

**MANAGING UNCERTAINTY IN STRATEGY
EXECUTION IN THE TRANSPORTATION SECTOR
OF THE UNITED ARAB EMIRATES**

**إدارة عدم اليقين في تنفيذ الاستراتيجيات لقطاع النقل في
دولة الإمارات العربية المتحدة**

By

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الملخص

إدارة عدم اليقين (Uncertainty) في تنفيذ الاستراتيجيات لقطاع النقل في دولة الإمارات العربية المتحدة

عبير محمد محسن العامري

توضع الاستراتيجيات والخطط المؤسسية لدعم وحدات العمل بالمؤسسة وتوجيه الجهود لتحقيق الأهداف والغايات الإستراتيجية ضمن مسار محدد ومتفق عليه من بين خيارات متعددة، ولكن المسؤولية الكبرى تقع على عاتق القيادة في تحقيق الغايات والأهداف وتحويل الرؤية الى واقع ملموس. "وتكمن الخطورة في عدم توفر خطة استراتيجية مرنة تواكب التغيرات البيئية ليتم تبنيها من قبل القيادة مما يؤدي الى فقدان الثقة في عمليات التخطيط والتحليل وخلق حالة من عدم اليقين المؤسسية ينتج عنها اتخاذ قرارات مبنية على الحدس" (1) هذه القرارات قد تؤدي الى سلك مسار مختلف عن المسار المخطط له وبذلك تنحرف الجهود المؤسسية عن تحقيق الغايات والأهداف المنشودة ولذا تعد حالات عدم اليقين (Uncertainty) مدعاة للقلق في المؤسسات.

هذه الأطروحة تلقي الضوء على أهمية الإدارة الفعالة لعدم اليقين وتقييم آثارها على تنفيذ الاستراتيجيات وتحديد استراتيجيات لمعالجة حالات عدم اليقين التي تعاني منها المؤسسات المختصة في قطاع النقل العام وأهمية إدارتها الفعالة لتسهيل عملية اتخاذ القرارات في ظل الظروف المحيطة، و تتواجد حالات عدم اليقين في أشكال كثيرة ويمكن إدارتها من خلال معالجة بعض العوامل المسببة في البيئة المحيطة الداخلية والخارجية للمؤسسات، في حين لايمكن معالجة العوامل الأخرى وتقتصر الجهود على احتواءها والتقليل من أثرها.

تتضمن الدراسة مسح على حالات عدم اليقين في مؤسسة هيئة الطرق والمواصلات في إمارة دبي كونها من المؤسسات الضخمة في قطاع النقل العام. وتعمق في تقييم هذه الحالات وعلاقتها بالاتصال المؤسسي وإدارة المعرفة وإدارة العقود المؤسسية. ويتبع البحث نهج غير تقليدي في طرح الفرضيات في موضوع عدم اليقين، مستوحاة من النظريات الموضوعية في تنفيذ الإستراتيجيات. تم جمع المعلومات من خلال إجراء مقابلات مع ذوي الخبرة من مدراء أقسام وإخصائيين في مؤسستي المرور والطرق والمواصلات العامة بهيئة الطرق والمواصلات، وتم تحليل المعلومات من خلال استخدام طريقة البحث المعروفة بـ **Grounded Theory** ، حيث تم الاستنتاج أن الخطوة الأولى لتسهيل معالجة حالات عدم اليقين هي تصنيفها ضمن مستويات مختلفة ليتم التعامل معها باستخدام الأساليب والمنهجيات المناسبة.

تتناقش الأطروحة الفرضيات في ضوء نتائج الدراسة، حيث يتبين ان قطاع النقل يعد من القطاعات ذات البيئة غير المؤكدة والمعقدة، وبالرغم من ذلك تمكنت هيئة الطرق والمواصلات من احتواء حالات عدم اليقين ضمن مستويات مقبولة. إن حالات عدم اليقين في هيئة الطرق مستمرة بسبب بعض العوامل الداخلية منها ترابط المشاريع وعدم توفر خطط تنمية الموارد البشرية والحاجة الى إدارة المعلومات وتكامل عمليات التخطيط، وهذه العوامل غالبا ما تؤدي إلى زيادة المهام الغير مخطط لها والتغيرات العشوائية في الأولويات، وترتبط حالات عدم اليقين المتعلقة بالبيئة الخارجية بعوامل أساسية يصعب السيطرة عليها كنقص الموارد وقلة الطلب على خدمات النقل العام.

تشمل التوصيات على استراتيجيات لكل الفئات منها حكومة دبي والجهات المشرفة في قطاع النقل العام والإدارة العليا لهيئة الطرق والمواصلات والشركاء من الإستشاريين وغيرهم، ومن هذه الإستراتيجيات استراتيجيات التكامل واعتماد نظام الإتصال الأفقي **Organic Management** والتركيز على العمليات ومعايير اختيار العقود إدارة المعرفة وإدارة المعلومات من خلال تحديد احتياجات الهيئة من المعلومات سعيا للحد من حالات عدم اليقين وغيرها.

ABSTRACT

MANAGING UNCERTAINTY IN STRATEGY EXECUTION IN THE TRANSPORTATION SECTOR OF THE UNITED ARAB EMIRATES

Abeer Mohd Mohsin Al Amri

The purpose of this research is to identify strategies for resolution and better management of uncertainty. Uncertainty exists in many forms. Some uncertainties can be managed while others cannot.

This dissertation studies the management of strategic uncertainty in a large organization RTA and evaluates its impacts on strategy execution. It then considers uncertainty in relation to corporate communication, knowledge and contract management.

The secondary research develops propositions about uncertainty based on literature review of generic theories of the environment and strategy execution under various uncertainties. Uncertainty is categorised based on the levels of uncertainty and a group of experts selected from two main agencies (public transport & roads and traffic) are interviewed and the data analyzed based on grounded research methods.

Discussion on the propositions in the light of the study's findings shows that the transportation sector is a highly uncertain and complex environment, however, RTA has managed to contain uncertainty within acceptable levels. Uncertainty persists due to internal factors including project interdependencies, lack of human resources development plans and the need for more information and integrated planning. These constraints and setbacks often lead to ad-hoc requests and random changes in priorities. External uncertainty is related principally to resources and demand changes

The recommendations cover internal strategies such as integration strategies, adopting an organic management system and focus on knowledge management processes and corporate information needs to minimize uncertainty. It is proposed that further studies are conducted in the domain of business and strategic management.

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DEDICATION

I dedicate my dissertation to my dearest mother Khurshid Ahmad Baksh. May Allah gives her long life for being motivator and a model for me throughout my journey and to all who have contributed to my research. I would also like to thank the next person reading this research and benefiting from the information and applying it to their life.

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1 INTRODUCTION TO RESEARCH PROBLEM

Urban development is booming in The United Arab Emirates. The Ministry of Economy and the Central Bank published the Economic Development Yearbook (2007) that government spendings in United Arab Emirates are in infrastructural projects investments involving transportation, communications and storage that contributed to significant 10.4 per cent of non-oil GDP (2000). The Roads and Transport Authority in Dubai has accomplished major achievements in road infrastructure within a short period of time. In such organizations managers face substantial pressure and challenges. Strategies and plans are prepared to assist and provide a roadmap but converting plans to reality and taking full charge of executing initiatives, programs and projects is in the hands of leading managers. It becomes more complicated when the ultimate goal is not clearly envisioned, resulting in dedicating valuable time and effort to clear ambiguity and cope with last minute demands and ad-hoc requests. Hence uncertainty is considered as a matter of corporate concern. Every organization drives its efforts towards an intended future and strategies are aligned toward achievements of its vision of the future. “Danger lies at the other extreme: if managers cannot find a strategy that works under traditional analysis, they may abandon the analytical rigor of their planning process altogether and base their decisions on gut instinct” (Courtney & Kirkland & Viguerie 1997, pp. 81).

The aim of this research is to identify strategies for resolution and better management of uncertainty. Uncertainty exists in many forms. Some uncertainties can be managed while others cannot. The overall research aims to equip managers with the best business and IT strategies and tools to manage uncertainty in their work environments.

This research proposes uncertainty management which is a technique used to avoid immediate loss due to any sudden changes in the environment and the system. Managing the degree of uncertainty is the work of management. Managers should attend to all the possible situations that may arise in a system. Managers should know the basics of all the decisions related to uncertainty and must take steps to control the key factors through management interventions.

The reality regarding uncertainty is that uncertainties are a basic fact of life and to some extent are unavoidable in any situation. Managing uncertainty assumes that everyone should identify and prioritize the primary contributors to decision making uncertainty. Social, economic and political factors may be important sources for various types of uncertainty. Managers should comply with decision making uncertainties and often have to contribute to the original project. Before the commencement of the work, the manager should analyze the sensitivity of these uncertainties and must take precautionary measures beforehand so that the possible damage due to uncertainty will be minimised or at least diminished. Uncertainty is described by McKenna (2006, p.438) as “a phenomenon that inhabits our daily work life and, as was discussed earlier, a number of internal and external factors generate it”. He also adds that it is vitally important “to state clearly the way likely future events will unfold, rather than remaining silent on key issues and fuelling speculations and rumour as a consequence” to avoid the risk of confusion and uncertainty escalating within the organization.

Hence, directly addressing all uncertainties is simply not possible. Currently, it is an active area for research to identify and quantify the model of uncertainty and develop specific theoretical models for its articulation and control through special plans or modules, whenever this course of action is feasible. The source of uncertainty is significant and some uncertainties are not quantifiable; managers should be able to learn about these sources of uncertainty as soon as possible. The development of dynamic work strategies is required to cope with different uncertainties and specific

modules must be implemented to prevent or reduce the risks arising from hazardous situations. Many uncertainties are dangerous for the reliability and performance of any system and so prior precautions are needed to avoid problems. Managing all of the significant uncertainties is a tough task and is in general learned through experience (Crumbling, n.d.).

Uncertainty in execution has many levels. Under manageable levels of uncertainty organizations can re-direct its efforts through selection of the best suited strategic option. This is further supported by Courtney & Kirkland & Patrick (2007, pp. 81) who agree that “Understanding uncertainty can lead to strategies that neither defend a company against the threats nor take advantage of the opportunities that higher levels of uncertainty provide”. On the other hand, un-manageable uncertainty causes increase in challenges in strategic planning, ensuring organizational commitment and consequently impacts on organizational development and performance. Uncertainty is a common issue in strategic planning which creates a barrier to the attainment of the organization’s ultimate goals and objectives. Uncertainty levels are determined by external and internal factors which are the key to ensuring effectiveness of the execution any organization’s strategy. This research is important because it suggests a unique approach to check the effectiveness of strategy execution and proposes re-aligning strategies through maintaining acceptable levels of uncertainty among employees and ensuring clarity of goals, objectives and hence clarity of the ultimate vision of the future.

The Roads and Transport Authority (RTA) in Dubai is selected as a case study for the this dissertation research and considered a worthwhile exploration and in-depth study for its unique domain characteristics. The transportation domain is highly complex and unstable industry. Environmental and external factors impacting on transportation are similar to the aerospace industry to large extent. The degree of environmental uncertainty in the transportation industry is influenced by the number of external elements of uncertainty and their variability. Therefore it is considered to

be complex in nature due to many external elements impacting on its strategic environment, and is a highly unstable domain due to the fact that many of these elements change constantly and rapidly.

In addition to external factors, a number of internal factors influencing uncertainty in RTA are considered unique. These factors include strategy, people and operational processes. The preparation of the strategic plan is highly dependent on people and operational processes. Strategic planning is the art of establishing challenging but realistic objectives that are in line with stakeholders' expectations and aims to overcome existing strategic issues and constraints facing the organization. The strategic plan includes a list of projects that are critical to the execution of the objectives and directly influences stakeholders. People are the key players in strategy execution and they demonstrate particular leadership characteristics including different degrees of adaptability and realism.

The research conducted for this dissertation further discusses the relationship between RTA and its stakeholder in relation to Principal Agent theory. It demonstrates the available risk management approaches in contract management and suggests a performance evaluation method and communication approach best suited for managing highly uncertain organizations. It further assesses uncertainty in organizations through identifying external and internal characteristics which can assist with determining the optimal knowledge and information management processes. The research takes into consideration the different principle stakeholders including policy makers, executives of RTA and its managers, as well as external consultants and suppliers. As a result it recommends various tools and strategies that assist with managing, if not minimizing, uncertainty to achieve organizations' business goals and objectives.

The empirical research conducted for this dissertation concentrates on qualitative research methods, since these approaches were determined most suitable to understanding expert views on dealing with uncertainty through corporate strategic management. This research utilizes Dubai Roads and Transport Authority as a single case study. A grounded theory approach was chosen as the process and data collection and analytical methodology for this research. Grounded methods are a circular type of process in which, after a phase of induction, the data proposition is set and then by further deduction the research moves back and forth to the substantive empirical data. This process was chosen for my research because it seemed to fit well with using a non-probabilistic approach. There is no clearly established probability associated with the sample or any major result of the data collection and analysis. Everything has to be completed according to the analysis and interpretation of the researcher. We can see in the theoretical model as well that the guiding propositions are in effect designed afterwards unlike the traditional model in which research customarily commences with the setting of propositions and hypotheses.

There are various types of interview methods which can be performed in qualitative research in order to collect data. Some of the more popular interview methods (Flick 2009) are focused interview, semi-standardized interview, problem centered interview, expert interview and the ethnographic interview. Among the various alternative methods of interviews chosen for this dissertation is the Expert Interview method which is developed as my principal source of research data collection. Managing uncertainty in RTA is a particularly complex problem. One credible approach is therefore to consult experts or a number of experts to report and discuss the complex issues from their positions of expertise and experience. In such complex issues, there is some probability that if the interview data collection methods do not sample a sufficient range of experts that the consequent analysis and assessment of the results may lead to some uninformed or incomplete conclusions. The expert interview focuses on the extracted information rather than the biography and personality of the

individual. This type of interview gives me the opportunity to focus on the critical areas of managing uncertainty and to explore the underlying reasons for uncertainty in the organization through a direct and informed expert set of viewpoints.

The objectives behind conducting this research are listed below:

1. Understanding factors influencing uncertainty in an organization
2. Associating and linking uncertainty to strategic elements and execution of plans
3. Identifying uncertainty in transportation sector of the United Arab Emirates
4. Discovering approaches used by experts in RTA to manage uncertainty
5. Identifying different mechanisms and techniques of managing uncertainty during strategy execution

1.1 Research Question

This dissertation attempts to answer the following research question:

How can project owners strategise under conditions of high uncertainty and feel capable of achieving their goals?

1.2 Scope of the Study

The research for this dissertation concentrates on a single, intrinsic case study of the Roads and Transport Authority in Dubai (RTA). Its recommendations extend to other stakeholders such as the UAE government however the overall generalizability of this study is necessarily limited to the transportation sector in the UAE.

Following the literature review chapters are two consecutive sections which are the methodology and the analysis chapters. The methodology section explains and

justifies the methodological approach used in conducting this qualitative research. Then, the analysis section reports the results of the analysis of the collected data using grounded theory methods. The last few chapters discuss the propositions highlighted earlier in the literature review and give my recommendations to different stakeholders including executives, project managers and employees of RTA, as well as consultants, contractors and software providers.

2 The Management of Strategic Uncertainty

The real challenge organizations face is not in preparing the strategy but in executing it and getting employees to abide by it. In spite of organizations' employees being actively involved in the development of the strategic plan, they often tend to disregard it and doubt in its practicality as time goes by. This literature sheds light on the uncertainty factors associated with strategy execution and reviews some of the best methods to minimize it.

2.1 Strategy Execution

Execution is defined as a set of steps that are to be followed for achieving a specific goal, and strategy is defined as a way to achieve those goals, i.e. if multiple paths are possible for reaching a goal then we must chose the shortest path possible. One must adhere to the statement that no strategy should be planned without considering the capabilities of the organization to execute it.

2.2 Factors Influencing Strategy Execution

The successful execution of strategy depends on various factors. Among the essential factors are adopting leadership behaviors, building an execution culture and positioning the right people in the appropriate place. Through the strategy development phase the organization's capability is assessed to determine the ability of organization to execute its strategy. Strategy execution is highly influenced by business leaders. A comprehensive understanding of the business environment and tactics relevant to the field are vitally important for leaders. Leaders have to inspire others through transfer of knowledge, directing action and timely involvement in the substance and details of strategy execution. Building an execution culture is where the directives of leaders are transformed into individual employee beliefs and

consequent actions, which are intended to become success factors for the organization as well as presenting challenges for their realisation at the same time.

In a study of factors influencing strategy execution it is worthwhile mentioning the parties involved in its implementation. RTA organization consists of leaders (CEO, Directors & Managers) and employees. Execution success requires an effective amount of communication occurs between two parties (Principal and Agent). The dilemma is when two parties have a conflict of interest influencing their actions and must balance these various differences to make the most out of the situation.

Proposition 1

Uncertainty in an organization can be minimized through strong leadership, flexibility on strategic options, a proper project execution culture and positioning the right people in the right place and time.

2.2.1 Seven Essential Behaviors

Leaders play a primary role in inspiring employees and continually motivating them to increase productivity and achieve business objectives. In every successful organization, leaders exhibit essential behaviors and attitudes which differentiates them from others. Comprehending knowledge management and other organizational resources is one highly important characteristic of leaders. Understanding the business opportunities and communicating inspiring goals and realizing employees' potential, capability and motivations are important for leaders. Successful leaders are always in touch with the day-to-day realities of business.

Second, an essential behavior of leaders is an insistence on realism. Although leaders are visionary people who start with the end in mind, they keep in very close touch with reality, and avoid the traps of over-commitment and ignoring reality. Leaders are additionally required to be strategic planners to an extent where, on a continuous basis, they revise goals and re-prioritize the business objectives with the corporate center. Prioritizing a number of objectives that can be easily communicated for everyone to grasp is essential to keep employees focused and results-oriented. Communicating objectives and following the strategy through is another necessary behavior of leaders, ensuring that the execution of tasks/projects/programs actually has taken place and then rewarding employees is essential. True leaders always expand people's capabilities through grooming and coaching which contributes as well to knowledge transfer and motivating others. The seventh behavior is to realize your capabilities as a leader and constantly endeavour to improve them.

Proposition 2

Leadership behaviour must include realism, understanding of the business environment and tactics relevant to the field which includes avoiding over-commitment of resources.

2.3 Strategy Execution Essentials

Today, the prime goal of any business leader is to plan and execute the strategy. These are two individual steps and must be adhered to separately. In both of these steps, execution is the major point of concern for a business leader because execution is the principal step which requires a comprehensive understanding of the business,

environment and the people involved. The leader is only a person designated to achieve a visionary understanding of the execution, but the actual working people have to be influenced to work for them. A leader can make the execution successful only through his/her ability to convince the followers.

For any organization culture, the execution of steps should be the core element of design and development. Execution should be embedded in the reward system of the employees and articulate some specific norms of behavior that every employee must follow.

Strategy Execution has three building blocks as a whole:

- 1. Building block one:** It includes the seven essential behaviors of a leader.
- 2. Building block two:** It includes the strategy creation for the execution of steps
- 3. Building block three:** The leader's responsibility includes appointing the right people at the right place for achieving the goal in a specific time period and number of steps (N. A 2011).

Building block one: Leaders should know each and every employee in the business and must live to realise their expectations. In many organizations, leaders are the personnel that touch the employees on their day-to-day activities.

The seven essential behaviors of any leader are:

- 1. Realism:** It is the heart of any strategic execution. One should start realizing his/her capital and clarify or realize the goals of all the dialogues in the organization
- 2. Setting of clear goals and priorities:** Leader must be crystal clear about the goals to achieve and priorities to be set for different objectives. He/she should

make sure that the priorities they defined should be easily accessible to each person in the organization

3. Follow Through: Clear and simple goals should be established. The goals should be taken seriously even if they are small. One of the major reasons for failure in most strategic execution is poor follow-up strategy
4. Rewards: Leader must reward the person or group achieving a particular task in a timely manner. Small rewards can make a huge impact on the employees' frame of mind. They will then work much more enthusiastically and energetically to perform their tasks
5. Training or Coaching: A leader must expand the capital of employees by providing them with specific training interventions. A leader must have acquired sufficient knowledge and experience; it is now the responsibility of the leader to share their experience with others. This helps to promote a friendly environment in the organization which would contribute towards working collectively on a major task
6. Analyze yourself: The leader must be honest with employees about his/her feelings and clear on organizational realities and the business environment. People should be given forthright assessments after achieving a task.

2.3.1 Creating an Execution Culture

An execution culture relates to introducing organizational change. Goffee described culture as guides for living that is derived from historical assumption about attitudes, behaviour and values of groups and individuals (in McKenna 2006, p.508). Creating and building an adaptable culture is not only the responsibility of leaders but also of the corporate center to ensure successful execution of the strategy in an organization. An essential factor in creating an execution culture is to change people's behavior to become more adaptable and encourage greater willingness to accept change and monitor organizational performance. Introducing change has to be conducted through a phased approach (Freeze, Change, Unfreeze) that informs employees of the change,

discusses the change and clarifies the expected deliverables as a key element of knowledge transfer and coaching.

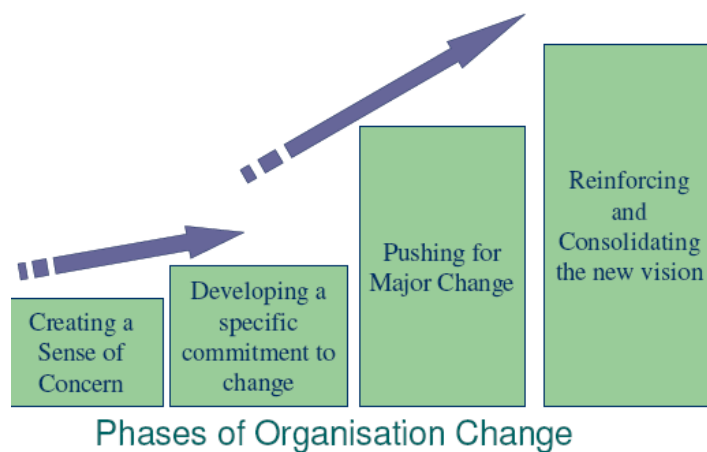


Figure 1: Phases of organisation change
Source: Adapted from Lewin (1947), p.23

2.3.2 Selective Positioning of People

This is a vitally important role of Human Resource Management (HRM) in organizations. Appointing people in the organization according to predefined competencies criteria that qualify them to hold positions within the organization. Recruitment, retaining and dismissing employees in an organization should be according to organizational policies that govern related processes.

Proposition 3

Employee Resourcing decisions should recruit and select people for positions in the organization according to predefined competencies criteria that confirm they are qualified to hold positions within the organization.

2.4 Communication

Communication is an important aspect of strategy execution. The development of the Communication plan takes into account the communication objectives, goals, tools, timetable and processes of evaluation. Strategy communication is communicated through different tools including but not limited to:

- Periodic print publications
- Online communication
- Meeting and conference materials
- Media relations and public relations materials
- Marketing and sales tools
- Legal and legislative documents
- Incoming communication including reception procedure and voice mail content
- Committee and board communiques
- Corporate identity materials including letterhead, logo and stationery
- Certificates and awards, annual reports, signage, speeches and invoices

Communication plans are part of the overall strategy process and are prepared typically as part of the development of the strategic plan. The plan can be developed internally or by a consultant to evaluate current organizational communications. This includes the current communication methods mentioned above and the frequency, objective and outcome of each communication activity performed by individuals. It is important to build into the organisation's plan a method for measuring results and effectiveness of communication through detailing communication processes and monitoring tools. Evaluation might take the form of:

- a monthly report on work-in-progress,
- formalized department reports for presentation at staff meetings
- periodic briefings of the chief executive staff and the department heads, and
- A year-end summary for the annual report.

Developing a written communication plan will take a significant amount of effort. Once in place, the written plan will smooth activities all year long, help set work priorities, protect last-minute demands, and bring a semblance of order to what at times may seem to be a chaotic job. A very common issue we all face nowadays are meetings which consume half the working day or more. This creates a chaotic over-reliance on communication through formal group discussion and leads to inefficiency in execution of individual and group work tasks which becomes increasingly critical over time.

Communciation is a two-way activity between sender and receiver (Shannon and Weaver, 1948). The communciation as illustrated in the Figure 2 is influenced by many factors, needs and goals are among them. If the factors on both communication sides are positive, then the communication is likely to be successful in terms of the achievement of the goals.

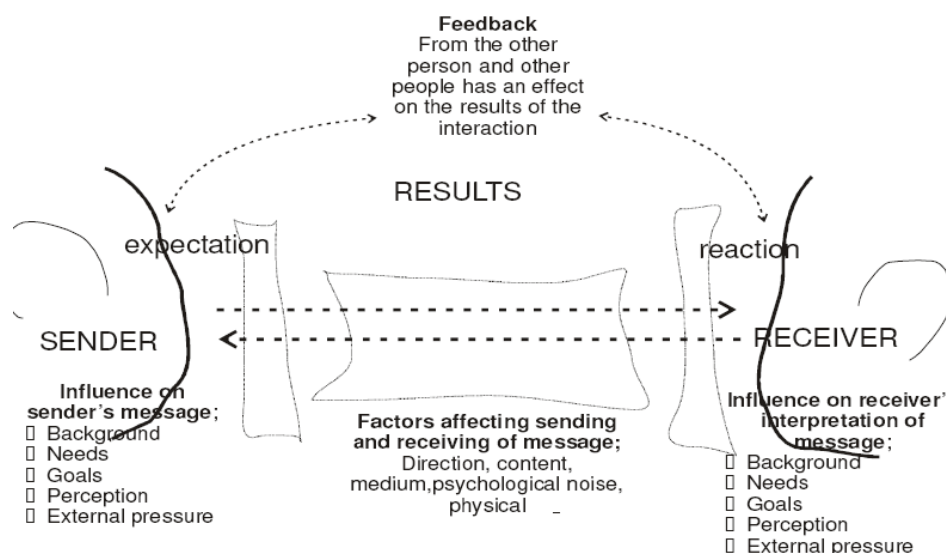


Figure 2: Communcaition Model

Source: Emmitt & Gorse (2003), p.50

Proposition 4

Execution success requires effective communication between two or more parties. Developing a written communication plan will take a significant amount of effort. Once in place, the written plan can inform activities all year long, help to set work priorities, protect last-minute demands, and bring a semblance of order to what at times may seem to be a chaotic job.

2.5 Principal Agent Theory

Principal Agent theory is mainly concerned with financial, business and management contexts. It is associated with many behavioral activities which includes employer –

employee and/or employer–contractor interaction. It is worth noticing that this theory can be applied to any non-profit, public organization or firm. This theory also shares a number of affinities with game theory because it utilizes the same environment of small group interactions as conceptualized in game theory.

This theory is based on the relationship between the Principal (e.g. owner-managers, shareholders, banks, pension funds) and Agent (managers) that is contract bounded. Sometimes other interests influence the relationship between the two which is not part of the contract. Usually this problem is considered as primarily associated with the goals and behaviours of the agent, however in other cases it can be double sided. A problem potentially may occur whenever the contract between the two is not satisfactory. In this theory, the principal can never determine whether the contract is being satisfied and must continually provide incentives and compensation to motivate the expected productivity level.

One of the known problems is the Principal – Agent problem. It is a central dilemma which is investigated by the principal-agent theorists to investigate and inquire about how to get both the contractor (employee/project manager) and the employee to act in the best interests of the principal (organization) when the contractor and employee has some informational advantage over the principal and have different interests from the principal.

A known solution for the principal agent problem is privatization. Principals must balance the costs of debt financing, travelling and transportation.., to associate it with the non-separation of ownership from control. Privatizations of the government services are not only dependent on the relative production costs in the private and public sectors, but also on the transaction and agency costs. This is made even more complicated by the fact that many of the separate forms of sovereignty/ownership are controlled by the employer. The forms includes many of the forms of contracting out,

control and agency costs. The contract state is referred to as a model solution for the principal agent problem. A live example in which this theory played a vital role is in the administration of New Zealand. Many times it was taken as a model to show the authenticity of the theory.

Implicit contracts are not necessarily written out formally, which are called psychological contracts, while other more explicit contracts are more or less formalized. The psychological contract is based on the process of reciprocation and is divided into coercive, calculative and cooperative. The contracts are highly impacted by the behavior and expectancy of the managers and other employees.

There are number of formal contract types which include:

- Agent controls the risk (Fixed Price)
- Principal controls the risk (High Complexity Cost Plus)
- Both control the risk (Alliance)

(Turner and Simister, 2001)

The basis of relationship between principal and agent and best suited contract type for the organization is determined based on various factors. Among the factors considered are project task specificity, degree of uncertainty and frequency of transaction as well as organization structure.

2.5.1 Basic Features of the Principal Agent Problem

The key features of principal – agent problems that uniquely identify it are:

The principal in any sense knows less than the agent. The knowledge could also be some vital information that needs to be known. The interest of agent and principal conflicts in some way or the other and hence must be resolved.

Hence, we have observed two problems in the structure of the principal – agent theory.

1. **Effort aversion or moral hazard problems:** This problem arises when the agent can take some costly actions for improving the outcomes for the principal, but the principal cannot observe the depth of actions taken.
2. **Adverse selection:** This situation arises when different types of agents and principals are not able to communicate the differences between each other. This is a severe situation and mainly occurs in the cases where type is fixed earlier.

The cost of agency is a type of transaction cost which reflects a basic fact that principals and agents will not act in the prime interest of each other until an incurring cost is provided. The cost of agency includes the cost of selecting appropriate agents, gaining information, monitoring agents, investigation and setting bonding payments for the agents.

The cost of information is the cost in the contract management. It is recognized as the management which involves the agency cost. One may observe it as the informational advantage of a contractor with respect to the performance measures.

Effort Aversion / Moral Hazard

One may conceptualise the agents and principals from two perspectives:

1. Risk Sharing, and
2. Incentives

Proposition 5

In the Principal-Agent dilemma, the level of knowledge and the interests of the principal can be different to the agent. One commonly applied solution to the principal-agent problem in the public sector is privatization.

Risk Sharing: There is a stochastic relationship between the outcome and the effort level in all of the problems of agents and principals. Hence, it won't matter if the effort was not observed for any problem. Risk aversion is one of the factors worth noticing. This contract feature pays off as an algorithm for the stochastic outcomes. Any agent will sign only that contract which provides him with the expectation utility of overcoming his/her current reservation utility. The expectation utility of an agent depends on many external factors like pay-off, outcome, receivable profits and market share.. The agent compares the current market with the expected utility to analyze the pay-off and to sign the contract. If the pay-offs and probabilities are fixed then the expected utility of an agent will be the decreasing function of his/her risk aversion. To glue the agent for signing the contract, the principal must offer higher pay-offs that offer more generous and equal offers to decrease the risk aversion.

Incentives: Incentives define additional functionalities to a contract that motivate an agent for signing it. Contracts set up incentive(s) for the agent, and then he may choose the effort level of the incentive. If the contract is more likely to produce higher outcomes, then to motivate the agent a higher effort level is required which in turn is reflected in higher incentives. If the expected utility exerts some level of effort which is larger than his/her current reservation utility then the agent will sign the contract. This is known as the risk issue of contracts.

There are different bases for the relationship which occur between the principal and the agent of any company and there are different types of factors which help to determine the best strategy for the principal agent philosophy. Moreover, there are different types of factors which help in this theory in order to minimize the degree of uncertainty. These factors are as follows:

- Project task specificity
- Degree of uncertainty
- Frequency of transactions
- Organization structure

The activity of any company which is required for achieving the final outcomes or we can say that the final outcome for any activity should be evaluated according to the above four factors. If the outcome of the project is highly specific and it is suggesting a definite outcome to the situation, then the probability of accepting the fact becomes very high, but if it is the case that the outcome of the task is not specific then the probability of accepting that outcome becomes really low. Similarly, if there is a very high level of uncertainty in the activity then it becomes really important for the company to reject the outcome because there is a high chance that the outcomes of the task will fail in this situation. In cases when the transaction of the activity is very frequent then it is much more likely for the relevant party to accept the task with ease because if it is high frequency, this means that there is probably nothing wrong with the outcome and there it can be accepted for the specified activity. Similarly the acceptance of the strategies is highly dependent on the organization structure of the company as well.

This above are the factors which relate the principal and agent in different types of organization. Hence the principal-agent theory is helpful in this regard

Proposition 6

Uncertainty will be high when the risk share for RTA is high.

2.5.2 Performance evaluation

A contract is designed which, in general, should take into consideration different types of performance determination:

Informativeness Principle measure of performance is through information that reveals the level of effort chosen by the agent and is judged based on that assessment;

Incentive-Intensity Principle also called performance-related pay optimal intensity of incentives depends on four factors: the incremental profits created by additional effort, the precision with which the desired activities are assessed, the agent's risk tolerance and the agent's responsiveness to incentives;

Monitoring Intensity Principle when the optimal intensity of incentives is high, it will correspond to situations where the optimal level of monitoring is also high. Thus, employers effectively choose from a "menu" of monitoring/incentive intensities;

Equal Compensation Principle that activities equally valued by the employer should be equally valuable to the employee.

