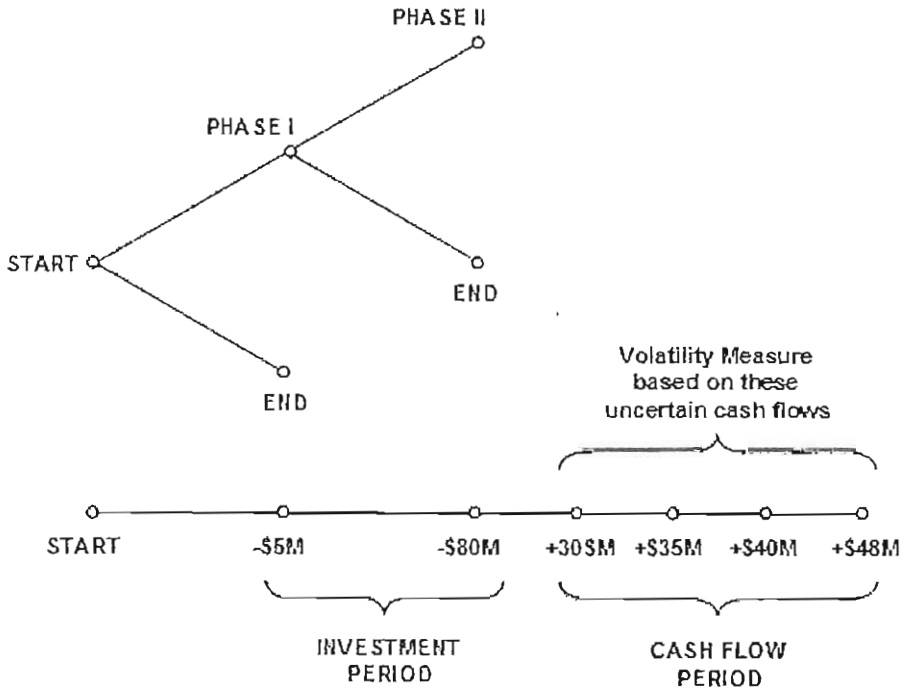
American Multi-Sequential Compound Option (10 Phases)

The *American Multi-Sequential Compound Option* with up to ten phases provides the same types of analysis as the two-phased sequential compound models. (For specific information and illustrations on analyzing compound options, go to the *American Sequential Compound Option* (2-Phases) module and run the *Analyze* report function). The difference here is that the phases are extended to ten. Research has shown that analysis of anything greater than 10 phases provides fairly negligible variances in results, and all future investment phases could be collapsed into the last phase. Notice that due to the backward induction process used, the assumptions for the last phase are entered first, back to the first phase. The graphic below illustrates this ten-phase project, where at every phase management has the option and flexibility to either continue to the next phase if all goes well, or terminate the project. Based on the input assumptions, the results in the module indicate the calculated strategic value of the project, while the NPV of the project is simply the *PV Asset* less all *Implementation Costs* if implementing all phases immediately. Therefore, with the strategic option value of being able to defer and wait before implementing future phases because due to the volatility, there is a possibility that the asset value will be significantly higher. Hence, the ability to wait before making the investment decisions in the future is the option value or the strategic value of the project less the NPV.



American Sequential Compound Option (2 Phases)

The *American Sequential Compound Option* with two phases is applicable for research and development investments or any other investments that have multiple investment stages. That is, management has the ability to decide if Phase II (PII) should be implemented after obtaining the results from Phase I (PI). For example, a pilot project or market research in PI indicates that the market is not yet ready for the product, hence PII is not implemented. All that is lost is the PI sunk cost, not the entire investment cost of both PI and PII. An example below illustrates how the option is analyzed.



This illustration is valuable in explaining and communicating to senior management the aspects of an *American Sequential Compound Option* and its inner workings. Note that the *Compound Option Benchmark* result is simply that—a benchmark calculated for a *European Compound Option* based on closed-form solutions. Most projects follow an *American Compound Option*, as calculated by the *Binomial Super Lattice* routine.

Appendix L: Overview Deliverables to Tebodin