If the efforts are visible then we can go for two of bets required to choose the outcome. Analytically, for a given effort level in contract e^* , the principal must choose a pay-off vector w , such that $w = \langle w_1, w_2, w_3 \dots w_N \rangle$; here, w : denotes the wages of each of the N customers.

Mathematically, the risk sharing problem for any observable effort can be represented as:

$$\max(w_n) > 0 \sum_{n=1}^N p_n(e^*) B(x_n - w_n)$$

In general, now the principal-agent problem reduces down to a case in which the principal chooses the level of effort of the agent which provides him/her with the maximum possible expected utility? When various effort levels are possible, the agent now chooses the contract which is best suitable.

When the efforts are not contractible, the contract must not specify the effort levels and rather must state the outcomes. The development of these adds an extra level of complexity to the problem and leads to a situation where agents must choose the right amount of effort. It can generally be assumed that if the effort levels are higher than it will give rise to the possibility of obtaining higher outcomes.

Analytically, a contract could be treated like a lottery; all the chips would go to the higher outcomes. If prizes are made big enough to encourage participation then there is a possibility for an agent to choose high levels of effort. But contrast is not the optimal value as the principal may chose a higher effort at lower expected pay offs. A risk averse agent may be willing to contribute at a lower expected wage but is still chosen for the higher effort levels.

There is a possibility that the contracts could be able to fully insure the agent against the risk involved because of the fixed wages payment to the agent regardless of the outcome. In these cases, however, the agent may not chose to go for higher effort. Choosing the best out of two bets is one of the tough jobs facing the principal agent problem. If the principal chooses to go for a higher effort level in the second bet then there exists a high possibility of him choosing the higher bet in the first one also. Even so, exceptional cases exist, the cases of compensation which he/she must give to the agent for bearing the producing – incentive risk (Garson 2008).

2.5.3 Fixed Price Contract

This type of contract transfers all of the risks associated with the project to the agent who is made responsible for achieving the objective of the project within the agreed price. Risks are related to the project tasks or transactions. Uncertainty increases with non-routine tasks or task objects/outcomes. Additionally, uncertainty increases with increased task specificity. Fixed price contracts ususally occur in highly structured organizations with a clear governance framework. This contract type does not impose high exchange of information between parties except during the initial stage of the project to ensure understanding of the delivery and business requirements.

In this type of contract communication is required to be initiated by the agent to minimize the uncertainty associated with the final product and to ensure the appropriateness of the delivery and success of the final outcome.

2.5.4 High Complexity Cost-Plus Contract

In this type of contract the owner controls the risk. Usually the risk is in the design of the project's product. Uncertainty increases with the complexity and specificity of the final outcome and incentive fee contracts are used. This type of contract works for flat organizations or projects with a minimum level of reporting. That is because it

requires high collaboration and frequency of reporting from the principal's side. This type of contract might prove to be costly for the organization.

2.5.5 Alliances

Alliance is the third type of contract that binds the agent with the principal. This is the second most preferable type of contract after fixed price, due to the mutual sharing of risk associated with the project. This type of contract requires proper management and therefore a high degree of collaboration, communication and information exchange with a certain level of depth depending on the project stage.

The nature and extent of communication in the different contracts depends on the project's communication goals including its clarity of objectives and relational norms. That is in addition to solidarity, flexibility and frequency of information exchange as well as the level of structure, such as whether the organization is a bureaucratic or organic structure and the transparency of the project methodology.

2.6 Core Processes of Execution

Execution includes strategy, people and operational processes. The preparation of the strategic plan is solely dependent on people and operational processes. Strategy planning is the art of establishing challenging but realistic objectives that are in line with directives of leaders and overcome the existing strategic issues of the organization. The strategic plan includes a list of projects that are critical to the execution of the objective and directly influences the stakeholder.

Operational processes include two sub-processes which are planning and review. Operational planning should include establishing a clear linkage between strategy and operational planning across a year to two year time frame. The operational plan for the functional unit includes a breakdown of corporate objectives to achieve sales, margins and cash flow. Monitoring and evaluation of the product and service

delivery focuses on reviewing the execution of the plan to ensure its success and fulfillment of the objectives. The execution plan should be adequately detailed so that it can be executed with minimal uncertainty. This is achievable through developing a deep understanding of the projects that need to be executed, being able to predict the desired outcome and familiarising other employees with it to achieve greater certainty and predictability of contract outcomes.

There are different types of execution processes which consist of different types of strategy, different types of people and various types of operational processes. In the case of strategic plans in the manufacturing industries, there is a high dependence of the plan on the employees of the company and on the direction of different types of leaders involved in its strategic execution. A realist approach may be followed in cases of challenging the strategies formed by different leaders. The involvement of various stakeholders in the decision is also very important and highly appreciable.

People processes are part of resource allocation decisions that are intended to result eventually in successful implementation of the strategy. A robust framework consists of HR processes, policies and procedures for ensuring the success of strategy implementation. Continuous improvement, succession depth and reducing retention risk are important HR processes as well as identifying and deciding what to do about non-performance. There is a requirement for rapid change in the case of the core process of execution. Rapid changes are required for the core process of execution because there is a high need for success in the company. Along with the rapid changes in the extent of success, there is a need for some degree of predictability, familiarity and certainty in any company and hence a common dilemma in cases of change in the organization's strategic position is understanding its implications for the core process of strategy execution.

Core process execution is an important strategy for managing uncertainty. In cases of core process uncertainty, there are various operational processes which are available. These operational processes are divided into two sub-processes. The two main sub-processes are planning and review. Planning is important because it encourages a very clear relationship between operational planning and the strategies. There are different time frames used for planning. There is short term planning which is called tactical planning or long term planning known as strategic planning. The next sub-part of the operation processes is review. Review is also considered to be an important stage because it produces the final overview of the strategies.

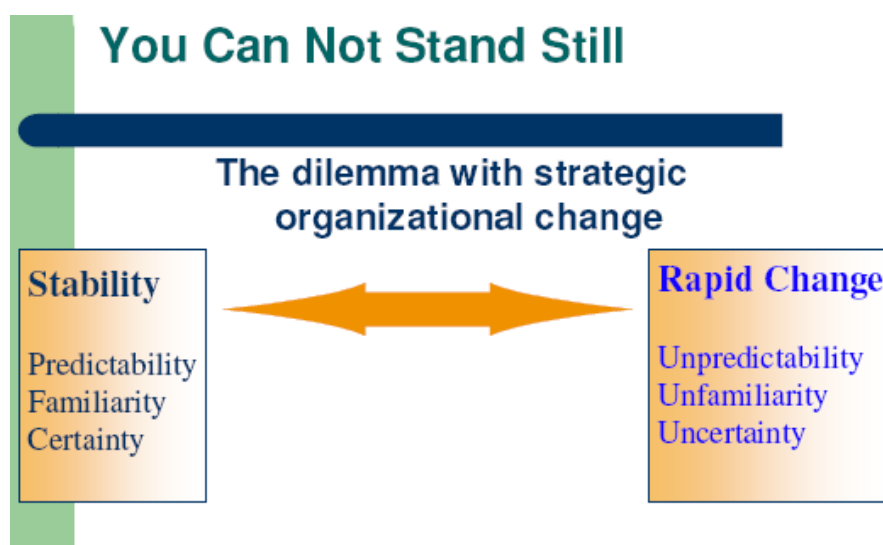


Figure 3: Strategic Change

Source: The British University in Dubai (2009), slide 4

People process are part of resource allocation that will eventually result in successful implementation of the strategy. A robust framework consists of HR processes, policies and procedures ensuring the success of strategy implementation. Continuous improvement, succession depth and reducing retention risk are important HR processes as well as identifying and deciding what to do about non-performers.

2.7 Centralized Versus Decentralized Extremes

Strategic planning in its traditional notion is a corporate policy designed to assist the senior executive team with clearly articulating their organisation's strategy and objectives and then to "cascade" them down throughout the organization. This is expected to occur in addition to creating process flows, performance measures, and automated reporting to ensure alignment and compliance throughout the organization structure. One extreme of this approach is implementing strategy without considering how employees will react or enquiring as to whether or not they may have a better ideas.

The other extreme encourages executives to simply relinquish management control to their employees' entrepreneurial and innovative energies. "Command and control" organizational structures are a relic of the past, according to this perspective employees take the lead and influence the whole organization but a constraint of this approach is that it may lead to strategic anarchy.

Neither extreme is useful for an organization seeking to perform well under a changing environment with new and developing business competencies. The centralized extreme neglects the fact that front-line employees do have to innovate and improvise much of the time, while the decentralized extreme ignores the need for organizations to move in a consistent and planned direction. The logic is to find a balance somewhere in between the two poles.

2.8 Managing Uncertainty

Uncertainty management is a technique used to avoid immediate loss due to any sudden changes of environment in the system. Managing the degree of uncertainty is the work of a project manager. He/she should take care of all the possible situations that may arise in a system. Project managers should know the basics of all the

decision uncertainty and must take steps to control the key factors through management interventions.

The basic facts regarding uncertainty are:

1. Uncertainties are the basic fact of life and are unavoidable in any situations. Decision uncertainty is an uncertainty which guides the environmental relations of any decision
2. It is impossible to completely remove decision uncertainty. At a maximum, what we can do is to influence the level of uncertainty under our control so that it is acceptable within a given range
3. Reduction of decision uncertainty leads to some diminishing returns to the investments made by an organization.

Example: Sampling uncertainty. In general sampling uncertainty is reduced by a factor of the square root of sampling numbers, i.e. if the sampling uncertainty is to reduce by a factor of five then the sampling number should be increased by a factor of 25.

Managing uncertainty assumes that everyone could identify and prioritize any primary contributors to decision-making uncertainty. Social, economic and political factors may be important sources for the type of uncertainty. Some of the decision-making uncertainties, for example, for a construction organization could be funding constraints that are imposed by federal or state agencies or clean-up standards that keep changing with time. These uncertainties are important for any project manager of a team. He/she should comply with all these decision-making uncertainties and must contribute to the original project, too. Before the start of the work, the project manager should analyze the sensitivity of these uncertainties and must take precautionary measures beforehand so that the possible damage due to this will be minimised or at least diminished.

Analytical and numerical model uncertainties are beyond the range of any assumptions. Hence, directly addressing these uncertainties is not possible. Currently, it is an active area for research to identify and quantify the model uncertainty and develop a specific theoretical model for its articulation and control through special plans or modules, whenever this course of action is feasible. This source of uncertainty is significant and is not quantifiable; project manager should be able to learn about these sources of uncertainty as soon as possible earlier. The development of dynamic work strategies is required to cope with different uncertainties and specific modules must be added into it to prevent any hazardous situations. All these uncertainties are dangerous for any system and prior precautions are needed to avoid problems. Managing all these uncertainties is a tough task and is learned through experience.

2.9 Uncertainty in the Transportation Sector

Uncertainties in strategy execution within the transportation sector can be deeply understood if we know the basic differences between all of the uncertainties. Uncertainty arises in different types:

1. Decision Uncertainty
2. Model Uncertainty
3. Analytical Uncertainty
4. Sampling Uncertainty
5. Relational Uncertainty

Each of these uncertainties have been modeled and modified on the basis of different situations in which they occur. Let us discuss in detail the types and models of uncertainties.

Decision Uncertainty: It is equivalent to the possibility of making a wrong decision. Decision uncertainty is just the contrast of decision confidence. The quality of the

decision denotes the amount of decision uncertainty; it is the degree to which any decision coincides with the actual decision. Actual decision describes a decision when all of the information required for the decision is complete, accurate and up-to-date. Decision uncertainty is the aggregate of total uncertainty which is contributed by economical, political and public perception. It includes all the model, sampling, relational and analytical uncertainties. Sampling, relational and analytical uncertainties when combined together are known as *data uncertainty*.

In the Transportation Industry: Decision uncertainty plays a crucial role in the transportation industry. The cost measures, travelling expense, path to choose from, climatic conditions and various other factors which are not governed by an individual all relate to the decision uncertainty. The decision made is primarily based on individual intuition rather than factors in the transportation sector. The past record also provides some useful data informing us on various outcomes and options relating to the paths we may decide to follow.

Model Uncertainty: It refers to a situation of uncertainty which is associated with a model of absolute correctness. It uses C S M to represent any key feature or the characteristics of any hazards and waste. Accurately portraying features of a key site like fate, transport prediction, or risk pathway refers to the correctness of ability. Any of the key site features described are some of the most important features for inclusion in the decision-making process. The uncertainties are linked with many data relationships which includes sampling, analytical and relational. Data sets are used to create a model which is used to make decisions.

In the Transportation Industry: Modeling of an appropriate or critical path in the transport sector denotes the way in which the products or services are delivered. As a product manager who manages all the uncertainties is primarily oriented to reduce the cost by computing the shortest path possible. Many uncertainties like risk of pathways and correct state..., may lead to malfunctioning of the system. One must

make sure that alternate paths are always available in all cases to avoid a massive breakdown of the system.

Analytical Uncertainty: Analytical uncertainty refers to a type of uncertainty which is linked with the analytical result of any media sample. It stems between the limitations of determination and the analytical methods. Analytical uncertainty primarily occurs due to analytical biasing, lack of precision, poor detection limits, and many other factors. For traditional clean-up programs the analytical uncertainty and its reduction is the primary goal or focus. The contribution of this uncertainty is often unnoticeable as compared to other sources of uncertainty.

In the Transportation Industry: The analytical uncertainties like biasing and poor detection..., is not so important but if taken casually can still affect the profit of the firm. The mode to choose from is one of the steps that are primarily dependent on the analytical results. If any biasing or faulty results are chosen then it won't affect the end user, but will influence the shape of the organization.

Sampling Uncertainty: Sampling uncertainty refers to the degree of sample which results in the representation of actual condition of the population that is sampled. It neglects the contributions made by relational and analytical uncertainty. This uncertainty is an inclusive measure which depends on the catch-all phrase model. This type of uncertainty model gives rise to heterogeneity in the system and contaminates the distribution along the area it is being sampled from. It also removes the potential non-representative items of the sampling procedures. Some of the problems involved with the sampling processing are incomplete sampling equipment, improper handling of the samples and non-deterministic way of sampling.. These leads to data uncertainty which is often reflected in the sampling uncertainty.

In the Transportation Industry: Sampling uncertainty defines the degree of sample rating we have gathered from existing trends. This is important to know the current market trend and the market share of the organization. This sampling would also show us how our competitors are working, which path they are following and what mode they are using.. This helps to create a competitive edge in the market. The results of these are observed by the HR manager or the marketing manager who analyzes the trends in the market and recommends suitable changes in the firm.

Relational Uncertainty: Relational uncertainty refers to a scenario where the relationship between a parameter is observed. The true parameter of interest is needed to make an ideal environment for the decision-making process. This uncertainty could become a concern for real time measurement of the methods which are not specific in nature. The traditional data collection methods in which some parameters are fixed and used as a proxy denotes the data uncertainty of the system. Depending on the prevalent type of uncertainty, the impact of relational uncertainty on data uncertainty may or may not be less than the analytical and sampling uncertainty.

In the Transportation Industry: Relational uncertainty denotes the human relation with the environment. It is a true measure of goodwill of the firm in the area. If customers prefer company 'A' products rather than company 'B' then as a transportation firm, we must consult other participating firms to go for the products of company B. Also, the reliability of the transportation industry is at stake if products are not delivered to customers in a given time.

Hence, all these uncertainties when combined with the strategic execution play a crucial role in deciding the way forward for the transportation industry (Crumbling n.d.).

Proposition 7

Uncertainties in strategy execution in the transportation sector can be deeply understood if we know the basic differences between all the uncertainties.

2.10 Uncertainty and Knowledge Managmeent

The Figure below illustrates the relationship between different knowledge management processes and uncertainty. It represents how different business strategies are suited for organizations based on task and environment uncertainty levels.

KM Processes	Contingency Factors						
	Task Uncertainty	Task Interdependence	Explicit (E) or Tacit (T) Knowledge	Procedural (P) or Declarative (D) Knowledge	Organizational Size	Business Strategy*	Environmental Uncertainty
Combination	Low	High	E	P/D	Small/Large	D	High
Socialization for Knowledge Discovery	High	High	T	P/D	Small	D	High
Socialization for Knowledge Sharing	High	High	T	P/D	Small	LC/D	Low
Exchange	Low	High	E	P/D	Large	LC/D	Low
Externalization	Low	Low	T	P/D	Small/Large	LC/D	Low
Internalization	Low	Low	E	P/D	Small/Large	LC/D	Low
Direction	High	High/ Low	T/E	P	Small	LC	High
Routines	Low	High/ Low	T/E	P	Large	LC	High

Low Cost – LC; Differentiation – D

Figure 4: Contingency factors and KM Processes

Source: Fernandez, Gonzalez & Sabherwal (2004), p.75

An explanation is given below of each knowledge management process under the context of uncertainty:

1. Combinational Knowledge Management Process: There is low level of task uncertainty in this process and high level of task interdependence. This

- process explains the explicit knowledge for both small and large organizations. This process shows a high level of environmental uncertainty.
2. Process of Socialization for Knowledge Discovery: This process has a higher level of task uncertainty and high level of task interdependency. It is a tacit knowledge process which is mainly used in small organizations. This process has low level of environmental uncertainty.
 3. Process of Socialization for Knowledge Sharing: This process has a high level of task uncertainty and high level of task interdependence. The process uses tacit knowledge which is often simpler to achieve for small organizations. This process has a low level of environmental uncertainty.
 4. Process of Exchange: This process has a low level of task uncertainty and high level of task interdependence. This process is explicit in nature and is more typical of large than small organizations. It has a low level of environmental uncertainty.
 5. Process of Externalization: This process has a low level of task uncertainty and low level of task interdependence. This process is tacit in nature and is used for either small or large organizations. It has a low level of environmental uncertainty.
 6. Process of Internalization: This process has a low level of task uncertainty and high level of task interdependence. This process can be either explicit or tacit in nature and is used mainly for small organizations. It has a high level of environmental uncertainty.
 7. Process of Routines: This process has a low level of task uncertainty, low or high level of task interdependence. This process can be either explicit or tacit in nature and is more commonly associated with large organizations. It has a high level of environmental uncertainty.

Proposition 8

The best KM strategies and processes are determined on the basis of the level of uncertainty in the environment and the characteristics of tasks.

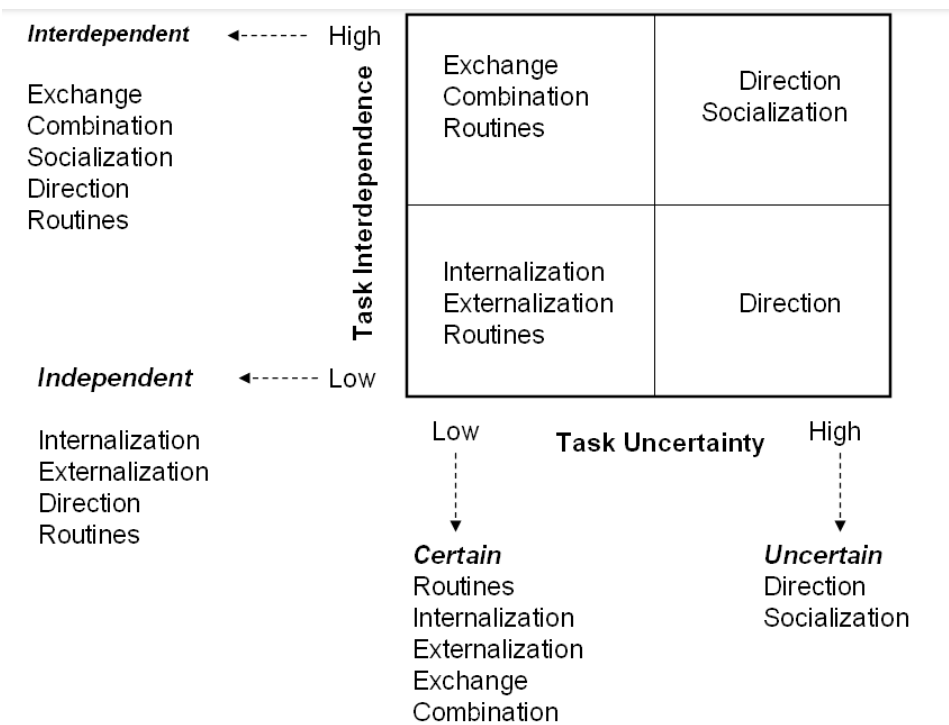


Figure 5: Matrix of Task Characteristics and Uncertainty

Source: Fernandez, Gonzalez and & Sabherwal (2004), p.69

The above figure shows the relationship between task interdependencies and uncertainty. As task interdependency in a project increases the level of uncertainty also increases.

The priorities of projects are interdependent on each other and change based on the number of interdependencies and its nature. The optimal communication and knowledge management strategies are recommended based on task characteristics, its difficulty, variability and interdependence based on the matrix shown in Figure 5.

Proposition 9

Managing task uncertainty in strategy execution necessitates utilization of the most suitable Knowledge Management sub-processes.

Task uncertainty incorporates all of the other factors that are impacting on tasks and causing them to be difficult to execute. The technicality of the tasks can increase the difficulty of execution of certain tasks and therefore the level of uncertainty. Increased technicalities do not necessarily pose an insurmountable problem for an organization because the technical difficulty can be outsourced or if internally executed can be solved through the application of internal expertise. As a result the task difficulty is a risk but not necessarily increases the uncertainty but variability raises uncertainty.

Proposition 10

Projects with high coordination requirements and multiple interdependencies are associated with high uncertainty, while projects with technical challenges are high risk but may not necessarily be high in uncertainty.

2.11 Uncertainty in Strategy Execution

Uncertainty in execution can be determined through the execution of projects.

There are different types of uncertainties in strategy execution. There are several powerful analytic tools which help with prediction of the future in various situations and degrees of uncertainty. These tools aim to provide a clear strategic direction for every step towards growth and development. This process helps in determining the amount of uncertainty in the achievement of the vision of the future. In cases where the future is uncertain, there are different strategies that can be used.

In this section, I am going to explain different types of uncertainties which are present in the strategy execution. These are as follows:

2.11.1 Level One Uncertainty: A Clear Enough Future

There are residual uncertainties which are irrelevant to making various strategic decisions at Level One in which managers are required to develop a unique prediction of the likely eventualities which are considered to be sufficient on the basis of different strategies. There are different strategic methods which can be used

in order to remove this level of uncertainty. These strategic methods and techniques include market research analysis, Michael Porter's Five Forces framework, and analysis of the value chain. Market research analysis is one of the most important strategic tools used for reducing uncertainties in the case of the cost and capacities of competitors.

Uncertainty about the clear enough future is one of the most considerable level of uncertainty. In this environment, single level predictions may be used by managers. This kind of uncertainty occurs in various situations where there is a need for utilisation of a DCF model. The DCF Model assists with determining the problem of assigning value to the alternative strategies. This is Level One strategy; there are three more levels of uncertainties which should be addressed.

2.11.2 Level Two Uncertainty: Alternative Futures

In this type of uncertainty, the level of uncertainty is described to be in the discrete scenario. There is a problem of identifying the level which is to be described easily and which level should be considered a difficult one. A relevant concept here is the description of the alternative probabilities. In this kind of uncertainty, some of the elements would not change even in cases when there is a problem of uncertainty or when the outcome is not predictable.

Organizations and businesses which face various regulatory requirements or changes in legislation tackle this type of uncertainty. In this scenario we can take an example of US Long distance Telephone services in the year 1995, there was a same level of uncertainty faced by all of the competitors in the telephone market at the time of entrance to the market.

In the case of Level Two uncertainties the strategic value of the uncertainty mainly depends upon the different types of competitors involved in it. This level of competition will be in cases of those strategies which can not be predicted or observed. This especially occurs in oligopoly markets. For instance, in factories for paper, pulp and chemicals there are economies of scale according to which any plant would be able to build large coverage in the market. Level Two uncertainties often occur in these kinds of market.

2.11.3 Level Three Uncertainty: A Range of Futures

In case of Level Three uncertainties, a potential future is identified. There are a limited number of factors which are defined within the range. The most important factors for this level of uncertainty is the real scenario of the activities that will most probably be arising within the specified range. Unlike Level Two uncertainty, there are no specified, discrete scenarios. The change which occurs in case of the final or the ultimate outcome is the same as that of the Level Two uncertainty which means that there will be a change in the strategy for all the outcomes or all the elements when the final outcome is predicted.

Level Three uncertainties are mainly faced by companies which are entering into a new geographic markets. As one of the important examples, let us consider a European company manufacturing and selling consumer goods. The company is deciding to produce the goods for the customer in the UAE market. The best type of market which is possible for the company is that a specified range of people, say a range of age of people between 25 years to 40 years, but there might be huge uncertainty at this this level because there is an estimated 10 to 30 percent obvious scenarios predicted for the company. Hence in this case there is a huge uncertainty for the company to introduce the goods to the UAE market. Such types of problems may also occur for companies in technologically driven industries as well.

2.11.4 Level Four Uncertainty: True Ambiguity

In this kind of uncertainty there are dimensions which create the environment which are virtually impossible to know and understand. Such a scenario is predicted by Level Four uncertainties. As in the cases of Level Three, in Level Four, it is absolutely impossible to determine the specified range for the potential outcome. It is also not possible in this case to predict a number of scenarios for the future outcome.

It is one of the rarest kinds of uncertainty which mainly tend to mitigate toward one or another level of uncertainty as the time passes. But in some situations, these massive uncertainties do exist. One can take an example from the telecommunications industry which is mainly deciding the extent to which it will invest in multimedia market. There are a number of uncertainties which will be faced by the company in this case like the uncertainty regarding technology, retail and consumer demand, the relations between the hardware and the software parts as well as some other uncertainties that exist. It may be possible that all of these uncertainties interact in such a way that there is no range of scenario which can be identified. One of the primary examples which we can take in the case of Level Four uncertainties is the number of companies seeking to remain viable entities in Post-Communist Russia in 1992. These organisations faced Level Four uncertainties.

2.12 Strategies for Minimizing Uncertainty in Execution

There are various strategies which must be adopted. In this section, I am going to identify various strategies for minimizing uncertainty in strategy execution.

In cases of the business environment where uncertainty exists, most companies in the real world find themselves compelled to adapt according to the situation. In this strategic environment, an analysis has been made in order to predict the future landscape of the company. This strategy also involves making positioning choices in various regions in which competition exists. Once the choice is made, the strategies

which are formed to minimize the amount of uncertainty are said to consist of having no-regrets moves.

These strategies of minimizing the uncertainty are not considered to be boring or incremental in nature. We can take an example of Southwest Airlines' no frills strategy, which is also known as point-to-point service and is considered to be highly innovative in nature potentially creating big value for any company facing such cases of uncertainty.

There are three types of strategies which a company can adopt in response to different uncertainties. These strategies are as follows:

- Strategic posture: Shaping strategies, Adapting Strategies, Reserving the right to play
- A portfolio of actions: Big bets, options, and no-regrets moves
- Communication

In the above strategies, the best strategy or the best adapter of the strategy will stay in the market. These strategies will be defined by the uncertainties involved in the company. In the next paragraph, the the above three types of strategies are explained in relation to how to minimize uncertainty in the market or within the company.

Proposition 11

Business Strategy may be defined based on the level of overall uncertainty in the strategy and in the organization's strategic environment.

Shaping Strategies: In shaping strategies it is important for any organization to maintain a view on all of the activities underlying the business. There are different types of uncertainties that exist in a company and the final outcome which the company wants is one that has the best possible outcome for any uncertainty. For such a goal, the company will always perform all the activities in such a manner that their shaping is very profound which means that in case of uncertainties there exist the best possible outcome for the organization and possibly even the industry. Following the effective shaping of any activity related to uncertainty, it is very much important that the company must adapt according to the situation. Hence it is important that adaptability of the company should be rapid and responsive, hence such situations the company always keeps focusing on taking decisions which show adaptability according to different situations or types of uncertainty.

Proposition 12

An essential factor when creating a project and task execution culture is to encourage people to be more adaptable in their behaviour and encourage in the organization a greater willingness to accept change and monitor organizational performance.

In keeping with the adaptable character of a company, it is important for the organisation that it should reserve the right to play the game in cases where predictions must be made. The company should keep in mind that that it should make predictions in which the certainty of the outcome is the most assured. Hence the right to reserve is one of the important strategies for minimizing the uncertainty of any company (Dagblad 2002).

Another strategy which can be considered for minimizing uncertainty in cases of predicting the final outcome is portfolio selection. This is also known as the “no regrets” move. In the case of a portfolio of actions, it is important for the company to understand the fact that the portfolio of actions to be performed in the face of uncertainty is an important task. In this situation, it should be borne in mind that the various actions to be performed for minimizing uncertainty should have the same level of uncertainty involved. For example, in the case of an uncertain situation, if one situation is more highly uncertain than the other, then that situation should be automatically dropped. Hence the portfolio of the actions or the strategies should be made such that all the actions, tactics and strategies involved minimize uncertainty and should have an equal level of uncertainty. Consequently, it will then be more feasible to perform the task or else one activity or one final outcome may easily be chosen.

Communication is said to be one other major strategy for minimizing the amount of uncertainty. Communication is said to be one of the important criteria for all of the management activities in any company. It is not always apparent how communication will help with minimizing the uncertainty of any company but it often happens that communication helps a lot in this matter. In uncertain situations, communication between the different levels of the organization may help with reaching a final prediction and decision regarding the final outcome for definition and delineation of the activities. Communication is said to be one of the most important ways of solving uncertainty in any situation faced by an organisation.

There are several other levels of strategies which are performed in the case of any organization for minimizing uncertainty in any business and identifying potential outcomes. Leaders play a primary role in inspiring employees and continually motivating them to increase their productivity and achieve business objectives. In every successful organization, leaders exhibit essential behaviors and attitudes which differentiate them from others. Comprehending knowledge management and other

organizational resources is one highly important characteristic of leaders. Understanding the business opportunities and communicating inspiring goals and realizing employees' potential, capability and motivations are important for leaders. Successful leaders are always in touch with the day-to-day realities of the business.

There are different situations when the role of the leader may become an especially important characteristic for the company, especially whenever the problem of uncertain behavior exists. It is important for the company to show some leadership behavior which can be helpful in managing the uncertain situation or minimizing various uncertainties involved in the business.

Another strategy which is considered to be very important for managing the uncertainty prevailing in any business activity is encapsulated in the seven essential behaviors of the leader. The seven essential behaviors are relevant to a leader of any organization and will help the company in dealing with uncertainty. Although leaders are visionary people who start with the end in mind, they must keep in very close touch with reality, and should avoid over-commitment or ignoring reality. Leaders are additionally required to be strategic planners to an extent where on a constant basis they revise goals and reprioritize the business objectives with the corporate center. Prioritizing a number of objectives that can be easily communicated to everyone to grasp is essential to keep employees focused and results-oriented. Communicating objectives and following it through is another essential behavior of leaders, ensuring that the execution of tasks/projects/programs actually has taken place and then rewarding employees is essential. True leaders always expand people's capabilities through grooming and coaching, which contributes as well to knowledge transfer and motivating others. The seventh behavior is to realize your capability as a leader and improve constantly.

There are several knowledge management techniques which serve the company in managing uncertainties in various unpredictable situations of the company (Courtney 2007).

Proposition 13

Strategic planners should ensure that project plans realize employees' capabilities, and project managers should ensure the project team environment is motivating rewarding, and follows up project execution with appropriate training and coaching.

There are some other types of strategies which can be taken into consideration for the level of uncertainty in the business. In order to ensure fair predictions are made by the organization encompassing various types of decision involving uncertainties, it is necessary for the company to keep a watch on all of the activities which involve the decision regarding uncertain situations. To minimize the uncertainty in various tasks in the business, it is important for the company to monitor various factors which are involved in the decision-making process. These factors may be strategic evaluation of the task or the final outcome. This means that if there is a professional strategic evaluation of the final outcome then it can be accepted by the company, but in cases where there are some problems with the strategic part of the predicted outcome then it would be more difficult for the company to accept the outcome as a worthwhile goal. Similarly it should also be checked whether the frequency in which the final outcome has been achieved is high enough that it will be easy for the company to accept the final outcome. If there is a problem in the frequency of occurrence of the

final outcome then it might be possible that the company have chosen the wrong outcome.

2.13 Cognitive Psychology and its Implications

Cognitive Psychology is a new subject that helps understand the critical internal and mental processes.

2.13.1 Problem Solving

Procedural knowledge is that knowledge which we use to process certain cognitive tasks. This knowledge is the basis of all the troubleshooting activities that need to be processed after a system failure. A very well known example is the experiment with a chimpanzee named *Sultan*. He joined two separate poles together and then grabbed the banana out of the cage. The behavior of Sultan demonstrates three characteristic features:

- 1. Directedness towards the goal:** The behavior of Sultan to analyze and focus his attention on the poles and to work for the sole objective of getting the banana out of the cage.
- 2. Sub goal decomposition:** The whole problem is now subdivided into smaller parts and guidelines are set on which objective is to be achieved first.
- 3. Application on the surroundings:** The application of known operators for troubleshooting the uploading. Operator is a person or being who takes action (operation) step by step and after successful completion of all these operations a solution is produced

2.13.1.1 Problem Search and Space

When solving a problem it is can be represented in terms of the problem space. It is a metaphor which is used to relate to the virtual space with many virtual states. By the word “**state**” we meant to represent a situation which denotes whether the problem is solved or not.

We have many states when considering a problem like:

- ❖ Initial State: The state in which the analysis of the problem commences, i.e. case where the percentage of the problem solved is 0%.
- ❖ Intermediate State: The state in which analysis is completed and steps are under progress for the actual solution of the problem. Here the percent problem solved >10% and <90%
- ❖ Goal State: This is the final stage of any problem. In this the final testing or report is being generated for the solution of the problem. Here the percent of the problem solved is 100%.

As discussed, many operators function at different states, and each state has different work patterns. The problem now arises as to how to maintain the correct sequence of operators also keeping in mind that the search space is limited to the relevant problem. In such cases, establishing a hierarchical structure for solving the problems may assist. In this structure, each branch is associated with the probable next state of the problem. By creating a complete map or tree structure we may more easily identify the shortest path possible, i.e. the shortest sequence in which the operators can reach the solution goal of the problem.

Now, we have two generic and important questions to answer before proceeding further:

1. What are the factors which determine the availability of an operator for solving the problem?

2. How should the troubleshooter choose from the different operators Available at: any given instant in time?

Acquisition and operators: We must find new operators for solving the problem. There are three possibilities for selection:

1. Discovery
2. Observation
3. Instruction

It seems logical that the best and efficient way to solve the problem is to gain the knowledge of new open areas. But in some other cases cheating (or observation) is more efficient. In an observation, three teams were given some problem statement, team 1 received an abstract of a formula, team 2 received the application of the formula and team 3 received both. The results were team 3 scored the highest, then team 2 and last, team 1. It clearly signifies that the implementation part is mostly favored by humans. Here the implementation could be interpreted that it denotes "cheating" because the whole working steps are provided, one just has to use it to produce the desired results.

Imitation and Analogy: Imitation refers to the behavior advanced in which a person analyzes and then replicates the behavior. However, analogy is a process which is used by a problem solver to solve a problem. Relevant algorithms are key elements which may then be projected in terms of making an analogy.

A very well known and much perceived problem which takes problem solving to the next level is the "TOWER OF HANOI". The Tower of Hanoi is a mathematical problem or a puzzle. It consists of 'N' disks of different sizes, and 3 rods. The game starts with disk put in the ascending order of sizes on one of the rods. It makes a

conical structure on the rod. The goal is to move the entire stack of disks from one rod to other by following the rules described:

1. Only 1 disk moves at a time
2. User must take the top most disks first, and must slide to the top most disk of other rod.
3. No larger disk could be placed atop of a smaller disk

This problem is not solvable by the regular difference reduction model. Hence new and advanced models were developed to efficiently solve the problem (Grafman & Goel 2001) set up the standards for solving the problem. They divided the problem into many sub-problems and then efficiently designed certain operators and operations to solve the problem in as few steps as possible.

2.13.2 Development of Expertise

Experience, talent, zeal and skills are the prime need for acquiring an expert level of competence in any field. It is highly dependent on the field or area of expertise in which a user is working. Nearly each and every person has practical expertise in spoken language, driving and learning whereas in areas of chess, sports, and athletics only a smaller number of people have expert knowledge and competency.

There are two statements which come with expertise:

1. Without much hard work, expertise cannot be achieved.
2. With the expertise knowledge, you can solve many tough/difficult problems.

For possession and execution of an area of expertise you must gather the expertise skill set. There are said to be 3 stages for the acquisition of skills (Anderson, 1982).

1. Cognitive Stage
2. Associative Stage
3. Autonomous Stage

Cognitive Stage: In this stage of skill proficiency, knowledge from various factual resources are collected and interpreted. The analyses of the previously analyzed results are tested. Knowledge in the procedural form is not available.

Associative Stage: This stage occurs when successful skills run through the procedures. A declarative type of knowledge is required to adopt a fixed pattern of learning, a successful approach to most of the important problems and their solutions. This pattern may be described by the use of production rules.

Autonomous Stage: This is the final stage. Here all the available knowledge is already gained and comparatively little energy and attention is required for competent perception of the problem.

2.13.3 Nature of Expertise

The different level of expertise occurs depending on the amount of hard work, time spent and analytical skills gained. These areas of expertise are also dependent on the nature of learning and involve the utilisation of different resources.

Tactical Learning: A sequence of action applied when skills or concepts are learnt systematically by breaking the problem into sub-parts is known as tactical learning.

Strategic Learning: This learning denotes how an organizer tackles problems of a strategic nature.

2.13.4 Transfer of Learning

This concept of learning is based on research which could be framed as the study of the dependency or reliability of human learning, performance and conduct on prior

experience. The most important advantage of the transfer of learning or skills is that there is rarely a negative transfer. But negative feedback may be documented. Negative transfer occurs when learner believes there are links between information, or incorrectly sees some value in using information from one setting in another which proves to be incorrect. Let us consider an example, a student is set a fairly simple mathematical calculation to be carried out. The method he/she learnt is then applied again when solving a different set of problems. This kind of knowledge is considered negative learning when it involves an inappropriate and negative transfer of learning.

2.13.5 Judgement and Decision-making

Forming of an opinion or evaluating/comparing or manipulating any estimate with respect to current conditions is known as the capacity for making judgements. This activity is governed by factors of exercise, manipulation, purpose, and propositions on states of change.

This covers some of the main aspects of decision-making. The basic truth is that judgment is common and in everyday use. It may however be complicated for people to judge when some other person makes a decision to evaluate whether the decision taken was a good one or not. The answer to this question depends on the person under consideration, the level of knowledge level of that individual, and the current condition of the person. The power of good judgment is based on the wisdom that the person has, since it is the wisdom which clearly discriminates between good and evil, right or wrong.

The decision made is to some extent a reflection of one's feeling and belief. For a good decision, one must listen to others, such as the end user on which the decision has long-term consequences. They are the ones who may or may not accept the decision. For an organization, the judgment supporting an HR decision which affects the employee may be stated on employee feedback forms. Decisions that affect the

end user are reflected in the good will of the organization or may be present more broadly in society or in the market.

The key factors associated with decisions are the anticipation and ability to create the futures which at the same time are its major constraints and obstacles. One must be accepting of the fact that representation of all of the possible consequences often simply is not possible. Even if we try to determine and examine all of the expected outcomes, there are many situations which are in various ways beyond our total control. The main feature of a decision is the level of uncertainty associated with it. Hence, it is very important to analyze and evaluate a decision. The effect of any decision may be considered for both its long-term and short-term consequences.

Another factor which covers decisions is the amount of conflict. It denotes the choice in which at least two options are available, each of these options have their individual positive and negative effects. When considering one option over other, we get the positive aspects of one and reject the negativities of other. This is one of the major sources of dissonance faced when making decisions.

2.13.5.1 Information and Knowledge for Decision Making

Information and Knowledge plays a great role in strategic planning and execution. The below figure represent information phase at different levels of strategic planning. Information needs are defined at analysis phase of setting up the strategy therefore strategic uncertainty level are importantly associated with perceived information source accessibility and quality. Information needs must be defined at corporate level in the organization and is later discussed in details in section 11.7.

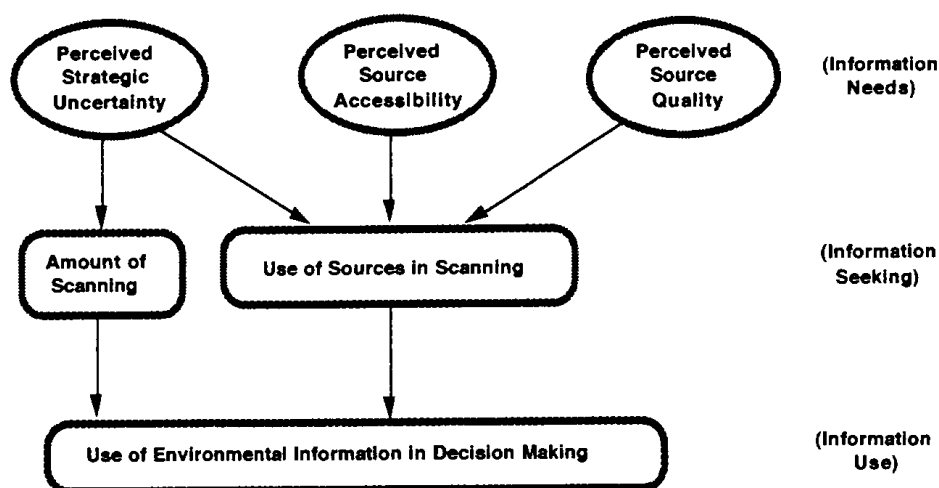


Figure 6: Model of Environmental Scanning Based on Environmental Uncertainty, Source Accessibility and Quality

Source: Auster & Choo (1994), p.209

Information objectives and needs are defined at planning levels. Second critical phase of information is “Seeking” this basically means obtaining information from different sources and each sector has specific reliable sources of information which helps in scanning external environment. (Auster & Choo, 1994)

2.14 Assessing Environmental Uncertainty

All organizations are assessed based on their environments and industries. Environmental uncertainty is assessed by environment stability and complexity. The degree of environmental uncertainty is impacted by the number of external elements’ similarity or variability.

Figure 6 below illustrates the characteristics of different environments and represents a few examples of different industries. For instance, universities and educational firms are considered to be complex in nature due to many external elements

impacting on their strategic environment, however, the operational environment is often somewhat stable because many of these elements remain constant and only change slowly.

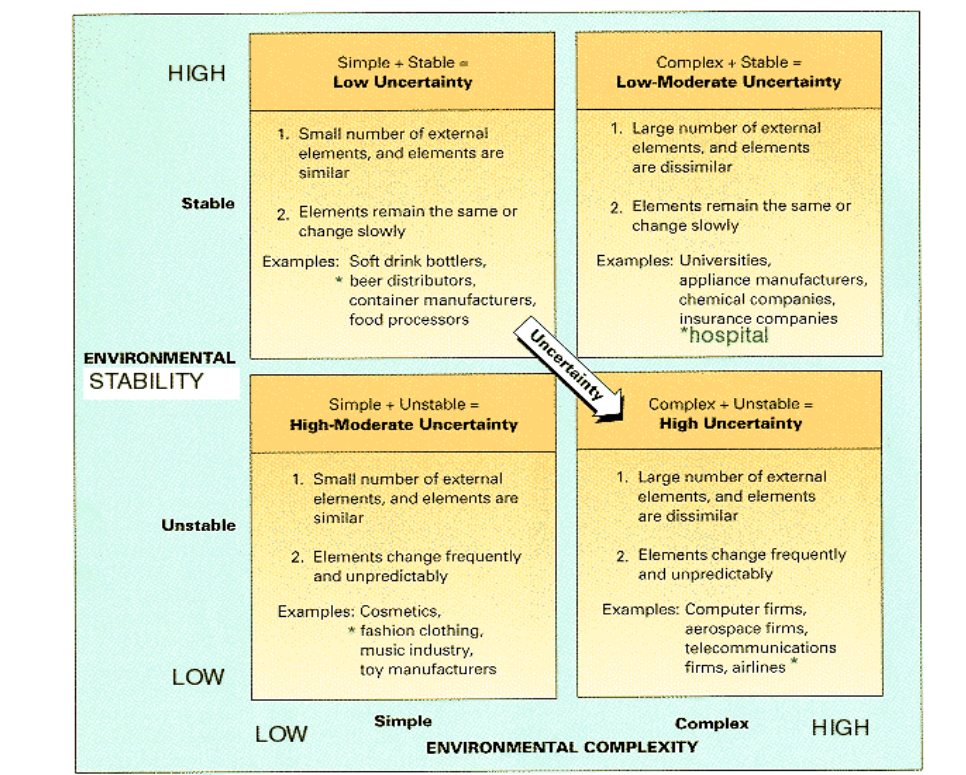


Figure 7: Matrix of Environmental Uncertainty

Source: Robert (1972), p. 59

Proposition 14

The transportation sector like the aerospace industry is environmentally complex and unstable therefore uncertainty is likely to remain high.

3 Corporate, Business and Operational Strategic Planning in RTA

The Roads and Transport Authority has developed aesthetically appealing strategic plans for the period 2009-2013. The development of the strategic plans was implemented in **5 phases**. The most critical phases are phase I and phase II. This included a baseline review of the existing situation and development of RTA corporate and sub strategic plans. Other phases included risk management and monitoring systems for following the plans's execution.

The above strategy development methodology resulted in a number of supporting documents for each phase. The development of the strategic plan was successfully completed by September 2009. It was initially scheduled to end by May 24th, however, due to scope extension it got extended for a further couple of months.

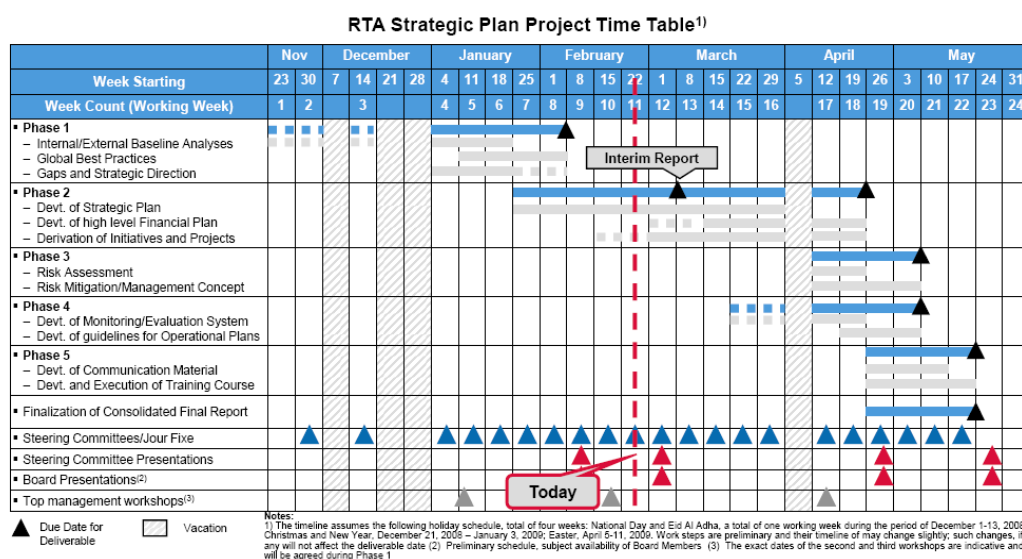


Figure 8: RTA Strategic Plan Project Schedule

Source: Booz & Company (2009), p. 3

3.1 Phase I

The purpose of this phase was to develop the baseline analysis that drives the goals and objectives for the Roads and Transport Authority. The baseline development depends on external environment, organization performance and stakeholder expectation analyses. It started with studying the external environment surrounding RTA and analysed the impact of socio-economic trends, mega trends and technology change.

3.1.1 External Analysis

The external analysis focuses on defining socio-economic factors (*GDP, population demographics, economic activities and social support mechanisms*) that influence Dubai's future development, determine the factors impacting on the supply chain (*population development, income levels/ranges, urban density, existing transport supply, financial capability*) and forecast how socio-economic trends impact further on the urban transport in and around Dubai.

Mega trends study current global mega trends (*demographics, environment, technology, economics, social, governance*) affecting urban transport and analyse the affect of these mega trends on the demands of urban transport in Dubai.

Technology assessment is a part of the external analysis that considers the technological aspects existing in Dubai that require review, upgrade or need to be achieved according to best practice and current assessment of RTA.

For the political aspects, the analysis addressed the legislative framework, gaps related to it, governance structure and the current issues associated with it. In addition, the existing governance model was compared with best practices in the transportation sector.

3.1.2 Best Practice and Expert Review

Benchmarking included 4 main countries, namely, Berlin, Singapore, Hong Kong and London. Benchmarking was conducted based on the transport system, transport governance system, strategic planning and technology innovation.

3.1.3 Internal Analysis

A baseline analysis of the internal organization was conducted as part of Phase I and included an organizational DNA survey and three process workshops with 102 participating employees. The above activities and analysis resulted in agency/sector baseline reports that determined RTA performance based on best practice.

3.1.3.1 Organizationa' DNA

Emphasis was placed on the weaknesses and strengths of the organization through four building blocks—structure, motivators, information and decision rights. Customized questions under each of the blocks held a different aim. The purpose of structure is to identify the people who are truly decision makers in the organization as distinct from the formal organizational structure, its lines and boxes. The motivators building block is about objectives and incentives that motivate employees, while the information block aims to understand how knowledge is shared, what metrics/measures determine performance and how the activities are coordinated. The last building block is the decision rights which takes into account the formal organizational chart, authority structure, lines of communication and positions in the hierarchy.

3.1.3.2 Organizational Processes

This exercise aimed to understand internal processes and highlight issues that were not discussed in management workshops in order to analyze further inter-departmental issues that were raised in these sessions and suggest improvements.

3.1.3.3 Internal Agency and Sector Analysis

In this stage each agency/sector is analyzed based on the SWOT framework and against demand/capacity (department responsibilities, forecasted demand, current initiatives) safety and financial performance. Benchmarking is used at this stage for each agency/sector to identify levels of supply and demand for the business and for initiatives and plans. The outcome of this stage is to come up with strategic leavers linked to objectives and goals.

3.1.3.4 RTA Performance

The performance of RTA was analyzed against the model shift survey findings and the expected demand for different transportation means at the first level. At the second level, safety, environment and financial sustainability analysis was performed. At the third level, organization processes were discussed and taken into account.

3.1.4 Stakeholder Expectations

The stakeholders were divided into three groups (RTA leadership, strategic partners and customers)

3.1.4.1 RTA Leadership

The internal stakeholders' expectations (RTA Leadership) were determined by three dedicated management workshops attended by the Chairman and the CEO of all RTA agencies.

The aim of the first workshop was to arrive at determining the strategic direction of management and perform an analysis of the existing position of the organization, in terms of its weaknesses and strengths. The main objective was to eventually arrive at the internal baseline and make a direct comparison with global best practice in the transportation sector.

In addition to the above there were one-to-one interviews with the CEOs to discuss the main challenges confronting RTA and understand strategic aspirations and executives' principal concerns. As a result of the workshop, a consolidated leadership vision on the aspired direction was developed. It addressed each challenge and the initial input into RTA was identified. The challenges were mainly related to the transportation system including congestion, accidents and limited public transport share of trips. Other non-transportation challenges raised were achieving financial sustainability over the coming years. Challenges revealed through extensive analysis were related to asset and facilities management, stakeholder relationships and retaining human resources. The aspired direction of RTA leaders were leading through integrated planning, reducing fatalities, managing congestion and increasing demand.

3.1.4.2 Strategic Partners (External)

In parallel with the first workshop a detailed SWOT analysis for each strategic business unit was conducted along with interviews held with other strategic partners, including private and public entities in Dubai.

3.1.4.3 Model Shift Survey (External-Customer Satisfaction)

As do other government entities in Dubai, RTA focuses on customer satisfaction. A survey issued to a representative sample of the Dubai population of about 1,000 socio-economic inhabitants was conducted. The survey's purpose was to learn about current model choice determinants in Dubai, understand changes that will result from introducing new transportation modes and understanding customer's willingness to pay.

In summary, Phase I included a baseline study of RTA including all internal and external determinants, a comprehensive gap analysis and development of strategic directions (directions to goals and objectives and lists of levers). The deliverables for this phase were assessment and situation/direction reports.

3.1.4.4 Study current policies and methodologies

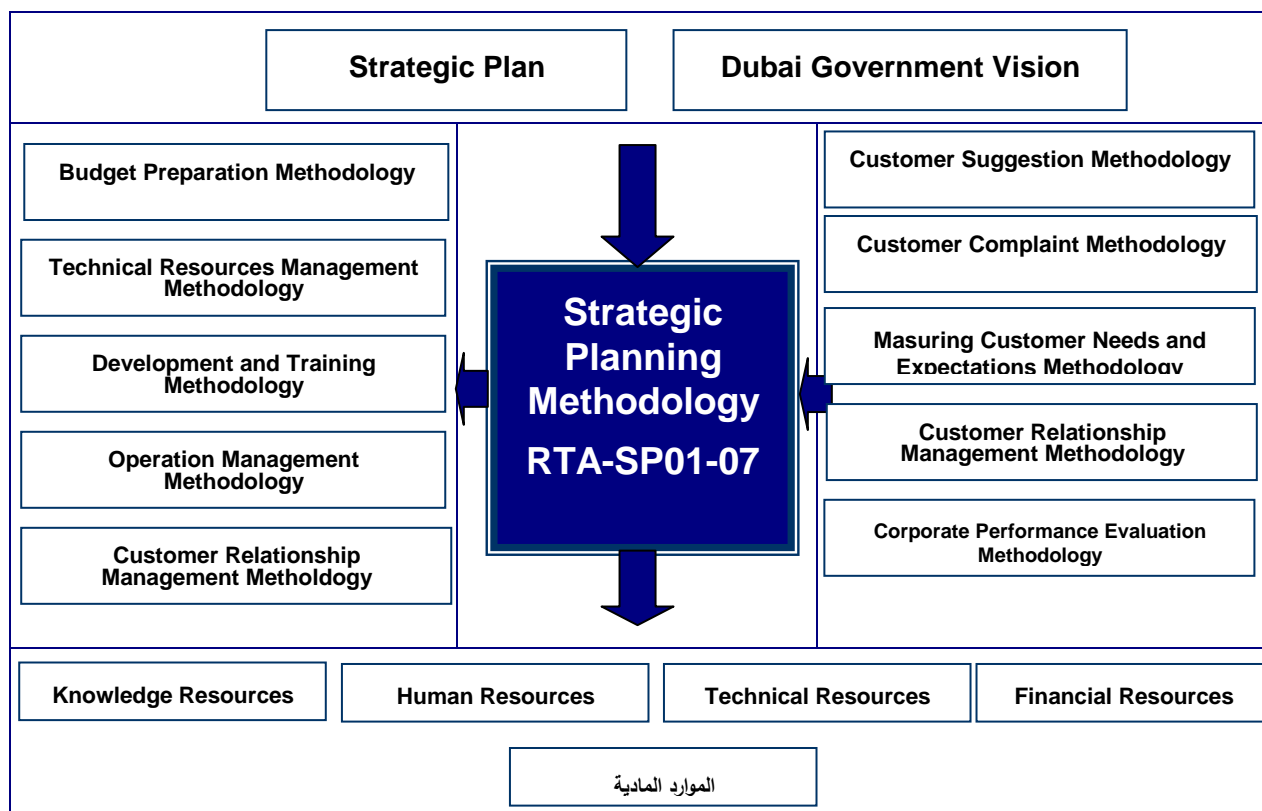


Figure 9: RTA Strategic Planning Methodology

Source: The Roads and Transport Authority (2009), p. 7

3.2 Phase II

The outputs of the previous phase outputs are inputs to this phase which focuses on developing a comprehensive corporate strategy and strategic plans for the nine agencies and sectors. Graph 1 presents the strategic planning methodology at RTA. The methodology illustrates the inner processes of strategic planning that is performed to arrive at the desired output which is chiefly, the corporate strategic plan. Other agencies and sectors (*Strategic Business Units*) strategic plans are then derived from the corporate strategic plan. The smallest functional units/departments of RTA are required to execute the strategic plan through customized departmental operational plans that list the programs, projects and initiatives.

3.2.1 Dubai Transportation Corporate Strategy (Intended Strategy)

The corporate strategy was developed in approximately 3 months. To understand how a corporate transportation strategy is developed, we will focus on detailed elements of the planning processes.

3.2.1.1 Defining Goals and Objectives

With reference to Literature review I the planning process is about closing the gap between the current situation (baseline review) and the desired state (aspired outcome). Since Phase I mainly focused on the baseline review, it largely covered the existing situation of RTA in terms of realization of its internal strengths and weaknesses and its external opportunities and threats. The consultants Booz & Co added value to this process through implementing best practice approaches in planning for identifying RTA's aspiration (vision) and analyzing the existing situation in order to arrive at a detailed plan of what needed to be undertaken (projects/programs/initiatives).

The current situation of RTA was a limited capacity in public transportation, lack of mass transit modes and dependency on the car. The aspired outcome was firstly to provide a world class mass transit system integrated with other modes of travel, and secondly, to provide convenient and effective public transport system that fulfills the vision of safe and smooth transportation for all.

It is worth mentioning that the strategic goals were derived from the major focus areas which were defined as: RTA (Internal Efficiency), core business (Transport System) and Target (community). Goals were derived from the external challenges and internal capabilities and then aligned with Dubai's Strategic Goals and RTA's visions and missions as illustrated in graph 1.

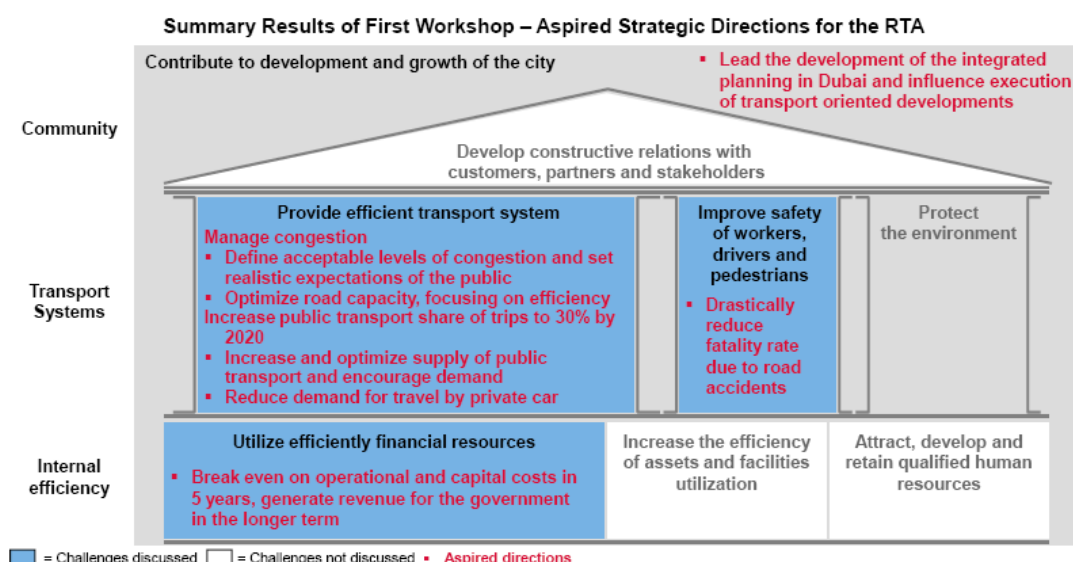


Figure 10: Strategic Levers in RTA Strategic Plan

Source: Booz & Company (2009), p. 10

3.2.1.2 RTA 8 Strategic Goals

RTA's new strategic plan consists of 8 strategic goals distributed across the three areas of strategic focus.

1. **Integrated Dubai:** Transportation in Dubai includes infrastructure, services, regulation and coordination with stakeholders. Infrastructure is to be planned according to Dubai economic and urban planning, while improving the legal framework for roads and the public transport sector. Coordination with partners is considered to be important for which mechanisms between entities need to be developed. Three derived objectives are:
 - Integrate transport planning with Dubai economic and urban planning
 - Develop effective stakeholder coordination
 - Improve legal framework for roads and public transport sector

2. **Dubai For People:** addresses two main elements asethically appealing to public through urban city design and heritage and network enhancement such as special consideration for people with special needs and walking and cycling. Two objectives are derived from this goal:
 - Make roads and public transport more people-friendly
 - Preserve Dubai Heritage
3. **Customer First:** customer services has a diversified and limited portfolio. This is a challenge and the channels are not seamless across agencies. To enhance customer service introduction of an improved customer interface is required, in addition to other enabling projects such as customer-focused strategies. Objectives derived from this goal are:
 - Improve customer service and interface
 - Listen to customers
4. **From Cars to Public Transport:** the target by 2020 is that private transportation trips are to be 70% compared to public 30%. Currently only 6% of trips are made by public transport. To be able to increase transportation we have to be able to supply world class infrastructure/service and ensure integration/accessibility while increasing demand through marketing measures and public awareness raising schemes. The derived objectives are:
 - Shift demand to public transport
 - Provide effective and convenient road access to all Dubai
 - Manage congestion
5. **Safety and Environmental Sustainability:** Many countries follow “vision zero” to decrease fatality to 0%. RTA’s target is to decrease fatality by 47% in 2013. This suggests that fatalities per 100,000 inhabitant is 17 which is among the highest in the world. The Dubai Road Safety Strategy (2008-2015) has been developed and corrective measures put in place with a positive impact (e.g. the number of fatalities declined from 332 in 2007 to 294 in

2008). RTA SCG should develop an overall safety policy and implement a safety management, monitoring and enforcement system, while the agencies should focus on the implementation of the specific safety policies and continuous improvement. The following are the objectives derived from this goal:

- Reduce the number of accidents and fatalities
- Minimize adverse environmental impact of roads and public transport

6. Financial sustainability: projections in the financial plan translate into targets for each objective under Goal 6 “Financial Sustainability”

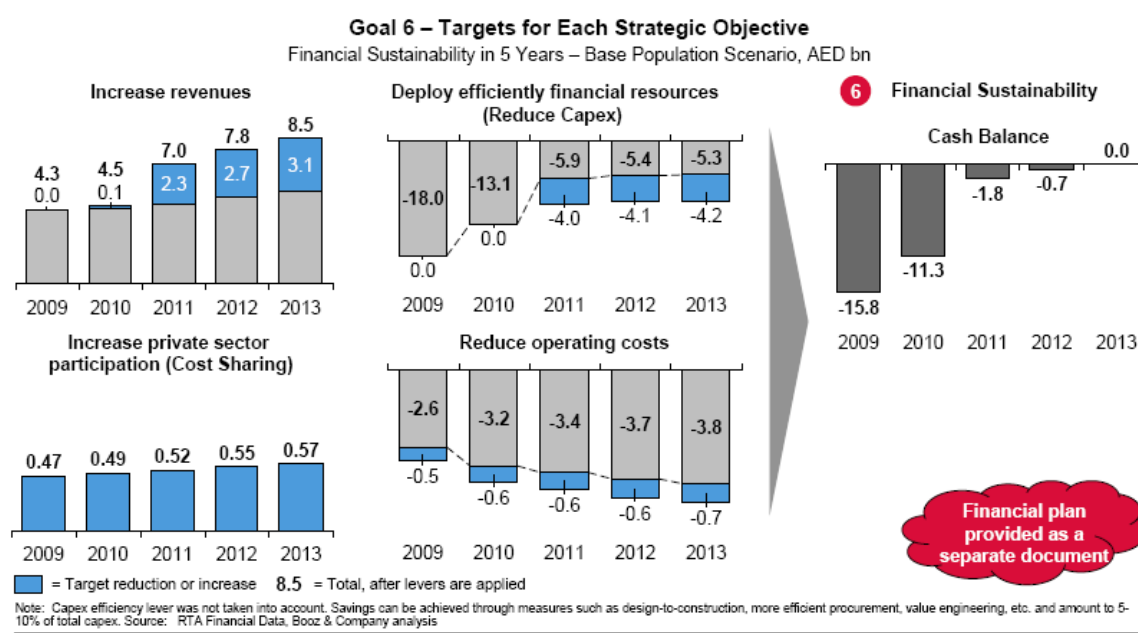


Figure 11: Scenario for Population in Dubai and the Financial Crisis

Source: Booz & Company (2009), p. 84

7. **Advance RTA:** RTA should continuously help employees develop managerial and technical skills. In the organization DNA, RTA is overall a healthy organization—the target is to improve efficiency. Under organization

processes current issues are highlighted within increased coordination, greater clarity of roles, more detailed procedures and further automation. These issues are addressed through several process improvement projects. The objectives set for this goal are:

- Develop human resources
- Increase organization efficiency
- Improve processes and systems

8. Asset Sustainability: Aims to achieve understanding of asset ownership and custodianship, establish unified asset management system across all agencies, establish corporate ownership of asset data with reporting relationship between agencies and corporate center. This goal includes only one objective which is to efficiently manage and utilize RTA assets.

3.2.1.3 Executable Objectives

In Phase I the directions and analysis were translated into broad goals for RTA. The goals were then broken down into objectives. Each strategic objective has a defined structure consisting of a set of initiatives, KPI and targets of clearly defined outcome for the five years to come. In other words, detailed targets and measures are set for **20 strategic objectives** in RTA's corporate level strategy. In order to measure the success of these strategic objectives, clear, tangible and actionable measures (*SMART*) were defined.

Performance measures used in the strategic plan include qualitative and quantitative measures. Qualitative measures are implemented to assess how far RTA is achieving the aspired outcome over a continuous, gradual process. Progress can be measured by a change in a specific indicator or be approximated by one. An example of a quantitative measure is the measure of the increased share of PT: % of trips by public transport compared to the total number of trips. Quantitative analysis can be either through monitoring the % of completion or other specific ratios and proportions.

Specific indicators are context sensitive and progress can be measured by periodic assessment of perceptions about the outcome (surveys) or detailed performance reviews, e.g. benchmarking studies.

3.2.1.4 Strategic Initiatives

Strategic initiatives are introduced to form another level of action, implementation and assessment for the sake of simplicity and better manageability. Initiatives are basically organization-wide programs or groups of projects to be undertaken in an effort to achieve the strategic objectives. They often can be broken down into several projects or workstreams.

The RTA initiatives were developed based on best practice and on current RTA plans and aspirations. Strategic initiatives were derived in both a bottom-up and top-down approach. The bottom-up approach was executed through consulting existing operation plans including current and planned projects and interviews held with agency/sector management and staff. The top down approach was performed through identification and comparison with best practice, internal analysis and stakeholder analysis.

Initiatives were categorized based on content and type of impact into: concept, capacity, performance and enabler. These four categories of initiative respond to plan, build, optimize and support, respectively. Both concept and enabler or plan and support have indirect or intangible impact on the short-term. An example is the congestion management strategy. While the other categories build and optimize usually have a direct impact and produce tangible benefits from initiatives during the short-term such as providing a comprehensive portfolio of customer services and communication channels.

The initiatives executed were also categorized into owner, support and input. Agencies owning the initiative are accountable for execution of the projects/programs in the strategic initiative and expected to achieve targets according to the relevant measures. Other supporting agencies/sectors support the project by executing some of the tasks within different projects, usually less than 30%. Inputs are the agencies/sectors which are held responsible for providing their output as input to other initiatives. This can be information, product or any other sort of input.

Out of the total number of initiatives in the RTA Corporate Strategic Plan 84 (about one third) are focused on Goal number 4 from cars to public transport. Many of the initiatives listed are in progress except for several strategies and policies that need to be developed.

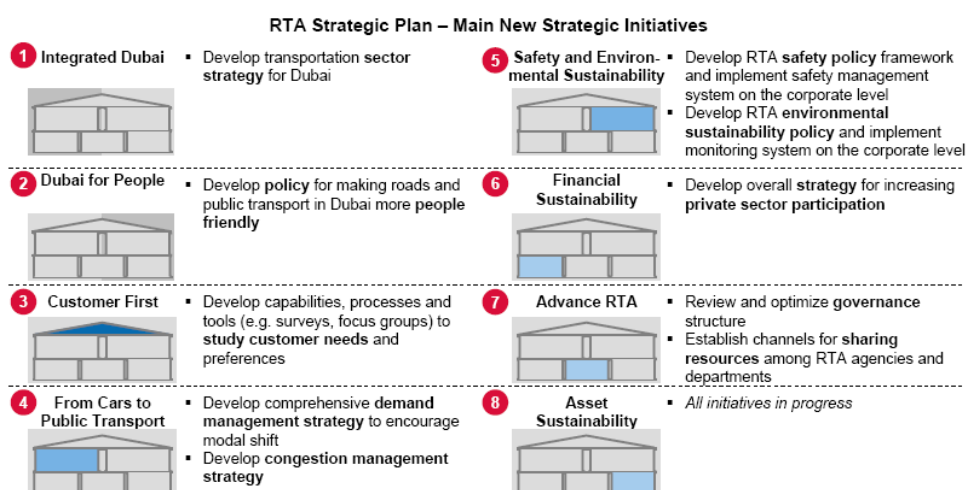


Figure 12: Strategic objectives of RTA Strategic Plan

Source: Booz & Company (2009), p. 15

3.2.1.5 Prioritising Strategic initiatives

In RTA initiatives are prioritised based on priority versus ease of implementation. Priority was determined based on two dimensions which were impact and urgency while ease of implementation was determined based on cost and complexity. High priority and easier to execute initiatives were basically mobilized to deliver

initiatives. Additionally, the impact of each of the initiatives was evaluated based on how much it was likely to contribute to achieving the objective and goal and how important that achievement was for RTA and for Dubai.

Following the above mentioned analysis, the main goals for RTA were identified as 1, 4 and 5 while Goals 8 and 6 were categorised as of second level of importance. The least important goals were defined as 2, 3 and 7.

3.2.1.6 RTA Strategic Road Map

The strategic road map for RTA for the coming five years was drawn up through prioritizing the initiative according to the time scale. The standard development cycle consists of

- Mobilize to deliver phase (Goals 1, 4, 6 HP; 3, 5 LP)
- Develop, manage and optimize phase (Goals 4, 1, 7)
- Continuous improvement phase (Goals 2, 5, 7)

The focus of RTA for the first two years would be on mobility to deliver through introducing modes of mass transportation such as the metro and ensuring integration of all of the modes while shifting overall demand away from private and more towards mass transportation. This was in addition to other initiatives including improving customer service, financial revenue and safety.

The second phase was scheduled to start in 2010 and last up to 2012. It focuses on developing, managing and optimizing transportation modes through demand policies to encourage modal shift, integrated planning, development of standards and monitoring systems, optimizing road mobility and managing congestion.

Continuous improvement would be assumed to have fulfilled the goal by the year 2012 and would contribute to a better Dubai for people, developing non-motorized

modes of travel, reducing adverse environmental impacts, empowering employees, educating citizens, and improving RTA's organization processes and systems

3.2.2 Agencies/Sectors Strategic Plan

Considering each agency/sector as a separate strategic business unit, RTA developed 9 agency/sector strategic plans. Each agency/sector had its own mission, current situational analysis determining its strengths, weaknesses, opportunities and threats. The added value was in defining the role of each of the SBUs in achieving strategic goals, objectives and initiatives. This was in addition to drawing up a roadmap and prioritizing their initiatives. In addition to that strategic maps were developed with details of business goals, objectives and initiative execution with reference to the 4 balanced scorecards. The total number of initiatives across the strategic business units were 267 some of which were customized to suit the core business of the agency/sector.

3.2.2.1 Driving Initiatives

Initiatives were set based on best practice and there has been standard number of initiatives mentioned in Corporate Strategic Plan 84. Based on the role of the agency and sector, the different strategic objectives for each of the initiatives were customized. This has been completed across all agencies and sectors and consequently the total number of initiatives increased to 267, after including customized initiatives.

3.3 Phase III

In this phase of the project, risks were detailed at the three different levels and named strategic, business and operational level risks. This specification was in addition to the risk management plan which included a risk mitigation plan for the top level risks and an overall approach to monitor and respond to identified risks.

Risks were defined at each of the three levels depending on the range of likely impact. The strategic risks were considered to impact on RTA with all its agencies and sectors and therefore were categorized to be of high impact since they were related to significant influences in the external environment.

Business level risks are classified as impacting on a specific agency/sector's business such as a lack of demand for the rail mode of transportation. Operational risks are very detailed and occur as departmental level risks which impact mainly on departments' processes and operations. The details of the each level are demonstrated in the Figure below.

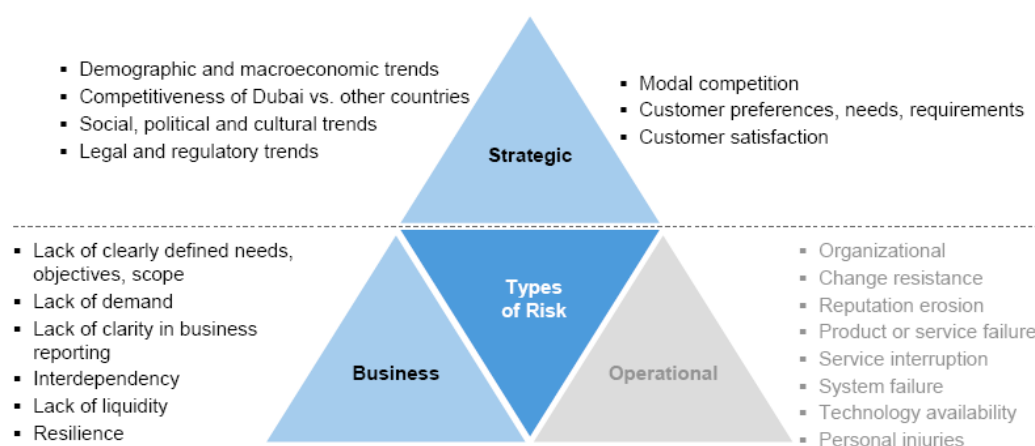


Figure 13: Types of RTA Risks

Source: Booz & Company (2009), p. 5

The risk management plan and register was developed to support proper execution of the strategic plan for next 5 years (2009-2013). The risk register lists details of overall strategic and business level risks identified across RTA. Effective risk management is required prior to and during implementation. Risks are to be identified, assessed and prioritized (*80 strategic risks*) prior to implementation in

order to effectively monitor them through the triggers. Risks, which are then identified as critical at any stage of execution of the strategic plan, require an implementation plan (*responses for 40 Strategic Risks*) that will fall within any of the defined actions which are avoid/mitigate/transfer. The implementation plan is developed for risks arising at the first two levels and are understood as being related to concept and capacity, in other words plan and build.

Risks should be monitored on a regular basis and updated with additional risk and mitigation actions.

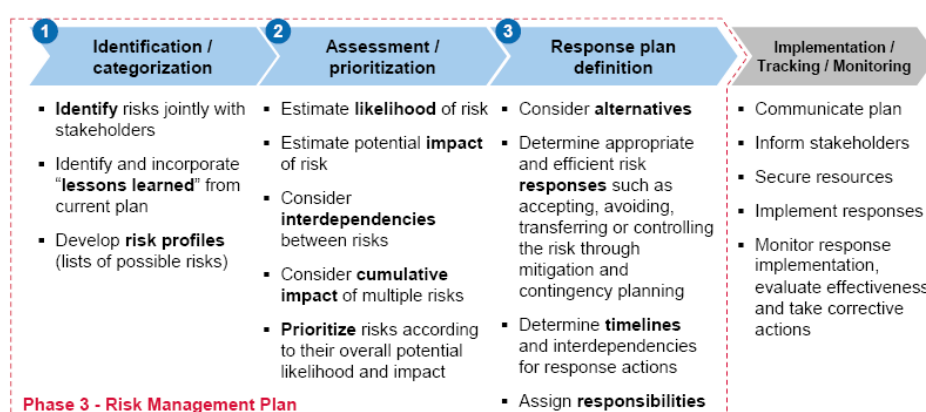


Figure 14: Approach to Risk Management Plan Development

Source: Booz & Company (2009), p. 3

Strategic risks associated with each initiative may hamper the implementation of the Strategic Plan and therefore impact strategic level and critical business level implemenations. Further, in the strategic risk management plan initiative level risks were listed for all goals, however, risk responses were provided only for risks that are concept and capacity initiatives that have certain strategic and business impact and that are highly likely to occur as shown in the Figure below.

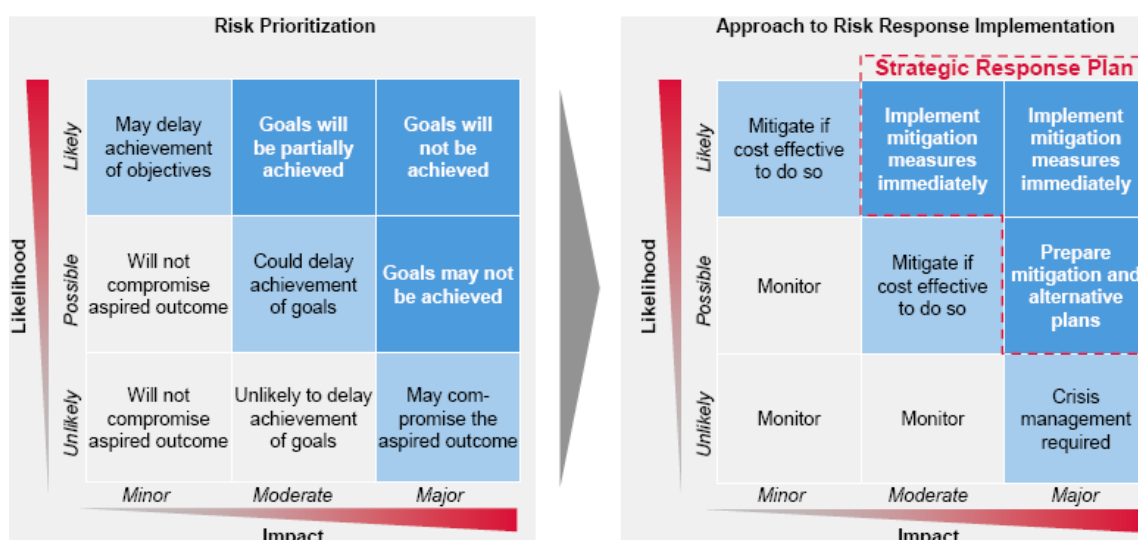


Figure1: Risk Assessment Criteria

Source: Booz & Company (2009), p. 8

In summary for the year 2009 a list of contingency plans/pre-requisites were highlighted for successful implementation of the strategy:

- Develop a *demand management strategy* to mitigate resistance to change
- Develop a *social cost / benefit analysis* of congestion management measures to mitigate impacts on business
- Develop *legal frameworks* required to implement the demand management policy in developments and free zones
- Develop an “*alternative scenario*” strategic master plan if demand management initiatives fail
- Develop a *financial contingency plan* to quickly obtain liquidity required if the demographic trend is much lower than expected

3.4 Phase IV

Developing an executable strategic plan is important, however, properly executing the plan is the most important and a big challenge for organizations worldwide. Cascading the strategy to the operational level is crucial and building a culture that

gradually practices strategic planning principles is the dilemma in the early years of any organization's strategic management. A monitoring and evaluation system is an integral part of monitoring the execution of the strategic plan.

3.4.1 Monitoring and Evaluation System

The monitoring and evaluation systems aims to operate based on the governance model and internal strategic planning processes. It emphasizes operational planning for functional units in relation to strategic planning processes. With respect to the model of governance the roles, ownership, accountability and organizational interaction for performance management have to be clarified. Processes, responsibilities, existing tools and reporting requirements are all assessed when monitoring and evaluating implementation of the strategic plan.

Resource allocation, execution management and performance management are the three critical aspects of RTA's monitoring and evaluation system. Resources are fundamental for the functional units to execute their planned projects/programs and consist primarily of human and financial resources. These projects need to be monitored through operational level KPIs, which feed through to the strategic level KPIs established for the initiatives. As initiatives contribute to objectives they are essentially strategic.

Three existing processes (performance, project tracking and issue management) were properly documented with roles/responsibilities, detailed process and reporting requirements. An additional three processes were identified and added to the strategy execution which included initiative portfolio change, interdependency management and risk management.

3.4.2 Guidelines for operational planning

Operational planning guidelines included the guidelines on operational level planning for the departments. The guidelines offered new proposed templates to capture detailed operational information that are valuable for the department and important in the planning process. Examples for a department were demonstrated for learning purposes. Additionally, a list of terminologies was provided for better understanding of the different technical and jargon terms (e.g. project, stakeholder).

3.5 Phase V

This phase of the project aimed to train the strategic planning team on how to properly execute strategic plans. This was an educational course intended to prepare the team in the detailed information, tools and techniques for monitoring execution, reporting and escalating, as necessary. This part of the project however was excluded due to the timeline and the scope was changed to developing strategic maps and balanced scorecards instead.

3.6 Finance Department Calls for Reorganizing Budget

The RTA corporate strategic plan and its implementation was profoundly influenced by the Executive Council's request to all government departments to re-prioritize projects and classify them into strategic and non-strategic in order to allocate a limited budget for the year 2010 for the execution of programs. This was the first major indication of the instability in the environment that followed many more challenges and at the same time the overall amount of strategic uncertainty increased.

4 METHODOLOGY

Research methodology is often subdivided into quantitative and qualitative research methods. The research conducted for this dissertation concentrates on qualitative research methods, since these approaches were determined most suitable to understanding expert views on dealing with uncertainty through corporate strategic management. There are a large variety of methods of qualitative analysis can vary from action research approaches, field studies, observation, interviews, case study methods, comparative studies, retrospective studies, documentary studies, and other types of studies. This research utilizes Dubai Roads and Transport Authority as a single case study.

4.1 Designing Qualitative Research

When designing qualitative case study research involving expert interviews, it is important to be selective about the purpose and design of the schedule of interview questions. Interview questions should reflect several factors and concentrate on answering the research questions and objectives of the dissertation. Factors that should be considered include:

- Interview questions should be related to the main objective of the research i.e. How can project owners strategize under high conditions of uncertainty and feel capable of achieving their goal? Questions should be asked to the experts in connection with the main goal or problem area specified
- The organisational context and resources should be addressed like the decision-making strategies of the department. For example, , it could be investigated as to how alongside strong decision-making strategies of the department uncertainty still persists.

A grounded theory approach was chosen as the process and data collection and analytical methodology for this research. Grounded methods are a circular type of

process in which after a phase of induction the data proposition is set and then by further deduction the research moves back and forth to the substantive empirical data. This process was chosen for my research because it seemed to fit well with using non probabilistic approach. There is no probability associated with the sample or any major result of the data collection and analysis. Everything has to be done according to the mental analysis and interpretation of the researcher. We can see in the theoretical model as well that the guiding propositions are in effect designed afterwards unlike the traditional model in which research starts with the proposition setting.

Purposive sampling was used for the sampling process in the case selection and data analysis parts of the research. Purposive sampling is performed by taking a subset of the population which is central to the research questions and objectives of the research but is not necessarily representative in any way of the entire population. In this there is no a priori or empirically derived probability associated with any criterion. The data collection and analysis depends on one's knowledge about the cases and issues under study. The sampling criteria used in this research were based on the expert's knowledge about the successes and failures which had occurred in RTA departments.

All interviewees were interviewed using the same set of questions (a total of 23 questions-compulsory and optional). The duration of each interview was pre-defined as one hour, however some got extended by up to a further half an hour. Questions in general consisted of compulsory questions that must be asked of all interviewees and some optional ones. Depending on the time available and the direction taken in each individual interview optional questions were raised.

The questions aimed to tackle different levels of uncertainty that might exist in an organization. The first set of questions focused on uncertainty at the execution level.

Since Dubai RTA is a project-oriented organization and the strategy is executed through projects, the researcher searched primarily for uncertainty determinants that occur at the project and execution level. Below are the set of questions raised to determine the nature and extent of uncertainty related to RTA's project execution:

- 1.1. What type of **project** is associated with high uncertainty? State one that is on- going and one that has been completed?
- 1.2. How **difficult and variable** (changing) are the tasks in the mentioned projects?
- 1.3. Are the tasks in a single project **interdependent** on another task in another project? If yes how difficult is to obtain information from the other departments?
- 1.4. What are the **issues** encountered in the high uncertainty projects that got resolved and still are to be resolved?

A second set of questions were written down to discover and explore uncertainty on the strategic level. These questions focused on the main aspects of core transportation, the business competitiveness of RTA and how the external factors impact on the business, and assessment of uncertainty level in the transportation business.

The results section first focuses exclusively on the execution part of both strategy and project, and then attends to making a general comparison of knowledge management (KM) and contract types used within projects or programs.

- 2.7. How easy and flexible is it to make changes to the **strategic elements** (KPI, numbers)?

- 2.8. Is the strategic plan **realistic and achievable**?
- 2.9. What importance does the organization give to **knowledge management**?
How effective is knowledge sharing in this organization
- 2.10. How did the **financial crises impact** on the projects in strategic plan (in
general % of projects cancelled out of overall) budget approval wise?
How did it impact on the two particular projects you mentioned at the
beginning?
- 2.11. What type of uncertainty exists in **environment**?
(Decision, Model, Analytical, Sampling, Relational)

Below is the transport operation uncertainty model and its elements that impact on
the business of transportation.

- 3.15. What **type of contract** is chosen for the two selected projects?
- 3.16. How many **update reports** are exchanged? How many and what
types of meeting are required? What are the **flows of information**
(trends) and their **means**
- 3.17. How many times has **cost variation** occur in the two particular projects?
Did the company have penalties on the **delay**?
- 4.20. What are the means of **communicating** knowledge, **documenting**
knowledge **and applying knowledge**?
- 4.21. The knowledge used for the project exists in **which form**?

Declarative/ procedural/ tacit/ explicit

The optional set of questions belonged to each section and are meant to give more clarity on four principal considerations of uncertainty:

1. Execution and Uncertainty

- 1.5. How do you classify the issues? Related to Decision Uncertainty, Model Uncertainty, Analytical Uncertainty, Sampling Uncertainty or Relational Uncertainty*
- 1.6. How many resources allocated to the project and what percentage of the project is outsourced to be completed by an external entity*

2. Strategic Uncertainty

- 2.12. Are the employees aware of the strategic plan and projects mentioned in it?*
- 2.13. Is the resources (financial/human) requirement to complete the Project fulfilled?*
- 2.14. How well developed is the strategic plan?*

3. Contract Type and Uncertainty

- 3.18. Do you face issues with the vendor in terms of request for cost variation? Other issues?*
- 3.19. Do you find other type of contracts are more suitable for selected projects?*

4. Knowledge Management and Uncertainty

4. 22. How is the knowledge gained from the projects communicated between team members?

4.23. How is information shared during and after project? Is there a mechanism of knowledge sharing after project completion?

4.2 Sample Selection

There are various types of interview methods which can be performed in qualitative research in order to collect data. Some of the more popular interview methods are focused interview, semi-standardized interview, problem centered interview, expert interview and the ethnographic interview (Flick, 2009).

Among the alternative methods of interview I have taken the Expert Interview method as my principal source of research data collection . Managing uncertainty in RTA is a particularly complex problem. One credible approach is therefore to consult experts or number of experts to report and discuss the complex issues from their positions of expertise and experience. In such complex issues, there is some probability that if the interview data collection methods do not sample a sufficient range of experts that the consequent analysis and assessment of the the results may lead to some uninformed or incomplete conclusions. The expert interview focuses on the extracted information rather than the biography and personality of the individual. This sort of interview gives me the opportunity to spotlight on the critical areas and to explore the underlying reasons for uncertainty in the department through a direct and informed expert set of viewpoints.

In my qualitative research study of uncertainty in execution, I interviewed managers holding strategic positions in the two agencies and their ages ranged from 25 to 50 years old. The majority of interviewees were male gender and diverse nationalities. A large percentage were UAE nationals; about 55% of the total number of

interviewees. Most of the interviewees agreed to be audiotaped except for 20% of the participants. The selection of particular sections was supported by the strategic planning department having significant impact on the overall organization. Interviews were held in 3 main locations including Muhaisanh Building, Al Aweer and in the Head Office.

4.3 Developing the Theoretical Framework

The theoretical Framework will be divided into two main steps:

1. The main Selection Principle: A Gradual Selection Method was applied for the expert cases in RTA and constitutes the main selection principle for the research. In this dissertation, the main aim was to select the case or the experts according to some concrete criteria. The sampling was done according to the representativeness of these experts as a sample of experts employed in RTA. In this process Data Triangulation is done through integrating various sources of data on the same phenomenon studied with different individuals interviewed at different times and a variety of documentary resources. This in-depth qualitative approach does not triangulate the data through comparison of different methods or different samples of experts since the in-house expert was the focus of the research. A different study may have considered two or more organizations in the road transport industry or may have interviewed contractors as well as RTA employees.

Grounded theory will be used as a theoretical model in this case study research. This is a method in which the research is done in a reverse way as compared to more traditional methods of research. In my research instead of first setting the propositions and hypotheses, I engaged in a combination of literature review and empirical case study data collection. Comparatively early on in the research, I conducted interviews with several experts whom I had identified as central to the

corporate strategy of RTA. A series of codes were developed inductively from this data collection and subsequent analysis. Then these codes were later grouped into similar concepts which lead to the formation of categories and the basis for a grounded theory.

2. Sampling Method: Purposive Sampling will be used in which various steps will be taken:

Integration of different cases was performed by continuous iteration between inductive and deductive modes of understanding. To assist with the consideration of uncertainty, I selected various projects which have to some extent experienced problems, setbacks and failures in various different departments of RTA. An alternative way of proceeding would have been to have chosen some typical projects and analyze them from their centers. This approach was however discounted since it did not seem to yield direct consideration of strategic issues of uncertainty.

Generalization of all the samples of projects considered is done after the analysis of all integrated projects. There may be a problem of access although in this regard the research was fortunate to have access to the relevant networks of contacts within RTA.

After the data has been inductively selected, it is reduced to codes or sets of concepts. These set of concepts or codes are considered further through processes of induction and deduction to derive the grounded theory of the research. A notable distinction between this approach and others is that it generally does not formulate hypotheses but relies upon propositions. These propositions have an active function intended to encourage the researcher to return to the data or the sample for continual analysis until data saturation and a final analysis is achieved. The final analysis was done accordingly with the idea of selected project failure or

uncertainty in the projects seen as an indication of failures or uncertainty levels of the RTA departments.

The following framework model helps to determine the sequence in the flow of research methodology, although the reader should replace the words ‘provisional hypothesis’ by ‘proposition’ or ‘grounded theory development’:

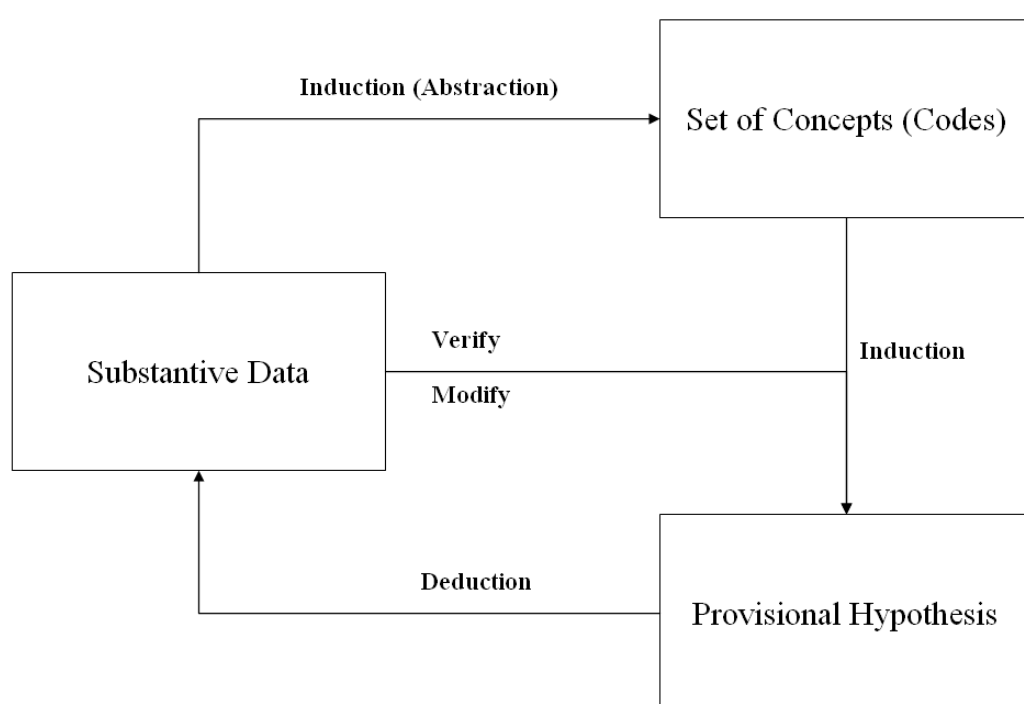


Figure 15: Framework Model

This research followed this framework in terms of developing a grounded model for the purpose of understanding four perspectives on strategic uncertainty in RTA. Each perspective has its own importance but the research for all the perspective was performed in a similar fashion, using grounded methods.

The above diagram shows how the model for the four perspectives on uncertainty strategies was developed. We can see from the above model that in the third step proposition testing will take place. In case of propositions, discussion will present what ever I interpret is significant for RTA. This researcher viewpoint should be supported and criticized especially towards the end of the dissertation research study. The propositions developed in the literature review are discussed in detail in the last chapters. The second step in this model presents the concepts which in this dissertation are all related to uncertainty and strategy in RTA and its different departments. The first step of the model involves gathering and qualitative processes of evaluation of the data. This evaluation two ways of understanding data one is interpreting the data (primarily inductively and based on the empirical contents) and other is categorizing and coding data (theoretical categorization and coding informed by before and after phases of inductive analysis).

In this RTA case study and interviews with senior management, the evaluation involved interpreting what was said by the senior management and what appeared in the case study analysis using the coding paradigm model to formulate relations, develop and refine concepts and categories. The final step used in modeling of the data through grounded methodology is writing up and publishing final result. In this stage, further decisions have to be taken about the relevance and insights of the various propositions including whether they should be accepted or rejected for the purposes of the final conclusions and recommendations for practitioners and researchers.

4.4 Research Case Study

The research is based on an empirical case study undertaken in one of the major government organizations in the United Arab Emirates. It oversees all the transport services in the emirate of Dubai. Ahead of any other emirate in UAE, this organization has completed mega projects such as Dubai Metro and Business Bay

Crossing and Floating Bridge which are very innovative in nature. RTA has over 4000 employees and many more projects in the pipeline, such as tram. The case study used in this research focuses on the two of the biggest business agencies which are Traffic and roads and public transport agency.

The Roads and Transport Authority in Dubai consists of 6 operational agencies and 2 sectors. The operational agencies are as follows:

1. Traffic and Roads
2. Public Transport
3. Marine Agency
4. Rail
5. Dubai Taxi
6. Licensing

Recently there has been major restructuring in organization where one of the sectors split into two and one of the operational agencies was merged (Marine Agency with Public Transport) with another. Among the different business agencies the first two operational agencies are the biggest operational agencies and that is due to the number of customers they serve and the nature of their business.

The traffic and roads agency is responsible for planning, designing and execution of road network projects and maintaining them. This includes preparing policies and legislation and technical criteria that ensure easy access and the safe arrival of riders. On the other hand, the public transport agency is responsible for conducting demand studies in all areas of Dubai Emirate for the purpose of planning means of public transport.

There are different perspectives in which the research has been taken in order to understand that how uncertainty in the different departments of RTA is managed. RTA has an organizational structure which is flat in nature. There are easy means of access for any employee of the company with the senior management of their department. This kind of structure of RTA helps to develop an easy lines of contact and communication among the employees of the organization. This presents ready access for employees to solve the problems which are occurring in the department and to do so within a shorter period of time than if the channels of communication were more hierarchical and formalized.

There are certain responsibilities that RTA has to its employees, the government and society. RTA manages a very huge network for transportation and there are a large number of employees working in the organization. There are a variety of issues which may arise both at the lower levels and in the upper levels of management, there are various uncertainties which are faced, but overall these uncertain situations are very well managed by each and every department of RTA. These responsibilities of RTA shows that there is a requirement for very strong management because the network is very large.

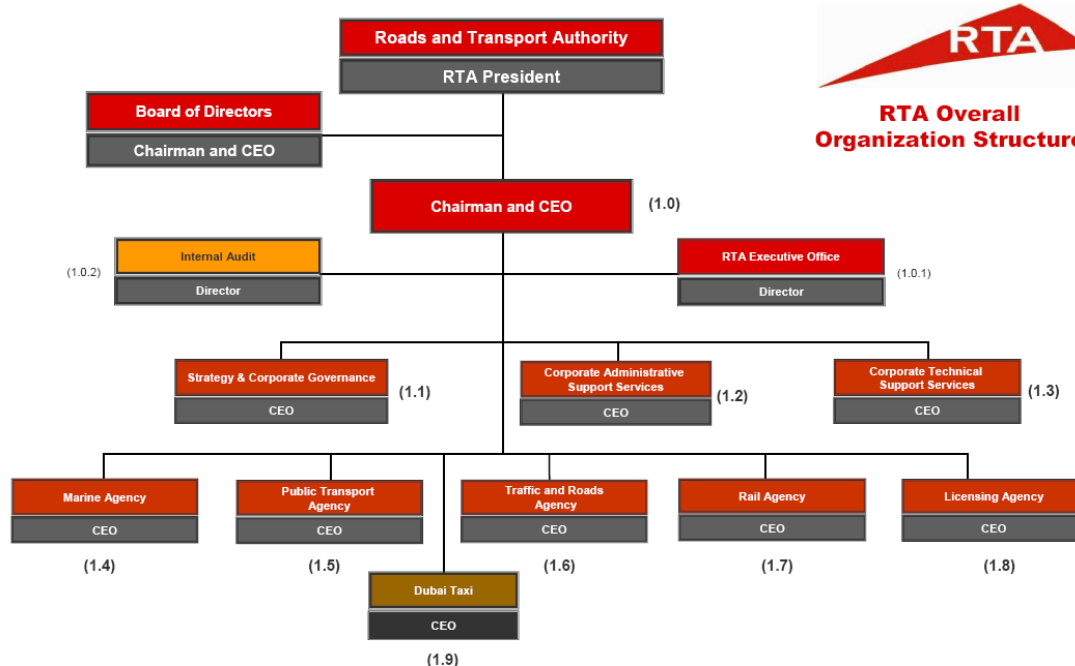


Figure 16: RTA Organization Structure

There are different business departments which are associated with the RTA and its agencies. There are different types of transport which are there for the people such as public transport like buses and personal transport like personal cabs. A complex range of business is processed in RTA in which management has to take care of various issues like traffic and accidents. None can be certain about such issues and hence these have to be managed properly by implementing strategies for dealing with uncertainty.

Different departments manage uncertainty using different approaches and this management is influenced by the functional approaches of departments of RTA such that there are some financial uncertainties which are managed by the financial department, uncertainties among the employees which are managed by the human resource department. Thus, to some extent different departments are specialised to manage different types of uncertainties.

The qualitative research approach for this dissertation is based on a sample of experts chosen from two top departments in two major business agencies (Strategic Team at Abu Dhabi Government 2010). The expert interviews were designed to encourage participants to discuss uncertainty among the various departments they worked with.

Some of the roles and responsibilities of different departments of RTA is described in the following section.

The role of corporate strategy and corporate governance is played by various departments like strategy planning department, development and corporate finance department, investment and commercial affairs departments, legal affairs departments, planning and safety regulation department. Corporate social services roles are performed by some departments like customer service centre's department, building and facilities department, automatic fare collection department, finance

department, procurement department and information technology department. There are various other strategies which must be adopted and it is necessary to identify various strategies for minimizing uncertainty in project execution.

5 RESEARCH PROCESS

The research investigation which I performed is qualitative and involves similar procedure to other types of qualitative research study. My research starts with some proposition (propositions) which I created based on previous knowledge of the domain and theories on uncertainty. Then, the data collection phase involved interviewing experts to gather information and then review the data in light of what they said and what I knew as full-time employee in the organization, and the theory expounded in literatures addressing uncertainty. In this exploratory research some propositions will be supported with evidence from the literature while other propositions will be criticized and discussed in more depth since these ones arose and seemed to be more important during my grounded methods of data collection and analysis. The statements of the propositions are listed in the literature review in chapter 2.

5.1 Interpretation of the Results from Interviewee 1, Manager of Traffic Safety Section

Below is the analysis of the interview with the Safety section manager following the open coding grounded method:

5.1.1 Open Coding

Using the interview transcripts I have arrived at the listed codes for the interview with the manager from the Safety section.

Please note that the headings below (causes, consequences) are an application of the second stage of the analysis which is Axial coding, however, the headings are listed here for ease of reading and to assist with maintaining the focus of attention of the

reader. This variation of the (Strauss and Corbin, 1990) grounded method applies to the method of analysis for all eight interviews.

5.1.1.1 Causes

- Culture and atmosphere and Behavior of riders
- Higher management have different priorities
- Costly safety impact studies
- Safety and fatality has big impact on economy
- International standard adopted
- Not enough involvement in preparation of strategic plan and is prepared in rush
- Stakeholder needs not comprehensively studied
- No career path for employee and resigning policy
- Ad hoc requests

5.1.1.2 Consequences

- Data unavailability and few studies conducted and lack of evidences
- Enforcement need to be coordinated to achieve targets
- This year none of projects approved
- Struggle to put safety on agenda of higher management
- Planning issues ex. Bridges with no pedestrian facility
- Construction and standards does not suit Dubai environment, need of customer...
- Increased fatalities/enforcement control
- Real KPI are not there and we can not rely on it

5.1.1.3 Context

- Health and Safety not observed by management and contractors
- Riders and Drivers attitude has major impact on safety in Dubai

5.1.1.4 Strategies

- Reprioritizing safety projects and extend duration
- Outsourcing implementation of plans to investor and sell naming rights
- Policy of designs approved by a committee
- Communication plan governing rules and regulation of meetings/communication/committees

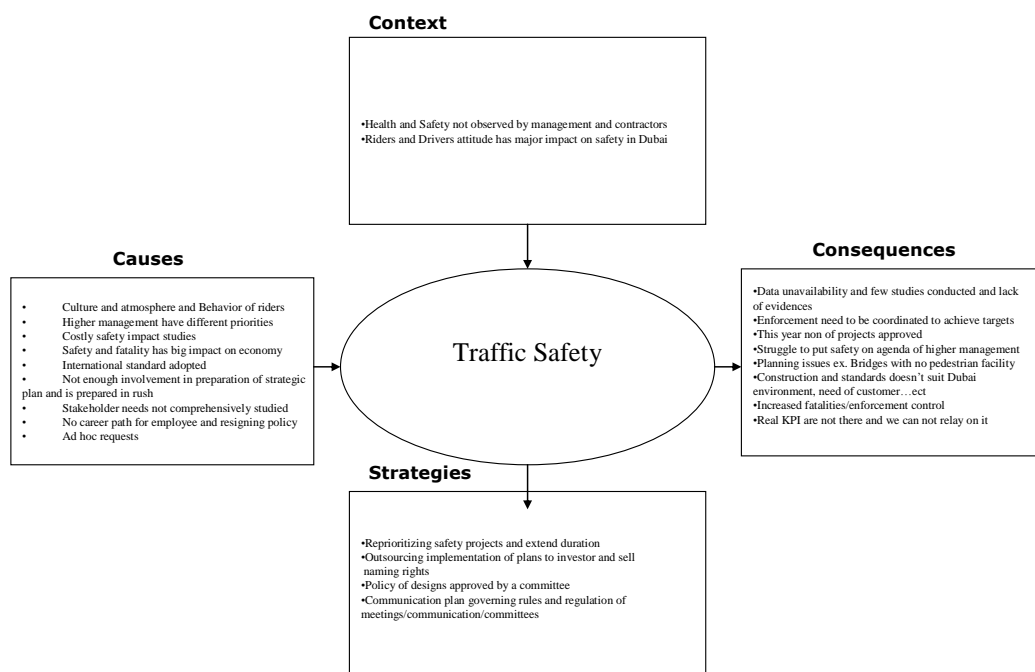


Figure 17: Interviewee 1 Axial Coding

The interview with the Safety section mainly talks about the uncertainty involved in various projects and what steps are taken by the department to overcome them. Several projects involve a high level of uncertainty. One of the examples of such

projects is the floating bridge project for which there is high level of uncertainty. It is not exactly a project of the Section, but the section is providing inputs to the project which is based on the idea of a floating bridge made for the Army's use.

According to the interviewee in the Safety section, the nature and the level of task difficulty performed in such an uncertain project can be considered to be 6 on a scale of 10. Around 30 percent of variation or less is seen in the tasks mentioned in the projects mainly because safety projects are more consultancy projects than they are execution. These uncertain projects are highly interdependent as far as different departments are concerned. The interdependency is based on the information received and is not coordinated or monitored within RTA as to what one department gets from another to progress the projects' requirements.

Another project is a pedestrian facility action plan which contains high uncertainty. The uncertainty which occurs is due to the financial difficulties which arise. A solution for overcoming this uncertainty is to provide a third party with advertising rights to execute the safety plan. The main reason for the uncertainty involved in this project was the serious agenda for decisions on safety faced by the top management of the organization. The Safety section talks about pedestrian safety and has produced a mobility action plan which has been implemented by the department, but funds are required to carry on with these plans. This project is uncertain due to lack of funds, lack of facilities, rule breaking by traffic and lack of education and insufficient concern for road safety. There are three more projects for 2010 which are on the verge of uncertainty (all are on hold) due to the financial crisis and one out of three projects for the year 2011 is kept on hold. Uncertainty belonging to all of these projects involves financial problems and decision problems as well. In the interview, I was told that there are two main goals of the Safety section department:

1. Reaching a breakeven point in a period of 5 years and financial sustainability in the organization; and

2. Environmental sustainability

However, these two goals contradict each other. Among the projects in the Safety section of RTA, more than 60 percent tasks are difficult for designing and execution process. There are many projects which have been designed, but several issues have since arisen. The best example of such a project is Al Garhoud Bridge. The difficulty mainly lies in the problem of obtaining information on the progress of the project from different departments due to various problems such as the communication gap faced by the Safety section.

Steps have been taken to overcome such problems in order to resolve some of the difficulties faced by these uncertain projects. Risk management plans are devised in order to reduce the risks caused by various vehicles and safety is maintained.

5.2 Interpretation of the Results from Interviewee 2, Acting Manager of Transportation and Planning Network Section

Below is the analysis of the interview with the Transportation and Planning Network section manager using open coding and the axial coding paradigm model:

5.2.1 Open Coding

Using the interview transcripts I have arrived at the following listed codes for the interview.

5.2.1.1 Causes

- Re-planning 40 of 101 bus routes “*We have changed the routes that were overlaying to remove one which is additional*”

- Wrong anticipation of demand impact planning *“in bus master plan we have identified some corridors where buses could travel & based on that the requirements were studied”*
- Resistance of customers
- *“Forecasted population was expected to increase but opposite happened”*
- Routes re-planning is time consuming process and can not be planned in an hour time
- Dependency exist on other department *“big responsibility trying to get information from other department is difficult” for any change a report is written and reviewed by a group”*
- Actual operational demand pattern for bus riders
- Strategic plan prepared talking into consideration economical crisis

5.2.1.2 Consequences

- Customers were frustrated and consequently complained “
- Impact on traffic direction, density and congestion
- Change management
- Routes were re-planned accordingly *“study identified so many corridor based on demand so we had to cancel bus priority lane”*
- Implement priority lane for buses in some routes
- Time consuming and routine tasks is of medium difficulty
- Operating extra buses through additional routes
- Change is reviewed through group and is discussed
- Meetings and off site meetings
- Delay in projects
- Cancel priority lane

- Resulted in realistic plans and multiple scenarios

5.2.1.3 Context

- Major re-planning routes yield unsatisfied riders
- Demand anticipation reinforce change requirements

5.2.1.4 Strategies

- Marketing campaign
- Modeling survey on resulted forecasted demand
- Scenario planning
- We have contract for knowledge transfer

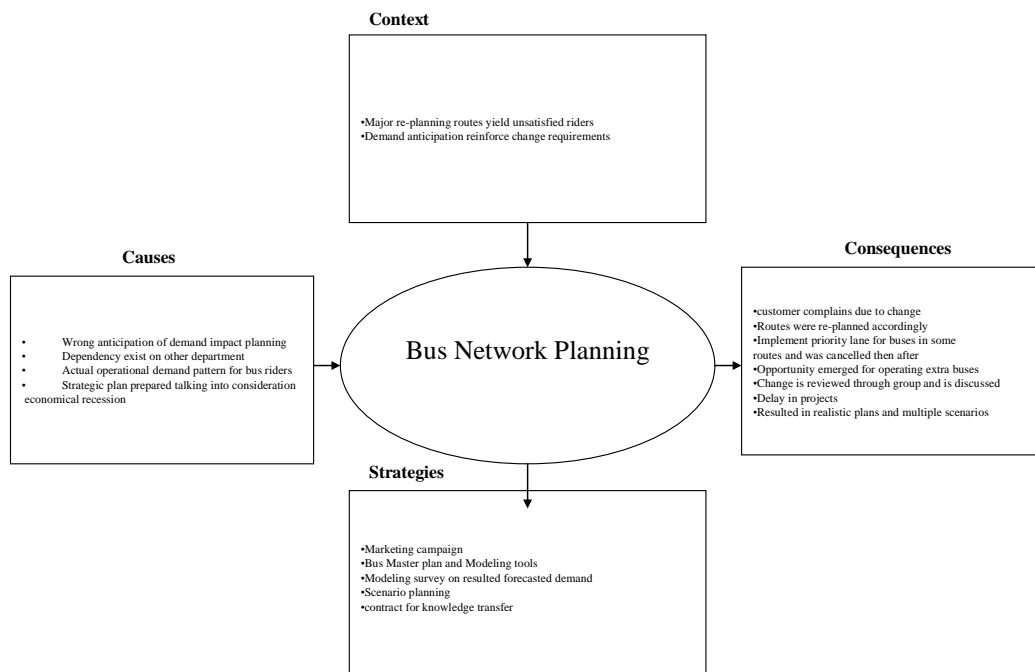


Figure 18: Interviewee 2 Axial Coding

This interviewee talks about the uncertainty involved in projects in the Bus Planning section and also focuses on several problems faced by customers. There are issues in which customers are facing some problems due to the present planning of the section like customers are compelled to change stations, for example, if a customer wants to go to Ibn Batuta from Ghubaiba, then the first bus will take the customer to Khalid Bin Al Waleed Road and then from the Metro one can reach Ibn Bauta Mall. This may be frustrating for customers especially if they have to change modes of transport from bus to metro and so on. In order to manage the change and keep the customers satisfied there are different strategies made in RTA like the Marketing campaign, Fair adjustment and survey.

One project under the bus planning section which causes uncertainty is the bus priority lane. This project has completed its first phase. The uncertainty in this project lies in the mistaken anticipation of demand as it has decreased whereas it was forecasted to increase. Around 10% of the time during its entire life cycle the scope of this project has changed due to requests specifically made by senior management. These uncertainties involved in the project are due to the modeling issues in the project that determines the traffic pattern and the resultant levels of congestion.

Steps are taken to overcome problems hence, modeling surveys are conducted. In response to complaints from customers about the quality of the bus services, some extra buses are hired by the department. Meeting are held to improve the situation of bus services in the city and these meetings are held at either the CEO or Director's level. Strategies in the Bus Planning section were prepared following the crisis, hence many challenges were not faced soon enough by RTA.

These steps included involvement of consultants but not the contractors who offer some important means of communicating knowledge, documenting knowledge and applying knowledge in RTA. Several knowledge transfer programs was held in the

organization in which several employees from the planning department are assigned to assist other employees so as to help with communicating knowledge.

5.3 Interpretation of the Results from Interviewee 3, Manager of Road Planning Section

Below is the analysis of the interview with Road Planning section manager using open coding and the axial coding paradigm model:

5.3.1 Open Coding

Using the interview transcripts I have arrived at the codes listed below.

5.3.1.1 Causes

- Based on defined criteria, Dubai map and community utility requirements projects are selected for years and budgets are allocated
- Developers or Government Department like DEWA ask to pause or reschedule project because of scope/schedule overlap *“it impacted our plans so we had to discuss and negotiate with them again”*
- Development were booming *“at that time there were many new ideas and the development of the idea to implementation didn’t take long time”*
- Financial crisis incident *“later suddenly the project was stopped, it is now cancelled”*
- In strategic plan the anticipated population is much more than actual
- Scope changes were high and undetermined *“ they asked us to plan the exit and entrances to the project but other phases are not clear enough”*
- Uncertainty about quantity of material required for construction of road projects

5.3.1.2 Consequences

- Cost of road projects are determined through consumption of material
- Road Projects like constructing local roads are stopped or re-planned
- RTA and other departments negotiate and discuss designs/plans and usually result in changing road corridors
- Phases of implementation of Meydan project (Urban development project) isn't clear to RTA
- Challenges include design issues and ad-hoc requests and being unaware of its existence when road plan were discussed and approved *“other phases were not clear enough to us this project is completed from our point of view”*
- RTA is struggling to cope up with demand in Dubai rather than focusing on actual traffic enhancement matters and reducing congestion
- Deira Palm Bridge project stopped and cancelled and other developer paused their implementation to rethink about execution of plans
- Majority of projects are of medium complexity but interdependency is high
- Some unrealistic projects requirement are rejected *“Requirements of Palm Bridge were rejected by us”*
- Dubai investors strategic development project are complicated in nature as they usually bring unique style and theme

5.3.1.3 Context

- Developers Projects Impact RTA Plans
- Drop in demand due to financial situation slowed down development projects

5.3.1.4 Strategies

- Deciding on projects for execution based on certain criteria

- Review and prioritize projects of developers before implementation
- Developers revisits plans and decide which project to be holded/paused
- If cost is high, margin strategy differs than when cost is low
- Committees and teams formed as a policy for effective communication

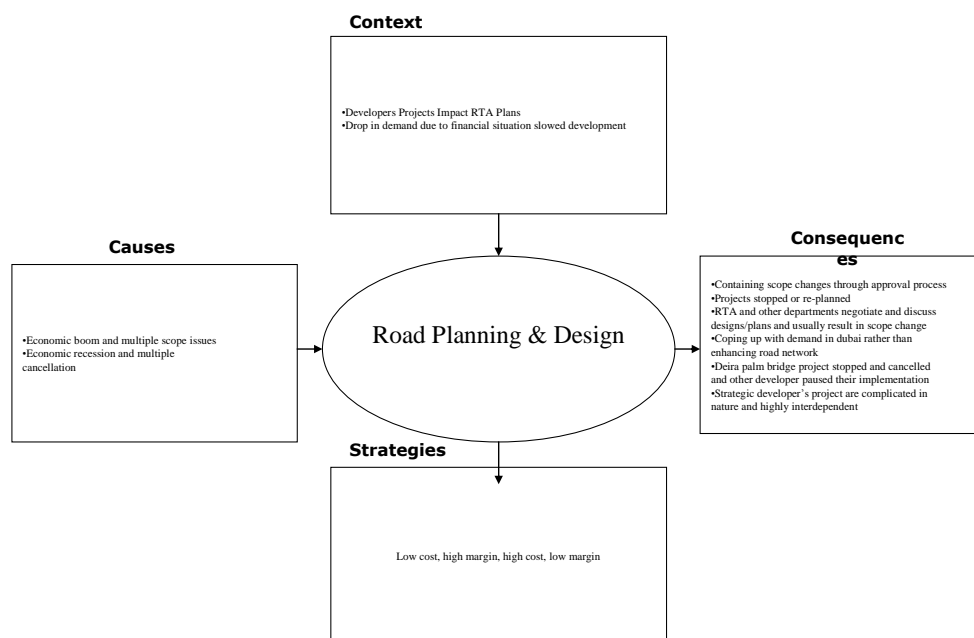


Figure 19: Interviewee 3 Axial Coding

The interview with the members of Road Planning department talks about various uncertainties involved in the projects within the department, for example, in the case of the Meydan Project, the scope of the project was changed and rescheduled. This uncertainty existed because the developer who had a plan along with RTA had a different one for the same location. Uncertainty did not end at that point. Even after the completion of the first phase of the project customers requested a re-design. Responding to ad-hoc changes for the design was the main challenge. One consequence of these changes is that it has had an impact on another project in which the high uncertainty involved caused the biggest loss; Palm Deira Bridge was cancelled. “The uncertainty level in the Meydan Project was said to be of medium level and the type of uncertainty occurred, I interpret, was decisional. However, in

case of Palm Deira Bridge analytical uncertainty occurred and it was a highly difficult project to execute due to stakeholder commitment which declined with the financial crisis”

In order to overcome the uncertainties involved in this project a proper alliance with the consultants and continuous negotiation had to take place. Knowledge communication for both projects was carried out through weekly meetings; 50 percent of the experience was documented and 50 percent was of a tactical nature.

5.4 Interpretation of the Results from Interviewee 4, Manager of Bus Intercity Services Section

The below is the analysis of the interview with Bus Intercity Services section manager using open coding and the Axial coding paradigm model:

5.4.1 Open Coding

Using the interview transcripts I have arrived at the codes listed below.

5.4.1.1 Causes

- Public bus return trip from Fujairah to Dubai was empty “*the problem was in return trip from fujairah to Dubai empty most of the time*”
- Other transportation departments involvement in same industry makes competition high
- Fujairah Police and transport department head are the same person “*the problem now was obvious to us...police head same as transport chairman*”
- Plans of best bus service offering in terms of luxurious, comfortable and world class standards

5.4.1.2 Consequences

- Partners (Fujairah Transport) didn't give positive response and broken communication
- No revenue and added operational cost due to for empty bus operation
- Issues to approving contract
- Stolen ideas of RTA and presented them under their own name *“we have learnt a lesson that we didn't repeat with Al Fujairah...”*
- Task difficulty is high and interdependency is high
- Additional penalties and fines and violation tickets and causing unnecessary disturbance for service *“for instance other emirates might not approve us taking passengers”*
- Target can be reached if demand stays as expected

5.4.1.3 Context

- competition between transportation departments causes obstacles in initiative implementations

5.4.1.4 Strategies

- Department shrinked and international transport section got cancelled
- Market services to riders such as “Coach” luxury passenger bus
- Alliances with private companies such as cars, al ghazal
- Time based bus operation between emirates
- Testing routes readiness to find shortest path
- Pre-agreed revenue models
- Alliances that we have with Abu Dhabi without revenue sharing but it is time based. Passengers insurance operating cost all is responsibility of the other party.

- Fixed price with "Al Ghazal" 60% us 40% them
- Fixed price alliance I incur all costs operational, buses..act and only we share revenue for passenger 60% to us and 40% to them (are all costs operational, buses..., eat & only

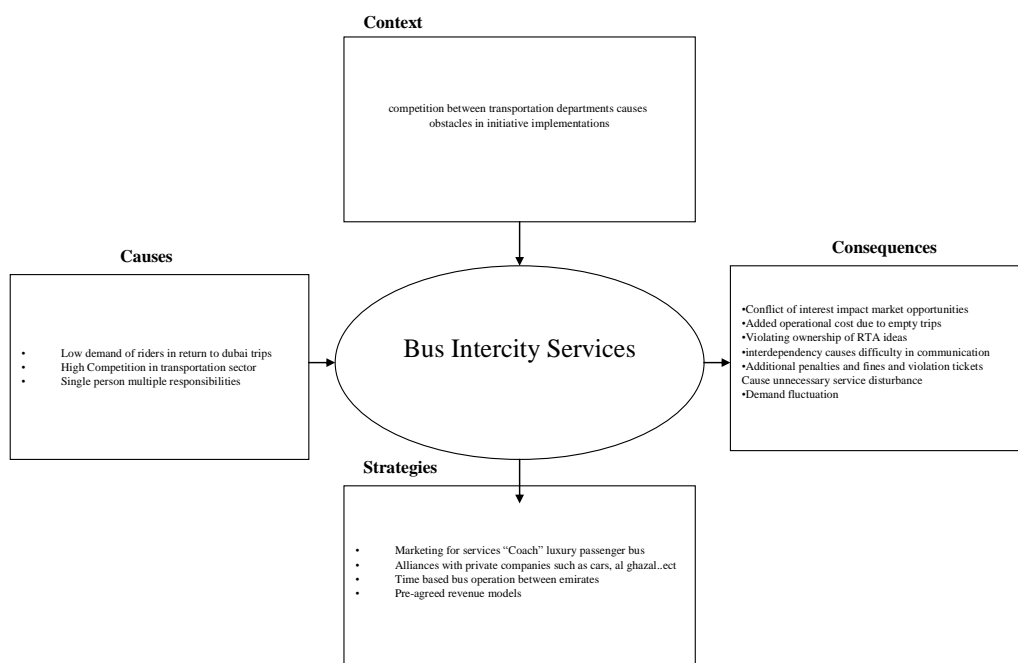


Figure 20: Interviewee 4 Axial Coding

This interview talks about uncertainties of the intercity section. One project with a high level of uncertainty in this section was operating on the Al Fujaira Route. Fortunately, it has been completed. But its initiation faced lots of problems and one of the main problems was that the return trip from Dubai to Fajarah was almost empty thereby making a huge loss and doubling the operational cost. This project had high interdependency because it was dependent on various internal and external departments where local competition is high. The difficulty level for the execution of the project was 6 out 10, i.e a medium level of difficulty. High dependency on the Strategic Planning department was present. The same problem occurred with Ras AlKhaimah Project but the project could not be successful.

In order to overcome this problem, operation of the project was outsourced to a semi government company Al Gazal based on a partnership and revenue model of 40% percent to the government and 60% to the private entity. Decision based and capacity based uncertainty occurred which means that all problems were tackled with good decisions and strategies. Periodic meetings occurred for knowledge sharing with strong communication level with the teams.

5.5 Interpretation of the Results from Interviewee 5, Manager of Traffic Engineering Section

Below is the analysis of the interview with the Traffic Engineering section manager using open coding and the Axial coding paradigm model:

5.5.1 Open Coding

Using the interview transcripts I have arrived at the codes listed below.

5.5.1.1 Causes

- Traffic pattern study indicate heavy trips from Sharjah to Dubai “take in for consideration many people travel from Sharjah to Dubai”
- Risks and issues identified for priority lane are traffic congestion on other roads, high cost of implementation and 10% expected decrease in congestion “*PTA CEO no buses are available and barely enough for feeder*”
- Attitude of core strategic planning team “like a thing that need to be done and get over with”
- Lack of knowledge with core team of strategic planning “*they didn’t have transportation background*”
- Difficulty in coordination with partners “coordination with dubai police which was challenging”

- Belief of individual that Salik will not solve traffic issue but rather generate revenue *“fees was low and will not shift demand to public transport”*
- Free gates are alternative to paid gates
- Lacking stability in Salik due to bugs in system”
- Challenges faced in integration of billing system
- Financial crises
- Impact of traffic study and change in traffic is observed in long term

5.5.1.2 Consequences

- Express lane initiative is suggested
- Project of priority lane didn’t get approved
- Employee unsatisfied with strategic plan
- Resistance toward Salik implementation
- People might turn to free gates than to pay which will not shift demand to public transport use
- Technological challenges and changes in Salik project “technology is implemented first time...another frequency that was luckily compatible with equipment”
- Strategic reports does not reflect accurate and realistic results *“annual operational planning report does not reflect realistic results”*
- Slow down the speed of development and observe traffic patterns

5.5.1.3 Context

- Satisfaction level of strategic plan outcome is low
- Impact of urban development on traffic flow is observed on long term

- Easing congestion (priority lane) isn't priority when compared to shifting demand to public transport (salik)

5.5.1.4 Strategies

- Slow down speed of development and focus on traffic impact study “financial crisis is a gift for us”
- Better coordination strategies

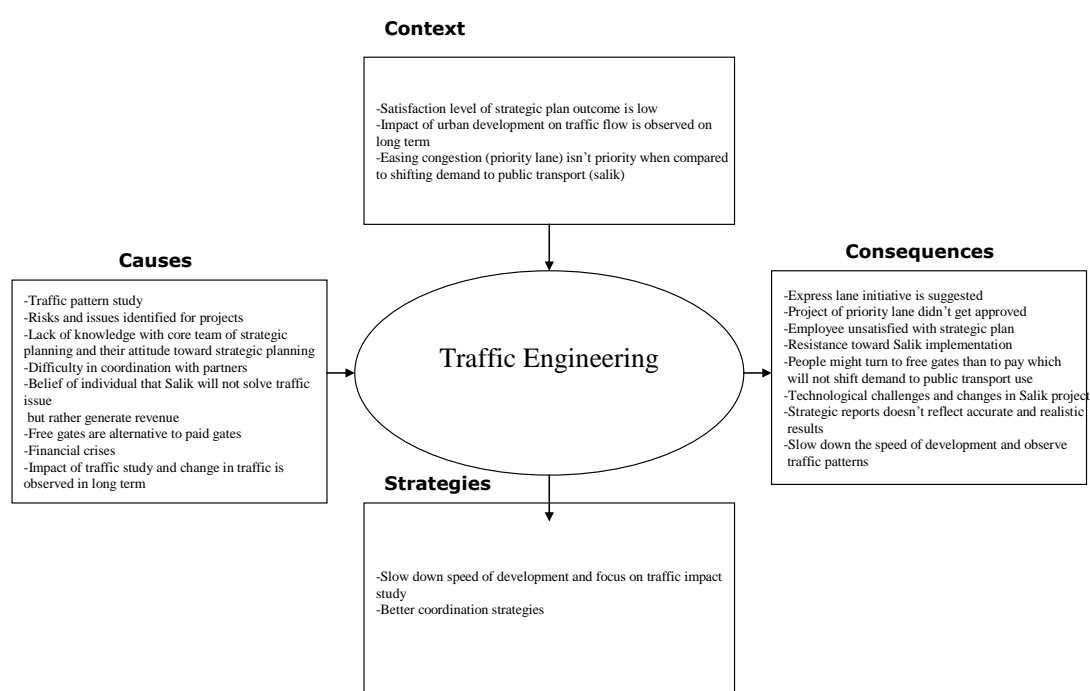


Figure 21: Interviewee 5 Axial Coding

This interview talks about uncertainty involved in the Traffic department of RTA. A principal example of such projects is the Express Bus Lane Project, a non-stop express way that takes passengers directly from Sharjah to Abu Dhabi which is on hold at present. There are various issues which caused uncertainty, for example, increase in the traffic in the other lanes for private vehicles, traffic congestion and the high cost implementation. Another project in this section is Salik which has fortunately

been completed. But uncertainty associated with this project was also highly complicated which involved system bugs, technological problems, low fees and lack of increased demand and change towards public transport.

In order to overcome these problems, meetings were held three times each week to remove strategic uncertainty. There was a high level of knowledge sharing among the departments. Knowledge is explained from its basics. There are two forms of knowledge evident in the department of RTA, namely, tacit and declarative. Basically, a strategic analysis of the problem was conducted.

5.6 Interpretation of the Results from Interviewee 6, Manager of Bus Operations Section

The below is the analysis of the interview with the Bus Operations section manager using open coding and the Axial coding paradigm model:

5.6.1 Open Coding

Using the interview transcripts I have arrived at the codes listed below.

5.6.1.1 Causes

- Demand forecast resulted in exaggerating population growth
- Unplanned opening of Al Ruwya Station in parallel to metro green line 9-9-2009
- Interdependency on others private/government entities and internal agencies and sectors as well
- Unclear financial objectives

- Safety issues identified “fence very low pedestrian jump in just to cross to the other side” were taken lightly by management [5]

5.6.1.2 Consequences

- Procurement of 128 buses not yet in operations and routes are cancelled due to demand fall “*we have 918 buses in total and about 128 need to be put in operation*”
- Challenges in mobilizing resources to provide feeders for metro 9-9-2009 “*we had to squeeze all the resources to complete Al Ruwaya depot*”
- Time consumption and difficulty in coordination
- Priority of project is high since this project feed into mega project (metro) “*if metro project wasn’t dependent on this project the priority of this project might have been low*”
- Determining pricing/fares of bus ride with high uncertainty of what is best suited fare based on bus type
- Create situation were threat to assets and risks of theft is high

5.6.1.3 Context

- Project interdependency determines project priority
- Asset safety issues taken lightly by management

5.6.1.4 Strategies

- Alternative ideas were raised such as reusing workshop spaces and renting other depots cheaper than building new one which is time consuming
- Cancel low demand routes-running at night
- Open door policy

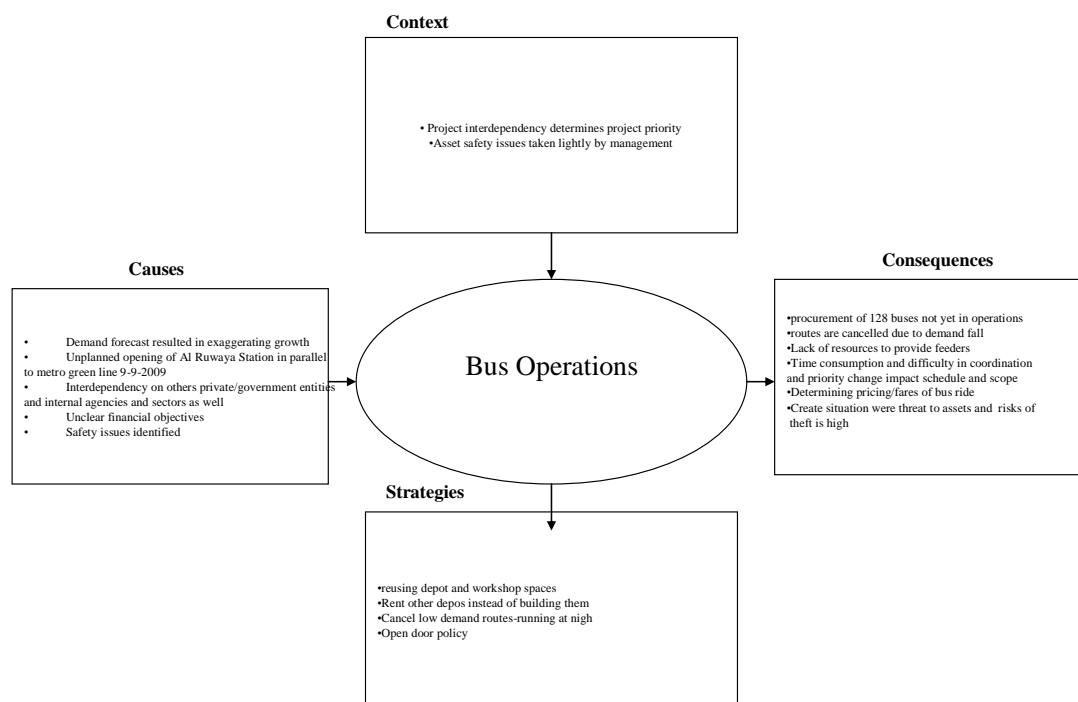


Figure 22: Interviewee 6 Axial Coding

The interview with the Bus Operations section reveals uncertainties involved in the projects tackled by the section. It involved several projects in which buses were used in RTA and in addition are rented external to RTA. The main area of uncertainty occurred in deciding whether the Al Ruwaya station will be opened in less than a year's time or not, because the opening of the Metro project depended on its completion. Interdependency in the project was very high and the priority of this project changed from low to high due to project and task interdependencies. This was a type of strategic uncertainty created by uncertainty in pricing and fares for the buses. Uncertainty was caused by low passenger demand for night trips.

Several meetings were called for section managers in order to put forward improvements in the knowledge area within their section. Fixed construction contracts were carried out with normal contract and procurement policies.

5.7 Interpretation of the Results from Interviewee 7 , Manager of Mobility Management Section

Below is the analysis of the interview with the Mobility Management section manager using open coding and the Axial coding paradigm:

5.7.1 Open Coding

Using the interview transcripts I have arrived at the codes listed below.

5.7.1.1 Causes

- Initial survey were conducted without considering facility utility capacity “the capacity had to be increased in order to allow us to rent the offices”
- Unavailability of funds due to economic recession
- Unavailability of utility in to be rented facilities (bus stations office space)
- Ownership and execution responsibility are not defined clearly making communication difficult “it is a joint effort between our department and commercial and investment and finance department”
- Law concerning school bus standards wasn’t known to all schools/institutes

5.7.1.2 Consequences

- Discovered electricity capacity limitation
- Scope change of project (renting bus stations for investors) than the originally agreed on “ *for instance we didn’t have enough fund to re-design the building to look like metro building especially under current situaiton*”
- Raises cost of operations including cost of diesel

- Coordination and extra fund investment required to prepare facility and increase utility capacity to accommodate any business requirements “*we discovered that we will require additional funds to support this project*”
- Coordinate with internal and external department for issue resolution and ensuring flow of information
- Difficulty in raising tender on time
- Marketing campaign were conducted with brochures
- Resistance of public

5.7.1.3 Context

- Lack of governance system

5.7.1.4 Strategies

- Involving manufacturers in building school bus model
- Fair estimation per student is 400AED

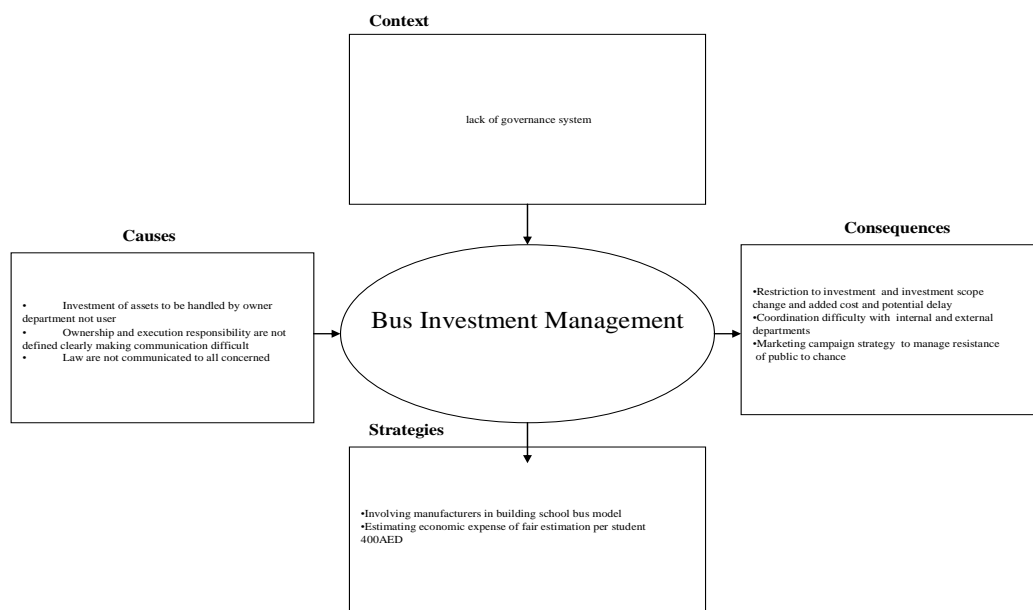


Figure 23: Interviewee 7 Axial Coding

The main role of this section is to find new opportunities for increasing revenue, decreasing operational cost and increasing customer satisfaction. Interviews with the Mobility Management section took place to discuss uncertainties involved in the projects of this department.

In Gold Souq, Subkha, Satwa and Al Ghusais, there is around 500 sq feet unutilized space which can be used for renting. Renting is necessary to generate revenue. A major source of uncertainty involved in this project occurred due to the fact that electricity was limited and funds were needed to get electricity from DEWA. Enough funds were not available to re-design the building and increasing utility capacity was out of scope. Uncertainty was also associated with a time deferment of around 1 month due to coordination issues. The difficulty level in managing such uncertainty with this department is around 7 on a scale of 10. There was a high level of dependency in this project due to commercialization and investment for the building and facilities as well.

This uncertainty mainly depended upon analytical decision and sampling and therefore a statistical environment was created in order to obtain and monitor the demands of the customer.

5.8 Interpretation of the results from Interviewee 8 Mohd Yousef, Manager of Road Construction and Supervision Section

Below is the analysis of the interview with the Road Construction and Supervision section manager using open coding and the Axial coding paradigm:

5.8.1 Open Coding

Using the interview transcripts I have arrived at the codes listed below.

5.8.1.1 Causes

- Construction area not defined clearly on land plot causes to dig experimental holes in ground to minimize technical risks “determine the exact location and the corridor service ducts”
- Constructing road without accurate defined areas measurements “when a project is planned on an area which sometime violate personal propriety of individuals wall or house”
- Difficulty in mobilization of resources ex.DEWA inspectors
- Economic recession
- Frequent variation in contracts

5.8.1.2 Consequences

- Schedule delay and compensation to individuals “In parallel 88/1 road project starting from Doha road to Jafza road we faced the issue....we had to dig experimental holes in locations for testing and the project got delayed”
- Road built violation corridor services or tunnels which goes above level of water
- Put unrealistic expectations
- Change request is approved by chairman due to missing part or due to missing prices
- High interdependency

5.8.1.3 Context

- Unforeseen environmental conditions pose a challenge in terms of scope, cost and time
- Management oversee road projects implementation closely and consider them top priority “two only were canceled we continued 37/39 projects”

5.8.1.4 Strategies

- Speeding up decision-making through experiment holes and better supervision and correctly determining construction area
- Circular used to document projects
- Liaison project are determined 3-4 per project responsible for communication and coordination

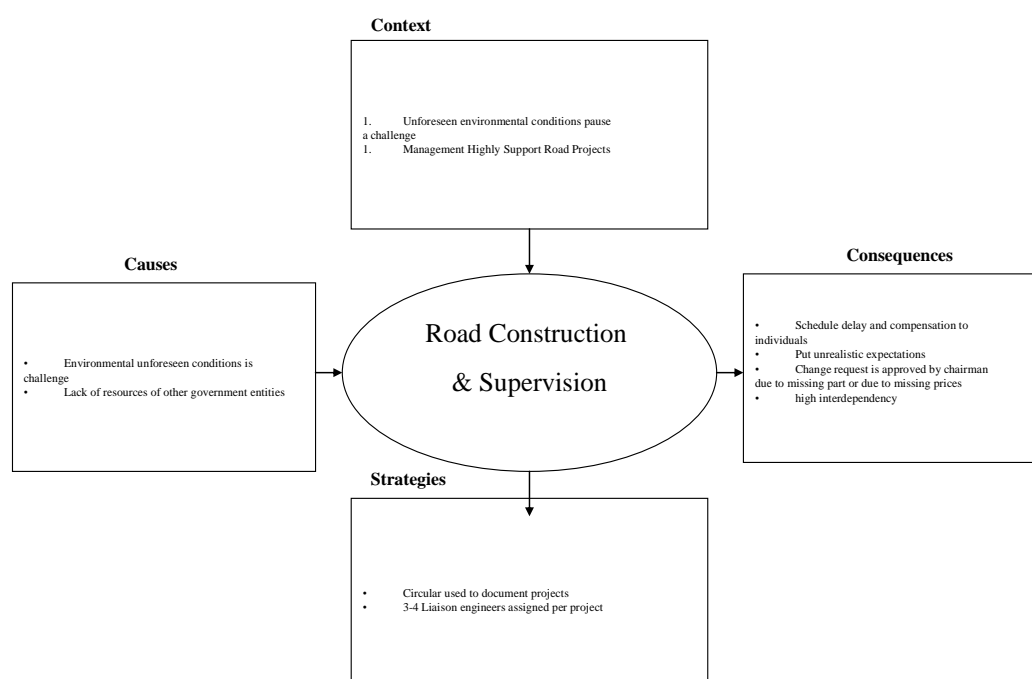


Figure 24: Interviewee 8 Axial Coding

This interview talks about uncertainties involved in the Road Construction, Supervision section and also covers the steps to overcome these uncertainties. All the projects in this section were initiated and delivered. Uncertainties occurred in case of corridor services and determining the exact area of construction to avoid corridor violation and hence paying compensation to individuals unnecessarily. Major difficulties occurred during the project's execution because the numbers of resources in DEWA were less and mobilization caused delay in the project. Design uncertainty was the main cause in execution part-uncertainty, which was high during the project's initiation and lowered as the project progresses. These uncertainties were strategic in nature due to the financial crisis although eventually only 2 projects out of 39 were cancelled.

In order to overcome these uncertainties measurement techniques were adopted which led to co-variation occurring frequently due to an inability to determine the material requirements during the planning phase. Knowledge communication also started in the department in which around 3-4 liaison engineers were involved per

project to ensure proper coordination and communication takes place. About 70 percent the contracts comprised of a tactical nature and around 30 percent were documented.

5.9 Abstract Axial Coding of Traffic Safety, Roads and Buses

Further to the grounded analysis so far conducted, the contents of the data can be categorized into

1. Traffic and Safety
2. Roads
3. Buses

These three areas of business have to focus on unique causes, consequences, context and strategies to resolve issues of uncertainty. For each area, an overview of the axial coding represented using the paradigm model is given and then a selective coding summary is narrated.

5.9.1 Abstract Axial Coding of Traffic Safety

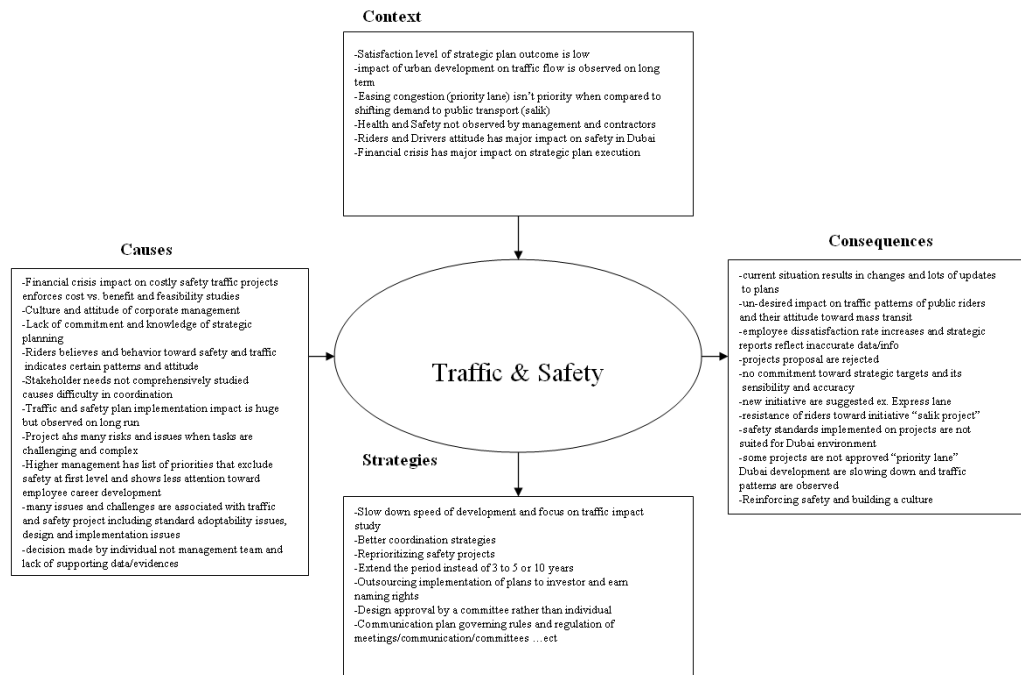


Figure 25: Interviewee 1 and 5 Axial Coding

5.9.2 Selective Coding of Traffic Safety

Roads, Traffic and Road Safety are critical since proper planning of the same yields less fatalities while improper planning will jeopardize lives. The impacts of traffic planning studies and initiatives can be observed in the long run and so management may hesitate to invest in such expensive projects when the results are not of the immediate, "quick win" type. Management are responsible for managing and controlling costs and should conduct cost and benefit feasibility studies to determine the potential of such projects. Among the issues and challenges faced beside management support are the beliefs and attitudes of public riders. An example is the Salik project and resistance of customers toward this initiative considering its revenue generation mechanisms. Additionally, riders or customers prefer using their private vehicles to travel by modes of mass transit.

The emergence of the financial crisis is considered in some ways to be a blessing for traffic and safety in Dubai since the development of Dubai projects/investments are slowing down which opens a door for re-evaluating traffic issues. RTA now has more time to observe traffic flows and ensure safety aspects such as pedestrian walkways as well as offering facilities for people with special needs. Safety aspects such as the pedestrian walk project created long debate and discussion amongst contractors. Many safety standards were claimed to be unsuitable to the Dubai culture and consequently could not be adopted comprehensively.

Many Safety and Traffic projects are considered high risk projects, for example, the Floating Bridge and Salik projects which consisted of many issues and risks that were considered challenging and complex. It has been noted that stakeholder needs weren't studied comprehensively and therefore coordination issues occurred. Further, lack of knowledge of strategic planning and low commitment toward achieving strategic goals created problems for RTA due to inaccuracy of data/information used in specifying the planning targets. It is observed from the interviews that the power of decision-making lies in the hand of individuals not management and lack of data/evidence to support project and organizational decision-making is considered a big challenge for safety.

To overcome the above issues a number of strategies have been adopted. Although the Safety project has an impact in the long run it is considered important. Reprioritization of projects and extending the duration were the strategy for implementation and justifying the additional costs incurred. On the other hand some plans have been tendered to private companies to implement and deliver according to contract for for a number of years in return. The strategy for traffic projects involved observation and evaluation of existing traffic implementation and making improvements to it. Designs are now approved by committees to ensure all parties

are involved it was also suggested to have communication plan and coordination strategies that regulate communication at a very high level to avoid being delayed and distracted by ad hoc requests.

5.9.3 Abstract Axial Coding of Roads

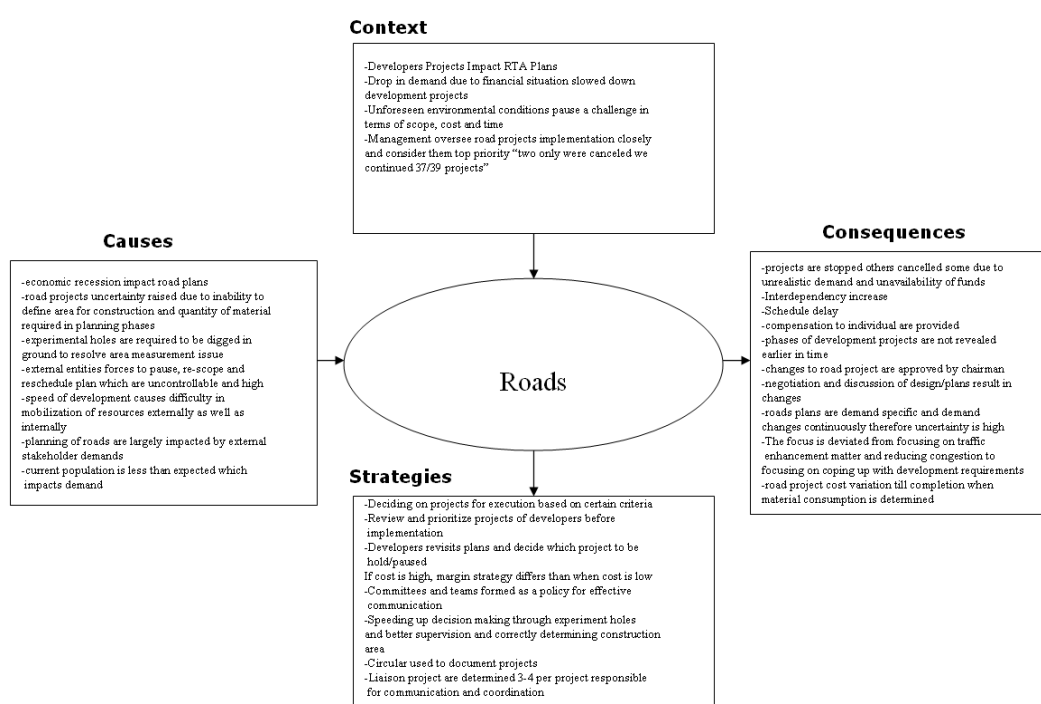


Figure 26: Interviewee 3 and 8 Axial Coding

5.9.4 Selective Coding of Roads

RTAs most expensive assets are roads. The two main sections of Roads are planning and construction. Roads planning is tightly linked with urban planning. Any new development in Dubai that would impact on the RTA Road Master plan R1000 ideally should be reviewed and agreed. This did not happen in recent years when the developers plans were not revealed soon enough avoid planning overlap and

difficulties. The rapid speed of development during the boom caused difficulty in mobilization of resources by DEWA as well as internally in RTA. This high interdependency on external entities, developers and other government entities caused projects to be delayed and re-scoped. The main challenge of Roads project construction is to define the area for construction. This causes extra holes to be dug in the ground to avoid unforeseen conditions. Without these experimental holes roads cannot be constructed, for instance, violating corridors issues may occur such as unevenness in corridor services lane with the bridge (800/6) causes compensation for individuals in the best case scenario and re-construction of roads as a worst case scenario. Variation to road projects happens during the execution phase as the actual consumption of material can not be completely estimated and determined at an earlier stage.

Roads projects are largely impacted by external stakeholders and re-scoping and rescheduling are very likely and are dependent on the result of discussions and agreements. Changes to road projects are approved by the Chairman especially when cost variation is necessary. RTA deviated from completing the road network planned for Dubai based on the road master plan R1000 designed to cope with the urban development and their resultant needs and demands. RTA's road master plan is prepared taking into consideration the current and anticipated population in Dubai following which the road master plan is executed and developers' projects impacted.

With the financial crisis the biggest impact is observed on the developer's plans where a number of projects were paused such as "Deira Palm" and several projects were cancelled and rejected; "Meydan Project" was re-scoped a couple of times but since has been completed. On the other hand, RTA road projects were minimally impacted, in fact, only 2 projects out of 39 projects were cancelled.

The strategies implemented to overcome the above mentioned planning issues are through establishing urban planning committees and mapping the road master plan with detailed urban plans to ensure proper alignment. Secondly, the process is managed through setting criteria for prioritization of projects, persuading developers to revisit plans and prioritizing development projects. RTA now makes more frequent use of committees as a formal mean of communication and negotiation.

Strategies for execution of road projects include technical testing to ensure readiness of the plan for construction. Accelerating the process of decision-making, documenting all projects and formally appointing 3-4 liaison engineers for communication and coordination are other techniques also adopted.

5.9.5 Abstract Axial Coding of Buses

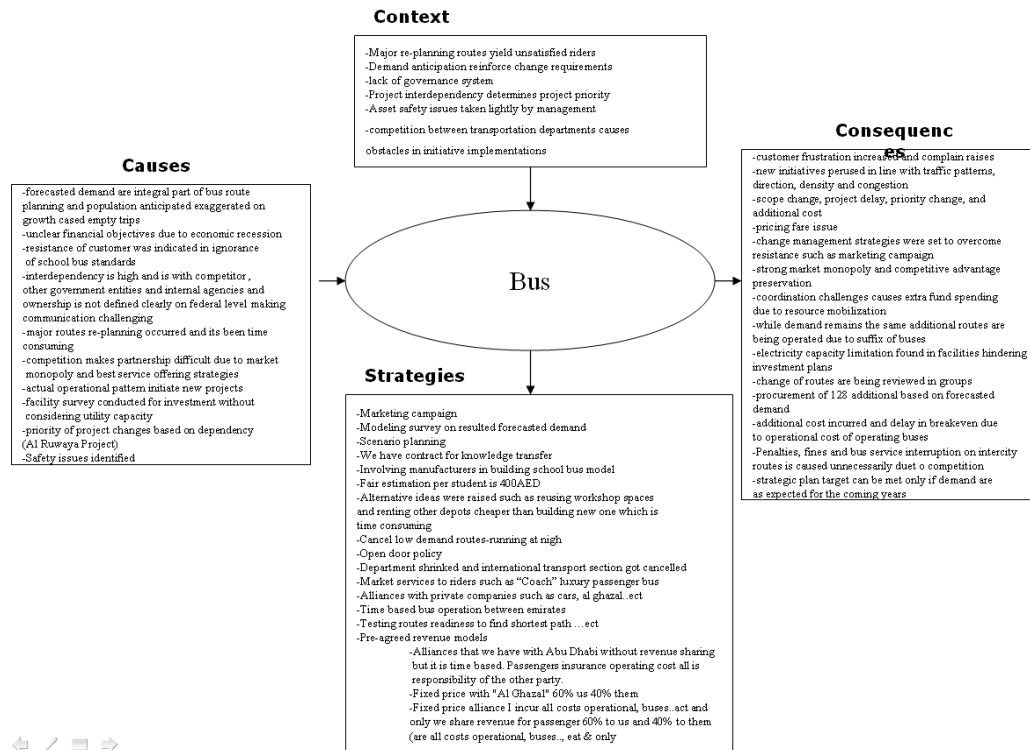


Figure 27: Interviewee 4, 2, 6 and 7 Axial Coding

5.9.6 Selective Coding of Bus

RTA ensures the delivery of bus services through proper planning of bus routes and operating lines and aims to take advantage of revenue generation opportunities wherever possible. Changes to the bus network is based on the demand pattern in the Emirate of Dubai and suggested changes are reviewed and approved by a group of experts. The usage demand of public transport buses remains low due to the small population unlike what was predicted. A major bus network planning/study project was undertaken recently and one of the project objectives was to integrate different modes of transportation such as bus and metro and marine. The changes that were

introduced caused frustration among customers who complained constantly of having to change the mode of transportation in one single trip. The resistance of customers also was clear through ignoring the School Bus law. It was coordinated with manufacturer to produce school buses based on certain criteria for safety and comfort for students riding and stepping down out of vehicles. It was estimated that it was costing about 400 AED extra per student due to implementation of the bus standard as a strategy to overcome the resistance of the public.

Another issue related to the anticipated demand problem is procurement of 128 spare buses. The cost of buses is high and unless they are operational, they will not yield the expected revenue while their value continues to depreciate. The strategic targets can only be achieved if the population of travellers reaches as high as was initially expected and planned. Meeting current demand means operating the existing buses to full capacity while meeting future demand means operating the spare buses and existing buses as per the scheduled routes.

Bus priority lane is one of the projects introduced to operate buses more efficiently. The efficiency of projects is another issue. Bus priority lane is one of the initiatives suggested based on past and current patterns of demand. This is a joint project between the Operation Section and Planning Section. It is observed that the interdependences between bus projects are high which changes the priorities. One notable example is the Al Ruwaya Station project that had its own plan based on the launch of the Metro project on 9-9-2009. The interdependency impacted on the project's scope and schedule. Another project with interdependencies is un-rented spaces in the bus stations. Preparation of such facility for rent also requires coordination between internal and external entities resulting in project delay and extra financial costs and loss of revenue.

Another issue is lack of management support for employees and lack of Dubai management support for RTA. The lack of RTA management support for the Bus Operations Section was observed in a matter related to the physical security of bus depots, this was in spite of recorded incidents. Lack of sufficient management support in Dubai Government was observed through them not approving higher fares thus failing to support achievement of RTA strategic goals.

Operating intercity buses is a complex challenge since operating buses in other Emirates involves seeking approval from their respective transportation departments to allow buses to convey passengers from their cities. These projects (operating new intercity routes) require significant coordination and persuasion. This is extremely difficult when there is market monopoly in transportation departments. As a result of this issue empty buses on a return trip from Ras Al Khaimah and Fujairah is observed. This issue is of a strategic nature because it is at a federal level and the fact that much of the issues of interdependency occur amongst competitors. Such challenges causes losses in operation, unnecessary penalties, and interruption to services due to the lack of adequate and timely approval.

Strategies set to overcome public resistance include marketing campaigns and estimating the costs of implementation of certain standards and laws such as implementing the school bus standard. Strategies set to overcome intercity issues were alliances with private companies, fixed price contracts with Al Gazal company and the application of different shared revenue models, as well as time based operations, with Abu Dhabi transport. Other tactics used to manage issues were promoting RTA services “such as Coach Luxury Service” to other transport departments and reusing workshop spaces and renting other depots instead of building new facilities.

5.10 Open Coding of RTA

Below is the final high level abstraction for the whole of RTA based on a summary from the findings of all 8 interviews.

5.10.1 Causes

1. Financial crisis impact road, safety and traffic projects and causes ambiguity about financial objectives and enforces cost vs. benefit and feasibility studies
2. Culture and attitude of corporate management
3. Lack of commitment and knowledge of strategic planning
4. Riders believes and behavior toward safety and traffic indicates certain patterns and attitude such as ignoring school bus standards
5. Stakeholder needs not comprehensively studied causes difficulty in coordination especially if it is other government entity
6. Traffic and safety plan implementation impact is huge but observed on long run
7. Project has many risks and issues when tasks are challenging and complex
8. Higher management has list of priorities that exclude
9. Road and bus safety at first level and shows less attention toward employee career development
10. Many issues and challenges are associated with traffic and safety project including foreign standard adoptability issues, design and implementation issues
11. Decision made by individual not management team and lack of supporting data/evidences
12. Road projects uncertainty raised due to inability to define area for construction and quantity of material required in planning phases
13. Experimental holes are required to be digged in ground to resolve area measurement issue
14. Speed of development causes difficulty in mobilization of resources externally as well as internally
15. Forecasted demand are integral part of bus route planning and population anticipated exaggerated on growth cased empty trips
16. Major routes re-planning occurred and its been time consuming
17. Competition makes partnership difficult due to market monopoly and best service offering strategies
18. Actual operational pattern initiate new projects

19. Facility survey conducted for investment without considering utility capacity

5.10.2 Consequences

1. Current situation results in updates to plans, delay, priority change and additional costs
2. Un-desired impact on traffic patterns of public riders and their attitude toward mass
3. transit forced on proper change
4. management strategies to overcome resistance
5. Employee dissatisfaction rate increases and strategic reports reflect inaccurate data/info
6. New initiative are suggested ex. Express lane
7. Reinforcing safety and building a culture
8. Some projects are not approved while other project got rejected in feasibility stage
9. Dubai Development are slowing are slowing down and traffic patterns are observed
10. Negotiation with developers and coordination result in design/plan change and causes
11. Challenges in resource mobilization
12. Changes to routes are reviewed in groups and changes to road projects are approved by chairman
13. Interdependency Increase
14. Compensation to individual are provided
15. Phases of development projects are not revealed earlier in time
16. Roads plans are demand specific and demand changes continuously therefore uncertainty is high
17. The focus is deviated from focusing on traffic enhancement matter and reducing congestion to focusing
18. On coping up with development requirements
19. Road project cost variation till completion when material consumption is determined
20. New initiatives perused in line with traffic patterns, direction, density and congestion
21. Pricing fare issue

22. Strong market monopoly and competitive advantage preservation
23. While demand remains the same additional routes are being operated due to suffix of buses
24. Electricity capacity limitation found in facilities hindering investment plans
25. Procurement of 128 additional based on forecasted demand
26. Additional cost incurred and delay in breakeven due to operational cost of operating buses
27. Penalties, fines and bus service interruption on intercity routes is caused unnecessarily due to competition

5.10.3 Context

1. Demand reinforce change and drop in demand due to financial situation slowed down development projects
2. Asset Safet is not observed by management and contractors
3. Riders and drivers attitude has major impact on safety in Dubai and major replanning routes yield unsatisfied riders
 - i. Financial crises and Dubai developers plans has
 - ii. major impact on RTA
 - iii. strategic plan
 - iv. Satisfaction level of strategic plan outcome is low
4. Impact of urban development on traffic flow is observed on long term
5. Easing congestion (priority lane) isn't priority when compared to shifting demand to public transport (salik)
6. Unforeseen environmental conditions pause a challenge in terms of scope, cost and time
7. Management oversee road projects implementation closely and consider them top priority "two only were canceled we continued 37/39 projects"
8. Lack of governance system
9. Project interdependency determines project priority
10. competition between transportation departments causes obstacles in initiative implementations

5.10.4 Strategies

1. Slow down speed of development and focus on traffic impact study

2. coordination strategies
3. Reprioritizing safety projects *and* extend the period instead of 3 to 5 or 10 years
4. Outsourcing implementation of safety plans to investor and granting naming rights
5. Change Management-Design approval by a committee rather than individual
6. Communication plan governing rules and regulation of meetings/communication/committees ...ect
7. Deciding on projects for execution based on certain criteria
8. Review and prioritize projects of developers before implementation
9. Developers revisits plans and decide which project to be hold/paused
10. Committees and teams formed as a policy for effective communication
11. Speeding up decision-making through experiment holes and better supervision and correctly determining
12. construction area
13. Liaison project are determined 3-4 per project responsible for communication and coordination
14. Marketing campaign
15. Modeling survey on resulted forecasted demand
16. Scenario planning
17. We have contract for knowledge transfer
18. Involving manufacturers in building school bus model
19. Fair estimation per student is 400AED
20. Alternative ideas were raised such as reusing workshop spaces and renting other depots cheaper than
21. Building new one which is time consuming
22. Cancel low demand routes-running at nigh
23. Open door policy
24. Department shrinked and international transport section got cancelled
25. Market services to riders such as "Coach" luxury passenger bus
26. Time based bus operation between emirates
27. Testing routes readiness to find shortest path ...ect
28. Pre-agreed revenue models (Alliances, Fixed price with "Al Ghazal" 60% us 40% them

MANAGING UNCERTAINTY IN STRATEGY EXECUTION IN THE TRANSPORTATION SECTOR OF THE UNITED ARAB EMIRATES

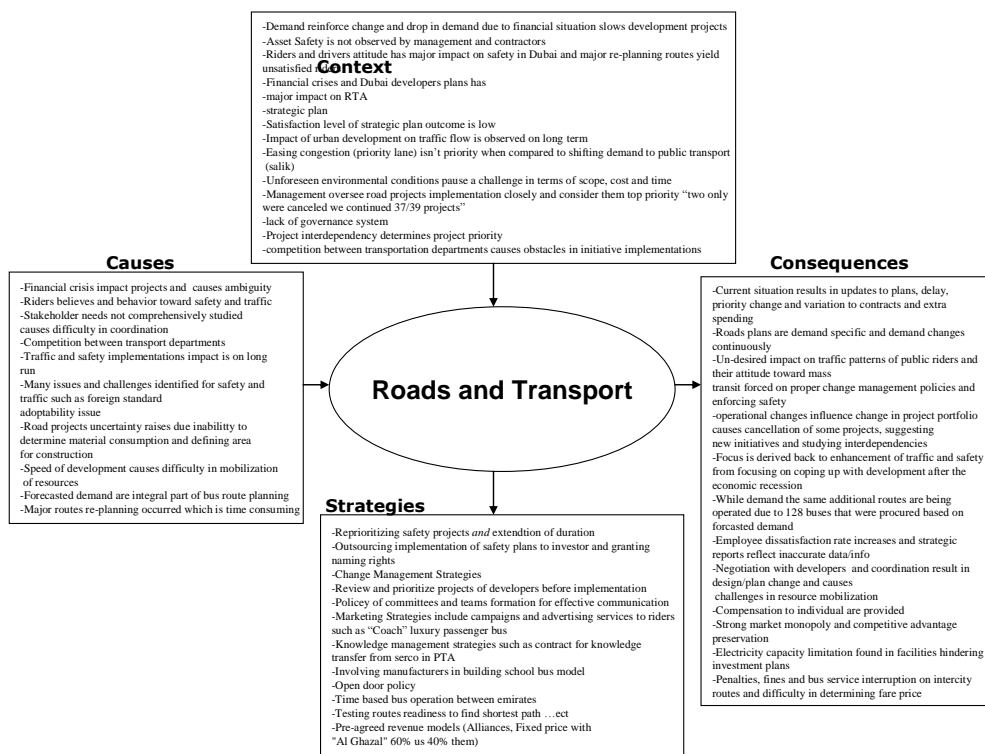


Figure 28: The Paradigm Model of RTA

5.11 Selective Coding for RTA

Uncertainty arises in RTA due to many reasons. The financial crisis is one of the biggest factors driving uncertainty in the transportation sector. Economic recession is an external factor which has impacted on everyone, suppliers, customers and the systems in the United Arab Emirates.

Factors related to suppliers are purchasing, manufacturing and marketing. From a series of interviews, it is observed that suppliers are currently facing increasing fuel prices which consequently increases bus operational costs. While the economic recession indicates that the population of users of public transport may increase as private travellers migrating to public modes of transport due to the situation, overall demand is however expected to remain the same if not decrease. This indicates that new bus procurement to meet demand is unlikely to be executed causing additional operational costs. This suggests that the prices of private vehicle ownership needs to be restudied in order to identify how best to shift demand to public transport and

create demand through other strategies. Fare strategies are also associated with uncertainty due to breakeven financial objectives.

Suppliers of transportation services compete between different emirates dominating the market and preserve their rights to operate in their own region. Such competition creates interruptions to intercity services and leads to unnecessary penalties and fines. Additionally, it impacts on overall revenue and adds to operating costs for running empty trips.

RTA is a service provider organisation and hence has been especially challenged by the financial crisis, some projects were extended and others were paused. RTA plays a major role in providing access to developments such as Meydan and Palm Deirah. Such projects have a major economic impact on the emirate of Dubai and on the UAE as a whole. One obvious issue for the development in Dubai is that the developers' plan is not part of the urban planning systems which raises overall uncertainty. Projects are ad-hoc arising from RTA's original plans and integrating developer's plans with RTA's Road Master Plan R1000 creates additional time expenditure and effort, and overall is a very consuming exercise. The demands of developers have to be managed and sometimes these demands are not realistic causing difficulties with coordination, and leading to many discussions, creating difficulties in reaching common agreements, leading to big challenges and frequently wasting time. In conclusion, developers plans impact on RTA road plans dramatically due to scope overlap, delays in implementation, cost variation and compensation that must be made out to individuals.

In addition to all of the above, uncertainty is also high due to technical difficulties in road projects, inability to determine material requirements from suppliers and exact areas for construction causes violation to transport corridors and invasion of the personal properties of individuals. Interdependency on other government entities

such as DEWA for resource mobilization is also another challenge facing many strategic projects.

Customer satisfaction is observed to be low with introduction of new initiatives and laws. With customer satisfaction identified as an important consideration for RTA, and one of its organizational strategic goals, external and internal change management strategies were established. For example, with the introduction of paid gates, an alternative free gates system was introduced. Similar to the introduction of the school bus standard, an agreement with manufacturers was signed on specification and cost per student were estimated. Customer frustration was observed with re-planning of the route where passengers were forced to use more than one transportation mode to travel from point A to point B. Marketing campaigns were established and many surveys were conducted. Other strategies to manage changes internally were also introduced, such as approval by the group rather than individuals.

Road traffic and road safety is also another dimension to the problem. Road safety does not attract the attention of higher management due to its limited impact in the short term. This also poses a concern when quick-win types of projects are preferred since their benefits are realized immediately. This is applicable to safety projects where implementation of foreign safety standards were not suitable for the Dubai transport environment. Convincing management of the importance of safety is also a challenge due to lack of information and supporting studies which are costly but valuable aids to decision-making.

In general project portfolio of RTA was impacted dramatically by the economic recession leading to cancellation of project, initiation of other projects and restudying the feasibility of projects in the pipeline. Lack of information, lack of knowledge and

lack of support from management and lack of commitment were factors of uncertainty observed through the series of interviews.

To overcome identified issues, many tactics, strategies and policies were implemented. Among these strategies were outsourcing of implementation of safety plans, marketing strategies and investment strategies. An example of investment strategies is the marketing campaign for coach services to other emirates as well as the marketing campaign for school bus standards. Policies were also introduced to support changes such as an open door policy, change management policy, formation of committees and teams which support effective coordination and communication. Strategies to manage the project portfolio were also introduced such as extensions to projects, reviewing urban development proposals and prioritizing projects. Tactics were also implemented by units including allocating 3-4 liaison engineers for coordination purposes in road, time-based intercity operations between emirates and other tactics. For more details please refer back to Figure 27.

6 OPEN CODING FAMILIES

In this section the analysis is done based on Glaser (1978) which suggest using opening coding families This coding is implemented on the interview results as a second approach to analysis.

6.1 The Six Cs

Causes and core sources of uncertainty are summarized in the listing below:

1. Financial
2. Technical
3. Competition and Coordination
4. Lack of Information and flow of the same
5. Interdependencies between projects
6. Dependency on other government entities
7. Support of Management
8. Demand forecast based on expected population
9. Dubai Developments not integrated to urban planning
10. Attitude of consumer and awareness

6.2 Process

Stages or phases of uncertainty throughout the lifecycle of a project is changing. It is observed that uncertainty is high at the initiation phase of the project and the uncertainty level is gradually reduced as we progress toward the end of the project.

An indicative project is the road construction project where the uncertainty about defining area (technical) and uncertainty about consumption of material exists. With the completion of the project the consumption of material is finalized therefore cost variation is less likely to occur. Moreover final state of the constructed road in

corridor determines any violation much earlier before completion in cases where they occurred. Other examples also demonstrates the same pattern. Consumer complaints and dissatisfaction result from improper planning or execution of projects and the uncertainty in such projects is likely to be high due to direct impact on consumers/passengers.

6.3 Degree of family

Considering the degree or the extent of uncertainty in an organization, it can be classified into 3 main categories in terms of visualizing future outcomes:

6.3.1 Manageable

Consist of two degree of uncertainty that are considered manageable, first the lowest extreme is when the future is easily predicted as one ultimate future, regardless of multiple existing situations, the vision and prediction goes line in line. The second highest extreme/degree of uncertainty imposes discrete scenarios and a limited set of future outcomes could be 2 or more, but based on existing defining elements that are changing and therefore the existing strategies will have to change, however the future is predicted and therefore is considered to be manageable.

6.3.2 Convertible

The future is not determined but is potential results that also indicate that the organization is having the right strategies generally; however, due to other changing elements it is difficult to determine the final future outcome

6.3.3 Un-manageable

Imposes a limitless range of future outcomes with which planning is not possible

Below are indicative points for uncertainty degree in RTA:

- Interview 2 -Model choice survey to determine “survey to create model & we run that, the outcome of data was validated & we ran metro scenario & we created new network routes”-dynamic path to each outcome including trigger events (Manageable)
- Interview 2 -3 Scenario planning is conducted for financial outcome and achieving financial sustainability in 3-5 years based on expected population (Convertible future)
- Interview 1 -Floating bridge options valuation/Risk Assessment of each outcome, “there were choices given for this special type of bridges Safety kind of issues were planned & risk management plan were taken” (Manageable)
- Interview 7 Mohd Janahi-Porter’s 5 Forces-Bargaining power of fuel suppliers, “Last month again they asked to decrease 20% of budget....and changes in the market is massively impacting us such as cost of diesel” (Manageable)
- Interview 7 Mohd Janahi- changes in legislation laws-“Dubai government has published a law(sheikh Hamdan) for public buses specialized to transfer students” (Manageable)
- Interview 4 -Porter’s 5 Forces-threats of substitute products by competitors and oligopoly market-from other emirates transport departments for operating intercity routes (Manageable)
- Interview 1 -Industry/world structure and operating condition-“ then we adopted international standard that might not be best suited for Dubai. we need to have something specific for us” safety standard are not applicable (Convertible)

6.4 Type family

There are different types of uncertainty determined in RTA which are: decision, model, analytical and sampling type. Below is a list of the uncertainty types that exist

in RTA, its characteristics, particular outcomes of the situation analysis of each type of uncertainty and a few examples from RTA:

6.4.1 Decision Uncertainty:

Factors like cost measure, travelling expense, path to choose from, and climatic conditions. The main factors relate to intuition rather than facts in transport sector. Specific examples from RTA:

- Fair estimation issue
- Empty trip expense
- Testing new intercity bus routes

6.4.2 Model Uncertainty:

Transport service delivery method/redundancy availability such as risk of pathways, correct state, computing shortest path. Specific examples from RTA:

- Technical floating bridge
- Salik gate and alternative are the free gates
- School bust standard model

6.4.3 Analytical Uncertainty

Uncertainty like biasing, poor detection in analytical results on which choice of transport mode is determined. Specific examples from RTA:

- Vism modelling tool used for bus route planning
- Modelling survey
- Inspection system for floating bridges-cameras & people

6.4.4 Sampling Uncertainty

Degree of sample rating we have from existing condition trends of population.

Important to know current market trend and share of organization. In RTA, it is important to determine demand pattern and traffic flow. Specific examples from RTA are:

- Sample used in studying demand 1006 individual from total population considered 10% only
- Demand pattern and traffic flow

6.5 Strategy Family

Strategies to manage uncertainty and specific tactics are identified throughout all projects. Below is a list of all of the strategies and tactics identified from the interviews.

6.5.1 Strategies

- Outsourcing implementation of safety plans to investor and granting naming rights
- Change Management-Design approval by a committee rather than individual
- Review and prioritize projects of developers before implementation
- Reprioritizing safety projects *and* extend the period instead of 3 to 5 or 10 years
- If cost is high, margin strategy differs than when cost is low
- Committees and teams formed as a policy for effective communication
- Open door policy
- Marketing campaigns and plans
- Modeling survey on resulted forecasted demand
- Scenario planning

- Contract for knowledge transfer
- Involving manufacturers in building school bus model
- Fair estimation per student is 400AED
- Cancel low demand routes-running at night
- Department shrunk and international transport section got cancelled
- Market services to riders such as “Coach” luxury passenger bus
- Time based bus operation between emirates
- Pre-agreed revenue models
- Alliances that we have with Abu Dhabi without revenue sharing but it is time based. Passengers insurance operating cost all is responsibility of the other party.
- Fixed price with "Al Ghazal" 60% us 40% them
- Fixed price alliance: RTA incurs all costs operational, buses..act and shares revenue for passenger 60% to us and 40% to the other party
- Are all costs operational, buses..., eat & only

6.5.2 Tactics

1. Slow down speed of development and focus on traffic impact study
2. Coordination strategies
3. Communication plan governing rules and regulation of meetings/communication/committees ...ect
4. Deciding on projects for execution based on certain criteria
5. Developers revisits plans and decide which project to be on hold/paused
6. Speeding up decision-making through experiment holes and better supervision and correctly determining construction area
7. Liaison project are determined 3-4 per project responsible for communication and coordination
8. Alternative ideas were raised such as reusing workshop spaces and renting other depots cheaper than building new one which is time consuming
9. Testing routes readiness to find shortest path.

6.6 Interactive Family

The uncertainty of a project increases when it is interdependent with another project.

- It is observed for Metro project that the uncertainty was high due to major interdependencies on other projects such as Al Ruwaya Station opening.
- It is also observed that interdependency changes the priority of projects which means that high uncertain project are highly dependent and important.

Unimportant and highly interdependent and high uncertain project might not be worth execution.

6.7 Cutting Point Family

Financial crisis is the cutting/turning point in uncertainty. The emergence of financial crisis is a turning point in uncertainty where it dramatically increased due to lack of funds and cancellation of projects and instability, delay in payments and extension of other projects. It is also observed that external Dubai developers projects are paused, cancelled and kept on hold.

6.8 Cultural Family

Consumers/passengers' attitude, trend and behavior largely impact transportation sector and certainly uncertainty. Social beliefs of consumer/passengers and their attitude impact on demand and therefore transportation planning overall and causes uncertainty to increase or reduce depending on the trends and attitudes.

6.9 Consensus Family

Multiple contract and agreement exist between employees and organization, supplier and contractors. In addition, there are investment contracts with investors and with other emirates as well. Risks are determined based on contract type and uncertainty is measured through level of risks, RTA is to bear based on cost calculation.

7 FINAL CASE NARRATIVE

The causes and core sources of uncertainty are: financial, technical, competition, coordination, lack of information, project interdependencies and management support. RTA's demand forecasts were based on expected population growth and Dubai's buildings and infrastructure developments have not been adequately integrated with urban planning. Recently, more effort has been made by government and corporate organisations to influence the attitudes of consumers and increase public awareness of transportation issues.

In general, uncertainty is high at the initiation phase of any individual project and gradually reduces as it progresses towards the end. This is noticeable especially in road construction projects. The nature and extent of uncertainty can be subdivided into three categories: manageable, unmanageable and convertible. Manageable projects tend to be characterised by the relevance of formal modelling and planning techniques. Convertible futures are ones where some approaches to leadership and strategising are helpful in change management and advancing project progress towards long-term goals, for example, project management through scenario planning methods.

RTA project uncertainty faces a range of factors such as cost estimation, travelling expense, climatic conditions, and the necessity of management and employee experience in the transportation sector to exercise intuitive reasoning skills. Conditions of uncertainty in RTA are monitored and predicted using techniques such as fair estimation, empty trip expense modelling, trialling intercity bus routes, transport delivery methods, evaluating school bus provision, monitoring Salik computer data, and provision of complex technical engineering on innovative construction projects such as The Floating Bridge. Other techniques used to predict

uncertainty of transport mode and analyze it include: bus demand modelling, surveys, inspection systems and sampling percentage of population the most representative.

RTA has adopted business strategies and tactics that have proved to be most beneficial in resolving current issues. Some of the powerful strategies are outsourcing the safety plan implementation, marketing strategies and alliances with other emirates' transport departments for time based operation like with Abu Dhabi. Policies were also set for project prioritization, transparency, change approval and coordination and communication policies such as committee and multiple team formation.

Work tactics were part of daily operations such as cancelling night bus lanes, introducing new initiatives such as bus priority lane, speeding up ground tests (experimental holes in ground) in road projects and involving manufacturers in newly introduced laws and estimating charges per consumer.

Innovative ideas were proposed to overcome financial issues such as renting depots, better utilization of current spaces, taking advantage of investment opportunities and merging units.

Uncertainty of internal and external environment elements is determined through interaction of these elements or project. The complexity of the projects is dependent on the quantity of difficulty of tasks, while the stability is determined by the frequency of task change that determines the uncertainty of the project environment. Interdependency between projects raises the chances of changes to the project scope and schedule. On the other hand, it might change the priority of projects from low to high as in Al Ruwaya Station Project; interactions of environment elements are deciding factors in determining project priority.

A noticeable cutting point in uncertainty of transportation sector in Dubai rose radically after the announcement of financial crisis in November 2009. Many projects were cancelled, paused, delayed or extended. This cutting point also impacted attitude and behaviour of the beneficiary to a large extent which caused increases in uncertainty due to difficulties with prediction.

The RTA believes strongly in consensus. Most of the decisions are taken with support and agreement of the group rather than based on individuals. Discussion and persuasion impacts on individual's thoughts, but the final say rests with the group. For example, project priority is decided on based on consensus between owners and committee members. This activity is conducted at the beginning of the year to approve budgets and allocate resources. Any project that failed to get approved by consensus does not proceed. One of the specific projects is the express lane initiative proposed by the Traffic and Roads Agency which didn't gain approval from other CEOs for a number of reasons.

The causes of uncertainty are the drop in demand, lack of management support, customers' unpredicted behaviour, improper planning and high competition. RTA's demand forecasts suggested slowing down urban developments and slowing new project executions. Therefore, the focus attention of organizations was redirected to improving the efficiency of existing operations. This has consequently impacted on strategic targets of RTA and hence employees satisfaction level. Usually operational enhancements means executing costly initiatives with major interdependencies which are not supported by management such as safety action plan which then raises the overall level of uncertainty. Projects executed internally were the most preferred projects, such as re-planning routes for its low cost of execution, however the impact of such projects was high as they directly impact on customers and therefore become more difficult to predict.

As a result of management changing its focus of attention to operations, low cost, and high impact, quick-win types of projects were much preferred. This increased the uncertainty as more and more projects were cancelled, paused and extended. Opportunity for potential of revenue was found in shifting demand to public transport through increasing the fare and vehicle ownership cost hence customer satisfaction level dropped and resulted in rise of uncertainty in programs concerned with congestion reduction, such as in the priority lane project. Additionally, aggressive competition observed with other emirates' transport providers caused uncertainty in intercity lane initiative implementations. This raised a need for governance system on the federal level (to take ownership of intercity services in UAE) and locally on Dubai emirate and city level (urban master plan).

8 Main Limitations of the Research Study

The single case study research undertaken for this dissertation has two major shortcomings. The first one relates to the research sample and the geographical and organisational coverage of the case study.

This study focuses on Dubai and Abu Dhabi transportation including western region and Al Ain in the United Arab Emirates. It could have been extended to the Northern Emirates however it may not have added much to the research findings due to the relatively small size of these transportation departments and their comparatively limited activities. Due to conflict of interest, exchange of information would pose some difficulties and this was a challenge facing this study which concentrates chiefly on RTA in Dubai.

The second major limitation of this dissertation research study is it concentrates exclusively on internal experts and their points of view. The interviews concentrated solely on internal experts view of uncertainty in the surroundings of RTA and it did not, primarily for reasons of shortage of space, include comprehensive primary data or secondary documentation of external environment elements impacting on the United Arab Emirates. For example, it did not research the viewpoints and knowledge of local experts on the economic situation of the UAE, such as the authors of studies published by The Emirates Center for Strategic Studies and Research.

9 Discussion and Analysis

The sections and paragraphs below discuss uncertainty in the light of theories and propositions and statements made earlier in this dissertation.

9.1 Explanation of the Uncertainty Model

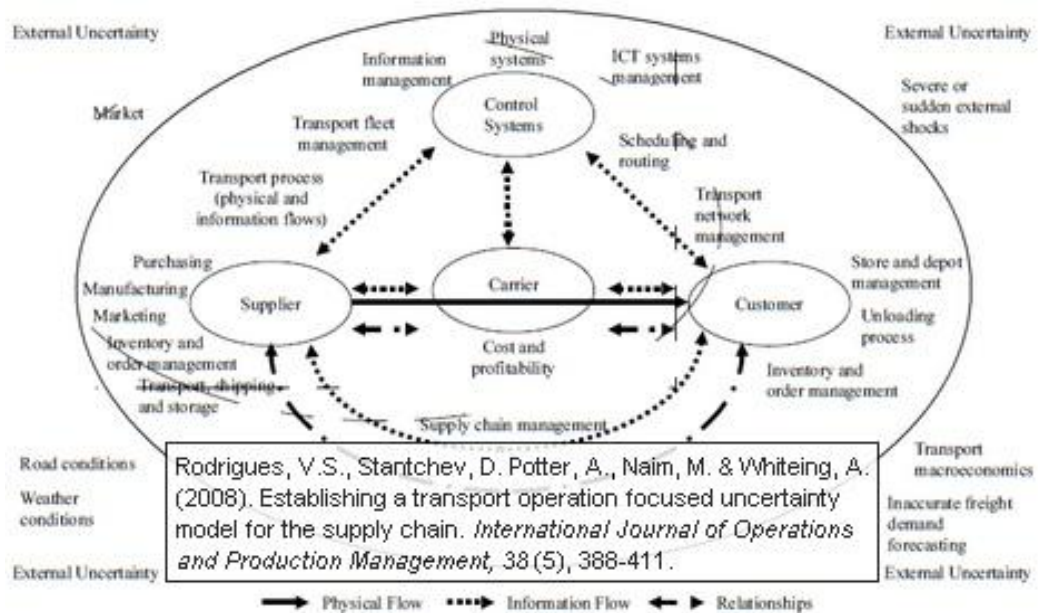


Figure 29: Transportation Operation Focused Uncertainty Model

Source: Rodrigues and Stantchev and Potter et al (2008), p. 388

Rodrigues and Stantchev and Potter et al (2008) have developed a model as shown in Figure 27 to demonstrate the model of uncertainty for the supply chain in transport operations. In this section, we will interpret various factors which cause uncertainty in the system. This model shows the relationship between the supplier and the customer and the role of the control system affecting this relationship. There are carriers which channel and flow the needs between the supplier and the customers. These needs could be the informational flow or the physical flow which maintains the relationship between the customer and the supplier. The uncertainty in RTA arose, it can be argued, due to the problems at both segments. Examples of problems on the supplier side are problems in purchasing, manufacturing, marketing, inventory

management and transport shipping and storage. These were a consequence of the problems in the weather conditions and road conditions.

The model explains the relationship between suppliers and the customers through the use of a control system that is a physical system and has been used for maintaining this relationship. Under this control system technique there are several types of management techniques which are used in order to maintain a good relationship among the suppliers and customers. There are some technical processes which are used in this control system which included the informational as well as the physical flow between the control system technique and the supplier. Management techniques used in this supply chain process are transport fleet management, information management and other process which are illustrated in Figure 28. The transportation carrier which is mainly responsible for the informational and physical flow between the supplier and the customer mainly aims for minimising cost and maximising profitability in the project. Each project is based on the effective cost and maximum profitability concept. This was the concept used between the supplier and the control system.

The external uncertainty in the projects may be caused due to transport macroeconomic problems, severe and sudden shocks, road and weather problems as well as problems occurring in the market conditions. In order to remove uncertainty, it is necessary for RTA to work on the described management techniques and address other problems so that variability in the forecast and level of difficulty may be reduced and minimised for the organization.

9.2 Discussion

With reference to Proposition 1 most of the interviewees expressed satisfaction about the flexibility of the strategic plan and its degree of realism. A strong strategic plan forms a foundation for the success of RTA. People were said to be results-oriented

which suggests that a proper project execution culture and environment was established. Leadership could have been clearer regarding strategic options and operational priorities as is demonstrated in the discussion of Proposition 2 below.

In examining Proposition 2, realism is one of the qualities found in the bus operation manager who mentioned that he realized opening Al Ruwaya station before launch of 9-9-2009 (Metro Green Line Opening) was simply not feasible. However this general level of realism did not encourage him to use specific business tactics such as utilizing existing workshop spaces and renting other depots during the attempts to fulfill RTA's business requirements. Over-commitment and under-achievement causes managers to lose credibility, however, effective project implementation will be sustained through communicating a sense of realism over what can be achieved and avoiding over-commitment of scarce resources. Another example of understanding the business environment is given by the Safety manager who suggested outsourcing execution of the safety plan for granting naming rights due to the overall lack of funds.

Proposition 3 & 13 states that planning for operating the new bus intercity lane involves selecting bus drivers who drive properly on the road. Such selection decisions indicate an appropriate realization of employees' capabilities. It was also explained that drivers are motivated through incentives and these help to sustain the continuing required levels of motivation.

Other section managers complained of the general unavailability of planned career paths for employees. In conclusion, it is understood that employees are receiving training in certain skill areas, however, a proper road map for career development is unavailable to employees. Training programs are not designed to be consistent with the career objectives of employees.

The interviewees estimated their satisfaction with the strategic plan at above 60%. This contradicts with the comments of the Traffic Safety manager who, in addition, claimed that the strategic planning team lack sufficient background in transportation.

Support for Proposition 12 was evident in managers showing willingness to adapt to numerous situations through execution of multiple projects designed to bring change to the transportation environment. Additionally, setting up a strategy which draws a map of changes for the coming years was accepted by the majority of managers. This indicates that RTA provides the execution culture through making it a challenging environment bringing change through projects and encouraging managers to execute them.

Proposition 4 discusses the communication plan and the assertion that its development can facilitate more effective utilization of time and focus everyone's efforts towards a stronger results orientation. However, it does not mean that ad-hoc request will not remain an issue as they can be many other reasons for their occurrence. As the Safety Manager claims, "I do think we are having problem with communication but obtaining information is a challenge" (27 May 2010). Two-way communication involves exchange of thoughts, ideas and information. Communication occurs when two parties effectively give information and receive information. It is said to not be occurring enough within the Safety section. A communication plan helps to organize work and streamline meetings and communications internally and externally, and therefore saves time and assists with setting priorities. Having said that developing a communication plan can also be overly cumbersome for small sections which involve no more than 5 individuals such as the Mobility Section.

Proposition 5 is about Public sector privatization, commonly referred to as Public Private Partnerships (PPP). It is one way of gaining resolution to the Principal-Agent

dilemma which requires investments to be made by both parties and holds them responsible for overcoming issues and achieving objectives.

If risks are increasing then information/knowledge requirements are also likely to increase. Information/knowledge are core requirements as inputs to decision-making process and clarifies the intentions of the agent. The Safety manager demonstrated the need for information to support decisions related to safety. Lack of information raises uncertainty in managing contracts and certainly the performance of the agent undertaking the work. Information management tools such as the performance dashboard can be used to ensure proper monitoring targets and achieving acceptable levels of performance through information sharing.

Proposition 7 addresses uncertainty, which overall, can be looked at from internal or external viewpoints. Internal uncertainty mainly relates to organizational policies and procedures, physical systems, transport processes and all working functions of an organization. While external uncertainty relates to those factors that can not be so readily influenced such as freight demand, weather conditions, road conditions, transport microeconomics and market conditions. Differences between uncertainties can generally be categorized into external and internal categories in order to invest in internal strengths to overcome external threats and make use of opportunities. While at the same time acknowledging the weaknesses and working on improving them.

Proposition 14 states that the aerospace industry is complex in nature due to many external elements impacting on the environment and these are unstable because they change frequently. Benchmarking RTA with other industries across the world proves that it is considered a highly uncertain industry like aerospace or the airlines industry. External elements include natural disasters such as earthquake or changing public demands which largely impact on business. Other factors impacting on the transport industry are weather and market conditions.

Proposition 6 concerning risks may be determined based on contract type. In a fixed contract the risk is transferred to the other party while in other contracts the risks is handled by RTA. Contract type and risk are highly inter-related. When the risk is high, requirements for information and knowledge sharing is high and therefore uncertainty often will remain high.

Through analyzing data gathered from 8 interviews I was able to derive the following interpretation and conclusion for Proposition 9 linked to Propositions 10. The need for diversified knowledge applications and communication rises when the risk shared is high. An example supporting the above statement is the roads construction projects. In such projects there are dedicated liaison engineers who are responsible for communication and coordination tasks. This results in managing risks properly and thus minimizing uncertainty levels. A more specific example is the Meydan project in which the design was altered several times, due to changes in stakeholder requirements. In this kind of project, a high degree of early socialization is recommended to arrive at the final desired design through negotiation and discussion. Usage of direction sub-processes was also demonstrated in the interview with the Intercity manager who said that for operating a new intercity lane a series of steps must take place starting with negotiating the contract with the other Emirates, testing routes and selecting drivers to determine the shortest path. Therefore, directions on negotiation include specifying what details are to be shared, while determining what not to communicate is an example of direction by an expert manager to mitigate risks associated with proprietary knowledge, intellectual property and copyright and managing uncertainty involved in the project.

Proposition 11 states that the overall level of uncertainty in the organization strategy and environment are the determining factors of the optimum business strategy for an organization. It can be concluded that with low environmental uncertainty either low

cost or low differentiation strategies are recommended. Both strategies can be used in conditions of low environmental uncertainty. RTA is based in the transportation industry which is similar to aerospace and therefore it involves high levels of uncertainty unlike other industries such as health. RTA, like aerospace, is highly unstable and involves environmentally complex organizations, thus sometimes requiring high cost and high differentiation strategies.

A differentiation business strategy is best suited to high uncertainty environments and tasks. To illustrate, RTA is likely to execute typical road and traffic projects. This involves a low cost strategy for providing road services to customers which may or may not involve high interdependency while task uncertainty is considerably low. On the other hand, a differentiation strategy involves introducing new services than the usual one which is, for instance, Salik services that involves high uncertainty, high interdependency and is environmentally uncertain. Most of the knowledge management strategies used in RTA include: combination, socialization for knowledge discovery, direction and routines. Services provided to customers include both differentiation and low cost strategies.

Proposition 8 examines the characteristics of tasks contributing to uncertainty including high interdependency and high coordination. The same is not applicable for RTA because the risk level listed in the contract type can be transferred on to the other party. Thus, the other party needs to have the knowledge to execute technically complex tasks so that the risk of execution failure is applicable but uncertainty remains low, since RTA does not necessarily play a role in managing the uncertainty existing for the agent. This case occurred in the Floating Bridge project where executing a new concept seemed to be challenging, however, the risk was transferred on to the contractor and consultant and RTA were then more able to manage the existing level of uncertainty.

9.3 Discussion of Uncertainty in RTA Strategy Execution

In this section, we will discuss all of the projects which have been implemented and in progress (Table 1). We will examine each of the projects one-by-one and will discuss the theoretical concepts which are responsible for some important features mentioned in Section 2.10 Uncertainty and Knowledge Management:

1. **Express Bus Lane Project:** this is an ongoing project in which the tasks are of medium difficulty level, low variance and high interdependency. The uncertainty level of this project is high either if the project is working externally or low. We have derived the reasons behind the uncertainty of this project. In this section we will discuss the theoretical model behind the uncertainty of the project. The high amount of uncertainty present in the project is caused by directional and socialization problems in case of different tasks. In the case of the Express Bus Lane project, theoretical concepts behind uncertainties were direction and socialization problems with better combination and routine among the different departments. The interpretation for the reason of uncertainty may derive from the conflicts which arose between the CEOs. There is a requirement for cost and benefit analysis for this project. It could be a cause of modeling uncertainty as indicated in Section 2.9 of the literature review in the department and its impact on the traffic changes.
2. **Salik Project:** This project has been completed with high task difficulties, higher variability in whatever happened and whatever was expected. This all happened due to several technical issues in the project. This suggests that there is high level of uncertainty in the project. This is mainly because of the directional problems which occurred. The reason for uncertainty arising in this project is the belief of the customer of RTA and the organization's image and reputation in the country. There were several technological issues due to which uncertainty arose in the department. Uncertainty may be a result of the

vague fare prices which could have a bad impact on traffic demand. Such uncertainty in the department may be in part due to the shift towards public transport and availability of the free gates.

3. **Pedestrian Safety and Mobility Action Plan:** This project is in progress in which around 60 percent of the project has a medium level of difficulty in the task and the rest is a low level of difficulty. The interdependency of the task in the project varies from medium to high and the variation in the planned and the actual scenario was really low. This means that the project was advancing at a better pace and phasing than the others. The theoretical concept behind interpretation of these results suggests that there is a level of externalization and internalization in the project and there are directional problems as well. This suggests that the project had a medium level of uncertainty which is mainly because of directional problems, internalization, externalization and bad routines. Uncertainty explained by the theoretical model arose mainly from the lack of informational flow, lack of funds in the department, and coordination difficulty between one department and the other. There could have been in the prioritizing of the project an improved identification of the required resources and more appropriate allocation of the time needed. Uncertainty in this project is decisional and analytical in which safety was given very low priority due to which many of the problems occurred as there was no proper support provided by the department. There were no proper policies maintained by the organization and contractors had not taken proper decisions for governing safety.
4. **Floating Bridge Project:** This project has been completed. It contained a relatively low level of uncertainty due to some good features involved in the project like inspection through cameras and several barriers to control the abnormal activities. Uncertainty was recovered by several risk management programs. The main cause of uncertainty in the project was non-assurance of

reliability and quality in manufacturing processes. One important reason for uncertainty in this project was that the project was not actually the responsibility and output of RTA rather RTA was just providing inputs. There was a lack of flow of information in the project and several technical issues as well which made the project uncertain, but finally the project was completed with all of the problems being solved.

5. **Meydan Project:** This project was completed with medium difficulty level and medium task variability because of high level of safety and maintenance was required and there was an involvement of stakeholders in the internal as well as the external part of the organization. The theoretical concept behind the results was some directional as well as some socialization problems. There is both internalization and externalization of the project in the organization due to which the uncertainty in Meydan project was of medium level. Uncertainty in this project could be because the plans were not synchronized in terms of proper inventory management and order management. There was a general lack of detail which led to miscommunication between the departments. It was also influenced by an approach of maintaining a rapid pace of development with no rationalization in the project.
6. **Parallel 881/1 Road:** This project was also completed with medium task difficulty and low level of variability. The interdependency among the departments was also high. There was low level of variability arising from the defined scope of the execution part of the project. High level of interdependence suggests that there are directional and socialization problems and there are some problem in combination among the departments and problems associated with routines as well. The uncertainty in the project could have been mainly due to the fact that there was a high level of investment in this project which could not have been scaled back and there

were several wrong assumptions made which led to an increase in variability in the project.

7. **Unevenness of Corridor Services Lane with the Bridge:** This is an ongoing project with medium level of difficulty level in various tasks involved in the project and low level of variability and high level of departmental interdependency, which means that there could be a problem of directional and socialization. The delay in the project and mobilization of the resources made it uncertain. Uncertainty in this project was mainly because of problems with the service delivery from the supplier which was always later than the expected time as well as limited supply. Additional problems occurred due to some bad weather as well as bad road conditions.
8. **Re-Creation of 2010 Bus Network Strategy Project:** This project is in progress with medium level of difficulty, low level of variability and medium level of interdependency between the departments. This means that there is a need for the organization to manage the resistance and traffic needs to be shifted. The theoretical concept behind this could be directional, externalization, internalization or any other problem.
9. **Bus Priority Lane:** this project is a completed project which contains medium level difficulty in tasks that is highly time consuming. The variability in this project was very high with 10 percent changes seen three times throughout the lifecycle of the project. The level of interdependencies between the departments is high. The issue in this project was the inaccurate forecast of demand.
10. **Renting Spaces in the Bus Station as Shops to Business Owners:** This project is in progress with a high level of difficulty, medium level of variability in the tasks and progress with high level of difficulty, medium

level of variability in the tasks and high level of interdependency. This means that there is a high level of uncertainty in this project. The theoretical concept behind this could be high level of directional and socialization problems which requires proper planning and feasibility study, fund requirement and coordination from the suppliers without which the project could not be a success.

11. Preparing Al Ruwaya Station Depot for Operating Metro: There is low level of difficulty, low level of variability and high level of interdependence in the tasks involved in the project which means the uncertainty involved could be externalization and internalization with in the organization. There is better resource availability and work-on-time progress in the organization.

12. Operating Ras Al Khaimah Road: This is a project which is under negotiation where task difficulty is medium and variability in the tasks is low. There is a high level of interdependency among the departments collaborating in this project. The uncertainty occurred as a result of stolen copyright of the ideas; this project was always intended to make profits and it was not for public interest.

The three graphs below show the percentage of the projects having low, medium or high level of variability, difficulty or interdependence among all the projects in RTA.

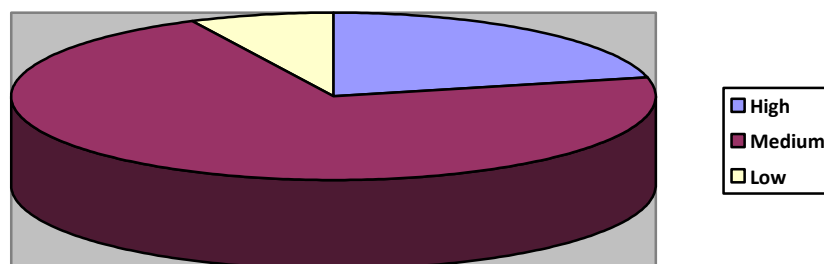


Figure 30: Levels of Tasks Difficulty in Organization Projects

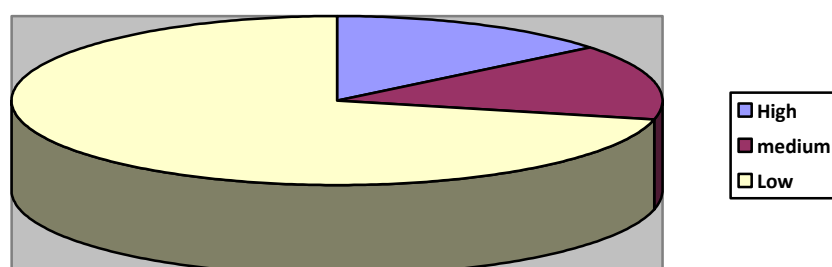


Figure 31: Tasks Variability in Organization Projects

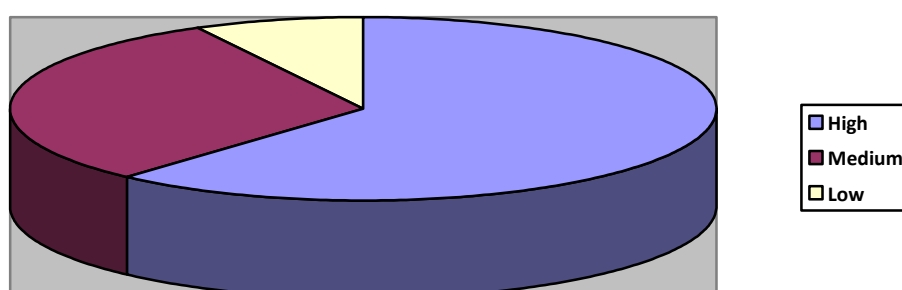


Figure 32: Task Interdependence

9.4 Uncertainty in the UAE Transportation Sector

Abu Dubai transport will be the transportation hub for the entire Gulf region. This is a big step which ADRTA is taking. It will help immensely in managing uncertainty as well. When DRTA becomes the transportation hub for the entire Gulf region then there will not be any problem for the transportation of people. However, a problem with this, is it is possible that people might get confused about several decisions that are needed to be taken by each and every department in different emirates. But there are several positive impacts of such policies that according to five year strategic

plans by Abu Dhabi Department of Transport, there are various massive improvements by which the city is developing. In the strategic plan issued by the government of Abu Dhabi for 2008-12, there will be an effective transportation system for the country. This transport system includes each and every mode of transport system and by aligning the future of road and land transport. This will surely make the transportation process smoother and it will surely add value to the country (Strategic Team at Abu Dhabi Government 2010).

This case study reveals the projections in the strategic plan for the year 2008-12. It is amazing to witness the growth and development of the country but along with such an advancement and growth of ADRTA, concerns for Dubai RTA today is greater than before. With the expanding network of transportation in the country, there will be added work considerations for each and every department of RTA. There will be a general increase in the uncertainties for the departments which will be noticed through intercity transport services. With such increase in uncertainties, it will be necessary for RTA to develop certain strategies in order to improve the situation of RTA and in order to manage the uncertainties arising in each and every department of RTA and at each and every level.

9.5 Using Information Management in Minimizing Uncertainty

Table 1 lists the projects mentioned in the interviews. These projects are classified based on the uncertainty level to low, medium uncertainty and high uncertainty based on task and environment characteristics.

Task uncertainty is determined based on its difficulty, variability and interdependence. The environmental uncertainty is determined based on company size, number of impacting elements and degree of change in these elements. The uncertainty in both project environment (tasks) and external environment uncertainty consequently defines the communication techniques in project execution, knowledge management mechanisms and systems of organization, best business strategies and

thus the corporate approach to managing uncertainty in an organization. The following points can be concluded from the Table below:

1. Most of the projects are of medium difficulty while only a few are of high difficulty
2. There are low to no variability in completed or in-progress projects
3. Task interdependence is considerably high for the majority of projects

The uncertainty depending on the above mentioned conclusions is that task level uncertainty is low for most of the projects that indicates the projects' execution are easy to execute, although the main challenges are related to interdependencies

4. RTA is considered a large organization but if we look at it from the context of a departments then we realize that it is a unique business operating with a limited number of employees. Some departments have up to 100 employees such as bus departments includes drivers, while other departments employ no more than 20 employees. This to a certain extent explains the importance of communication within and between organizations in managing uncertainty.
5. The best approach to determining environmental uncertainty level is benchmarking road and traffic sector with other similar sectors such as the aerospace sector. Both sectors face the same external challenges and provide transportation services. Dubai Roads and Transport Authority is highly uncertain from the environment point of view which is indicated below, however, in some cases the external environment does not impact on the functions of the section/department and therefore it has minimal external impact.

Another supporting method for determining environment uncertainty but not an alternative is a decision tree. The decision tree composes a set of questions to which the answers determine the uncertainty level for the organization. Environment uncertainty might have less impact on some organizations than others. The changes in industry environment typically impacts on all the organizations that operate in the

same industry. For the same reason benchmarking is a good approach to determining industry characteristics.

Certain measures are suggested based on environment characteristics and measures vary depending on the type of variable whether it is primary or secondary. This will be discussed further in the next section.

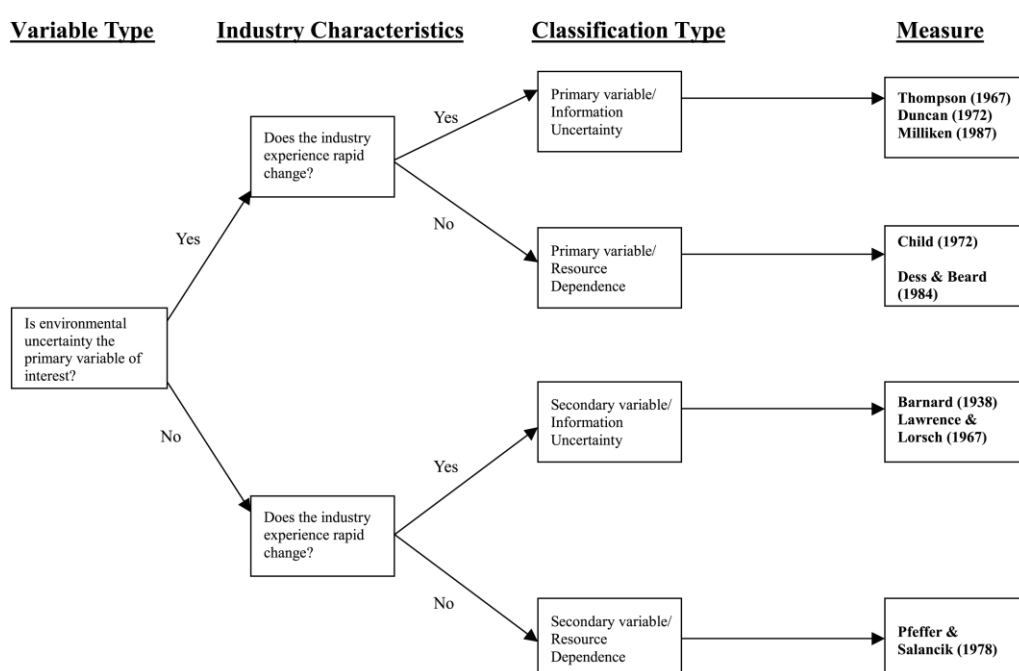


Figure 33: Environment Uncertainty Decision Tree

Project ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
State	I	C	I	C	C	P	C	I	I	C	I	C	C	C	I
Task Difficulty	M	H	M	N/A	M	H	M	M	M	M	H	M	L	M	M
Task Variability	L	H	L	N/A	M	H	L	L	L	L	M	L	L	L	L

Task Uncertainty	L	H	L	N/A	M	H	L	L	L	L	M	L	L	L	L
Task Interdependence	M/L	H	M/L	N/A	M/L	L	H	H	M/L	M/L	H	H	H	H	H
Environment Uncertainty	L	H	L	N/A	M	H	H	H	L	L	H	H	H	H	H
Organization Size	L	S	L	L	L	S	S/L	S/L	L	L	S	S/L	S/L	S/L	S/L

Table 1: Uncertainty level of Strategy Execution of RTA projects

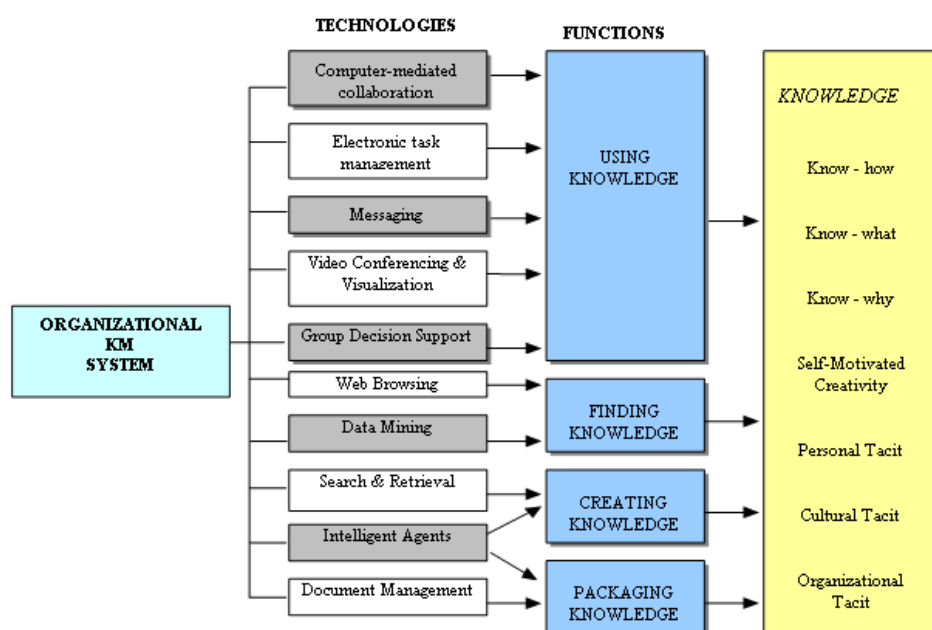


Figure 34: Technologies for Knowledge Management

It can be concluded that the knowledge is the key to managing uncertainty. The more knowledgeable an organization becomes, the less uncertain it will be. Augilar, Choo and Auster, faculty members of Information Studies in University of Toronto in Canada conducted a research on environment scanning for knowledge obtaining: “Environmental scanning is defined as the acquisition and use of information about events and trends in an organization’s external environment, the knowledge of which

would assist management in planning the organization's future course of action" (in Choo & Auster, 1994, p. 207). The recommended process of managing knowledge for highly interdependent and environmentally unstable environments as indicated in Figure 4 are: combination, direction, routines, internalization and externalization. Internalization and externalization processes are mainly used to overcome issues related to interdependency between projects. It was also adequately demonstrated through examples of capturing knowledge and through internalization and externalization processes, applying knowledge providing directions to subordinates and conducting routine tasks through the captured knowledge. Less attention is given to sharing actual knowledge in spite of having the knowledge captured and assigning less importance to discovering new knowledge.

The business strategy of an organization with high uncertainty has to be focused either on differentiation or low cost strategies. Using both strategies in such highly undetermined environments might result in undesirable outcomes.

Table 2 includes a demonstration of different strategies and tactics in the execution of projects that were further analyzed to determine the appropriate knowledge processes and business strategies and technologies that aim to increase knowledge and minimize uncertainty.

The Table includes some suggested situation analysis tools based on the level of uncertainty, aids understanding and identification of the problematic issues causing uncertainty to arise in an organization, and then proposes some technological tools available to manage it.

STRATEGIES, TACTICS AND IMPLEMENTATION	P. ID	KM PROCESSES	BUSINESS STRATEGY	SITUATION ANALYSIS TOOLS	ENVIRONMEN TAL UNCERTAINTY	IT APPLICATIONS
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MANAGING UNCERTAINTY IN STRATEGY EXECUTION IN THE TRANSPORTATION SECTOR OF THE UNITED ARAB EMIRATES

1. Slow down speed of development and focus on traffic impact study	1,2	Internalization and Externalization Socialization and Direction	LC/D	<ul style="list-style-type: none"> ▪ Market Research ▪ Cost Benchmarks 	L	Expert Systems, chat groups, best practices, and lessons learned databases, computer-based communication, AI-based knowledge acquisition, computer based simulations
2.coordination strategies	1,2		LC/D	<ul style="list-style-type: none"> ▪ Porter's 5 Forces ▪ DCF/NPV Valuation ▪ Discussion/event trees ▪ Game Theory ▪ Senario of the defined outcome ▪ Market Research ▪ Cost Benchmarks ▪ Porter's 5 Forces ▪ DCF/NPV Valuation ▪ Discussion/event trees ▪ Game Theory ▪ Senario of the defined outcome 	L	
3. Reprioritizing safety projects <i>and</i> extend the period instead of 3 to 5 or 10 years	3,4	Internalization and Externalization	LC/D	<ul style="list-style-type: none"> ▪ Market Research ▪ Cost Benchmarks ▪ Porter's 5 Forces 	L	Expert Systems, chat groups, best practices, and lessons learned databases, computer-based communication, AI-based knowledge acquisition, computer based simulations
4. Outsourcing implementation of safety plans to investor and granting naming rights	3			<ul style="list-style-type: none"> ▪ DCF/NPV Valuation ▪ Discussion/event trees 	L	
4. Change Management- Design approval by a committee rather than individual	9,10			<ul style="list-style-type: none"> ▪ Game Theory ▪ Senario of the defined outcome 	L	
5. Communication plan governing rules and regulation of meetings/communication/committees	3,4	Internalization and Externalization	LC/D		H	Expert Systems, chat groups, best practices, and lessons learned databases, computer-based communication, AI-based knowledge acquisition, computer based simulations
7.Deciding on projects for execution based on certain criteria	5	Direction	LC	<ul style="list-style-type: none"> ▪ Scanning and Trend Tracking ▪ System Dynamics ▪ Senario Planning 	M	Video conferencing, electronic discussion groups, email
8. Review and prioritize projects of developers before implementation	5,6				H	
9. Developers revisits plans and decide which project to be hold/paused	5,6				H	
10. Committees and teams formed as a policy for effective communication	5,6				H	

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11. Speeding up decision-making through experiment holes and better supervision and correctly determining	7,8	Combination and routine	LC/D		H	Databases, web-based access to data, data mining, repositories of information, web portal, best practices and lessons learned
12. Liaison project are determined 3-4 per project responsible for communication and coordination	7,8				H	Expert systems, enterprise resource planning systems, management information systems
13. Marketing campaign	14,15				H	
14. Modeling survey on resulted forecasted demand	9,10	Internalization and Externalization	LC/D	<ul style="list-style-type: none"> ▪ Market Research ▪ Cost Benchmarks ▪ Porter's 5 Forces ▪ DCF/NPV Valuation ▪ Discussion/event trees ▪ Game Theory ▪ Senario of the defined outcome 	L	Expert Systems, chat groups, best practices, and lessons learned databases, computer-based communication, AI-based knowledge acquisition, computer based simulations
15. Scenario planning	14,15	Combination and routine	LC/D	<ul style="list-style-type: none"> ▪ Analogy and past references ▪ Visioning and visionary scenarios 	H	Databases, web-based access to data, data mining, repositories of information, web portal, best practices and lessons learned Expert systems, enterprise resource planning systems, management information systems
16. contract for knowledge transfer	9,10	Internalization and Externalization	LC/D	<ul style="list-style-type: none"> ▪ Market Research ▪ Cost Benchmarks ▪ Porter's 5 Forces ▪ DCF/NPV Valuation ▪ Discussion/event trees ▪ Game Theory ▪ Senario of the defined outcome 	L	Expert Systems, chat groups, best practices, and lessons learned databases, computer-based communication, AI-based knowledge acquisition, computer based simulations
17. Involving manufacturers in building school bus model	12	Combination and routine	LC/D	<ul style="list-style-type: none"> ▪ Analogy and past references ▪ Visioning and visionary scenarios 	H	
18. Fair estimation per student is 400AED	12		LC/D	<ul style="list-style-type: none"> ▪ Analogy and past references ▪ Visioning and visionary scenarios 	H	Databases, web-based access to data, data mining, repositories of information, web portal, best practices and lessons learned Expert systems, enterprise resource planning systems, management information systems

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19. Innovative ideas such as: reusing workshop spaces and renting other depots cheaper than building new one which is time consuming	11	Internalization and Externalization	LC/D	<ul style="list-style-type: none">▪ Analogy and past references▪ Visioning and visionary scenarios	H	Expert Systems, chat groups, best practices, and lessons learned databases, computer-based communication, AI-based knowledge acquisition, computer based simulations
20. Cancel low demand routes-running at night	11,13	Internalization and Externalization	LC/D	<ul style="list-style-type: none">▪ Analogy and past references▪ Visioning and visionary scenarios	H	Databases, web-based access to data, data mining, repositories of information, web portal, best practices and lessons learned Expert systems, enterprise resource planning systems, management information systems
21. Open door policy	11,13	Combination and routine	LC/D	<ul style="list-style-type: none">▪ Analogy and past references▪ Visioning and visionary scenarios	H	Databases, web-based access to data, data mining, repositories of information, web portal, best practices and lessons learned Expert systems, enterprise resource planning systems, management information systems
22. Department shrunken and international transport section got cancelled	14,15	Combination and routine	LC/D	<ul style="list-style-type: none">▪ Analogy and past references▪ Visioning and visionary scenarios	H	Databases, web-based access to data, data mining, repositories of information, web portal, best practices and lessons learned Expert systems, enterprise resource planning systems, management information systems
23. Market services to riders such as “Coach” luxury passenger bus	14,15	Combination and routine			H	Databases, web-based access to data, data mining, repositories of information, web portal, best practices and lessons learned
24. Time based bus operation between emirates	14,15				H	Expert systems, enterprise resource planning systems, management information systems
25. Testing routes readiness to find shortest path	14,15				H	
26. Pre-agreed revenue models (Alliances, Fixed price with "Al Ghazal" 60% vs 40% them	14,15		LC/D	<ul style="list-style-type: none">▪ Analogy and past references▪ Visioning and visionary scenarios	H	Databases, web-based access to data, data mining, repositories of information, web portal, best practices and lessons learned Expert systems, enterprise resource planning systems, management information systems

**Table 2: Suggested Information Management Applications for Uncertainty
Levels**

10 Recommendations

Below are recommendations for the main list of stakeholders that impacts on and is impacted by uncertainty in the transportation sector in the United Arab Emirates.

10.1 Government and Industry Policy Makers

This research has explored many strategies and policies that either were recommended during interviews or had been adopted. One of the main policies which should have been addressed more thoroughly is planning for transportation and the urban environment based on the population forecast. At this point in time, real time data and up-to-date statistics are difficult to obtain. Dubai Statistics Center, Municipality, Immigration, Health Services and Dubai Police hold different information and versions of data, and yet are among the organizations that rely highly on population movement and changes.

The planning process in each of the organization is therefore significantly influenced by the population of Dubai. Urban planning, transportation planning, security, safety planning and health planning are influenced by people's behavior and the population density, demographics and environmental conditions. The Emirate of Abu Dhabi centralizes all processes of planning and plans are executed in an integrated manner under one umbrella. A separate government entity called Abu Dhabi Urban Planning Council discusses matters of strategic impact across government entities such as the population forecast for Abu Dhabi. This process positively impacts government organization's planning development and helps to resolve strategic issues at earlier stages. An obvious example of need for this entity is in the establishment of an urban planning committee based on request and suggestion provided by RTA.

Roles and ownership of government entities need to be defined in a very clear manner. And this information should be made available to all to ease communication, the flow of information and resource allocation. Another role set for planning government entities is to ensure that mega-projects such as the Metro Project progress according to plan. This project was scheduled to start on 9-9-2009 and required monitoring of multiple dependencies on resources to reduce the extent that they negatively impacted on the chain of projects/progress and initiatives. This provides insights on progress for management and sets the road map for the economic development of Dubai directing available funds based on a priority setting of the Emirates and the Emirates' strategic plan.

Policies in regard to appointing heads to government entities should be studied thoroughly and decided based on the best interests of the UAE. This recommendation is based on an observation by the Intercity manager who stated that the Head of Transport Department in one of the northern emirates was taking charge of two government entities at one single point in time which results in favouring one entity over the other. It is suggested that Federal Policy should state a single individual cannot assume a ruling position in another government entity. This avoids overlap of responsibilities and conflicts that might jeopardize the interests of the entity.

An evident observation is that RTA as a government entity looking for new revenue generation opportunities in an environment where the level of knowledge and achievement varies among government entities. This opens the door for sharing expertise and practices with other entities within the same industry to encourage more generation of revenue. An obvious example is the knowledge and expertise of the transportation department in the Northern emirates which as yet does not reach such a high level of sophistication level as the Dubai Transportation Department. Many issues arise when developing and signing contracts with Fujairah Transport Department for the purpose of operating the intercity road. In fact, communication

took place and copyright of ideas were used without permission for the sake of making greater revenue out of operating their own buses.

My recommendation is to sell copyrights, practices, ideas and knowledge to other transportation departments to increase revenue. This also includes outsourcing Fujairah transportation operations to RTA, and RTA holding expertise in the field can manage, maintain and operate the transport infrastructure and sell assets like spare assets to the other departments.

Having said that creation of a legislative entity on a Federal level governing all government entities in its own industry will help to streamline and issue laws and legislation governing all. An example is the same authority of communication regulation which streamlines legislation for both Du and Etisalat service providers.

10.2 Roads And Transport Authority Executives

To cope with environmental uncertainty, RTA executives can adopt the following strategies to manage uncertainty which should result in major change management:

10.2.1 Buffering and Selective Management

Create a buffer role which aims to absorb environment uncertainty through surrounding technical core team and exchange information, material and resources between the environment and organization. Buffer departments are functional management areas like purchasing and human resource departments.

An opposite approach is exposing the technical core team to the uncertainty in the environment because being connected to customers and suppliers will make them

more thoughtful and flexible which can be more important than internal efficiency. This facilitates with making the organisation and its work processes more fluid and adaptable.

Both approaches have advantages and disadvantages and an organization has to look at what is more cost effective and create intelligent competitiveness within employees. RTA adopted the first approach, however the second approach can be put to the test in order to assess its feasibility. A simple test, to start with is the establishment of a clear career path for employees, an issue which was raised by the Safety Manager. Every section can create a roadmap for its employees and based on their aspirations and suggestions, training and development interventions can be provided and employee performance then can be measured post-delivery to measure gains against real industrial indicators. This should create intelligent competitiveness and less dependency on the buffering departments/roles.

10.2.2 Differentiation and Integration

The cognitive and emotional orientation is often similar among individuals working within the same sector. This is a natural result that enables adaptation to external uncertainty and responsiveness to the complex and changing environment. A particular sector often behaves in a customary manner and using a common approach that enables them to deal with uncertainty in their external environment.

However, differences in general orientation among managers on the other hand causes difficulty in coordination. This may result in more time and resources being devoted to achieve coordination as indicated in example Figure 34, as the uncertainty is high the differentiation is also high and therefore management in integrating roles is also of a high percentage. In an environment like RTA, formal integration is required to coordinate departments in order to process more information and achieve horizontal coordination.

	Plastics	Industry Foods	Container
Environmental uncertainty	High	Moderate	Low
Departmental differentiation	High	Moderate	Low
Percent management in integrating roles	22%	17 %	0%

Figure 35: Environment Uncertainty and Organizational Integrator

Source: Lorsch & Lawrence (1972), p. 45

Integration in RTA is partially implemented through project managers and liaison engineers only for road projects. On the other hand, program managers play only a limited role in integration at the program levels which raises uncertainty. Support should be provided for project managers to achieve proper integration vertically in an environment when horizontal communication (hybrid organization) is essential.

This can be achieved through identifying project dependency chains and forming committees based on these dependency chain to enable horizontal coordination and exchange of information. In addition, managers have to be assigned for coordination roles such as committees and teams to strengthen the integration requirements.

10.2.3 Management Process (Organic Versus Mechanistic)

The Roads and Transport Authority favours a mechanistic organization system, however, this system better fits an organization where the external environment is stable, and therefore the internal organization can be characterized by rules, procedures, and a clear hierarchy of authority.

Through the interviews it was found that decision-making for budget allocation rests with certain individuals rather than management which reflects in particular the organic organization system. As mentioned earlier there is a need for horizontal communication to be tightened to manage uncertainty in the environment. This organization system suits organizations facing highly uncertain environments enabling them to take care of problems by working directly with one another and through encouraging teamwork, informal approach to assigning tasks and

responsibility. Thus, the organization is more fluid and is able to adapt continually to changes in the external environment.

Establishing Interorganizational Linkages	Controlling the Environmental Domain
1. Ownership	1. Change of domain
2. Contracts, joint ventures	2. Political activity, regulation
3. Cooptation, interlocking directorates	3. Trade associations
4. Executive recruitment	4. Illegitimate activities
5. Advertising, public relations	

Figure 36: Organizing Strategies for Controlling the External Environment

10.2.4 Controlling Environmental Resources

There are two strategies that can be adopted to manage resources in the external environment and minimize uncertainty. Both strategies are illustrated in Figure 35. The second strategy, controlling the environmental domain, is illuminated as the domain in which RTA operates is fixed and little if no alteration can occurs. By contrast, the first strategy of establishing inter-organizational linkages best suits RTA's environment and assists in controlling environmental resources and dealing with the causes of uncertainty, as illustrated in Figure 36, which suggests the following:

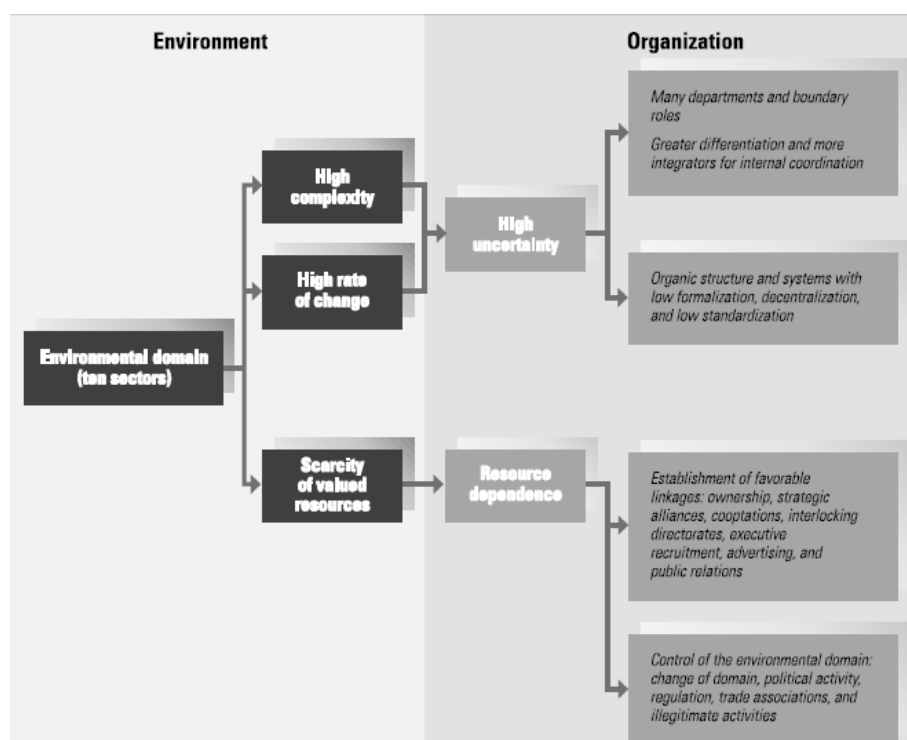


Figure 37: Relationship Between Environmental Characteristics and Organizational Actions

Source: Zaltman, Duncan & Holbek, J. (1973), p.131

10.2.5 Knowledge Management Processes

Interdependency management seems to be the biggest focus for the coming phase. RTA has demonstrated confidence in executing tasks. The majority of tasks were categorised as easy-to-medium difficulty and as a result variability in scope was very low. The main challenge was interdependency between critical projects that were not managed in an efficient manner. A clear demonstration of interdependency type and clear map of the interdependencies wasn't available. The project priority changed due to this interdependency and lack of clear mechanisms raised uncertainty. This role of managing interdependency or program management is advised to be undertaken.

With reference to Section 9.5, knowledge is the key to documenting expertise. Six key knowledge management processes are identified for RTA's environment; four of which are currently extensively used while the remaining processes such as

socialization and direction are minimally used. My recommendation is to search and identify tools and applications that use direction in a more effective manner, such tools could be case based reasoning. Other recommended tools are related to managing expertise in a more productive manner by establishing a clear set of targets and indicators to measure performance. Examples include: expert systems, enterprise resource planning systems and management information systems. One of the direction tools could be senior management dashboard which facilitates processes of direction.

10.3 Roads And Transport Authority Project Managers

Project managers usually experience risks and challenges in the project environment. The business culture and challenges suggest certain actions or strategies to deal with the situation. Alliance strategies are suggested in a business culture that depends largely on trust and mutual respect. While in transaction based and traditional business cultures an exit strategy is recommended. These two strategies are strongly recommended for use in complex and highly uncertain project environments.

Business Culture	Trust and Mutual respect	Relational Contracts High definition Target sum bidding Focus on efficiency	Alliances Goal alignment Early involvement Focus on Effectiveness
	Transaction Based and Traditional	Conventional High Definition Lump sum Claim mentality	Get out
		Simple	Complex
		Business challenge	

Figure 38: Three Contracting Approaches

Source: Turner (2001), p.15

		Uncertainty of the product			
		Lo	Hi		
Uncertainty of the process	Hi	Fixed Price Design and Build	Cost Plus Design and Build Alliance	Hi	Complexity
	Lo	Remeasurement Build Only	This situation was not researched	Lo	
		Lo	Hi		
		Ability of client to contribute			

Figure 39: Selection of Contract Types

Source: Turner (2001), p.14

A complex, challenging business environment is linked to task uncertainties presented in Figure 38. Alliances is the strategy recommended in situations of high uncertainty whether uncertainty is in process, product, complexity or in the ability of client to contribute.

In the interviews it was found that RTA uses different types of contracts, however alliances were not mentioned as an option to manage high uncertainty in a cost effective fashion. The Dubai Metro is one of the mega projects and yet alliances were not considered for its construction, development and operation. Costly fixed price contracts to operate and maintain the Metro were signed with contractors and consultants, and managing such contracts is an additional overhead.

Figure 39 shows how the cost of administering contracts increases as the uncertainty of the product increases. That is true for both fixed cost and remeasurement

contracts, except for cost-plus contracts. RTA mainly uses fixed cost contracts and remeasurement contracts for road projects.

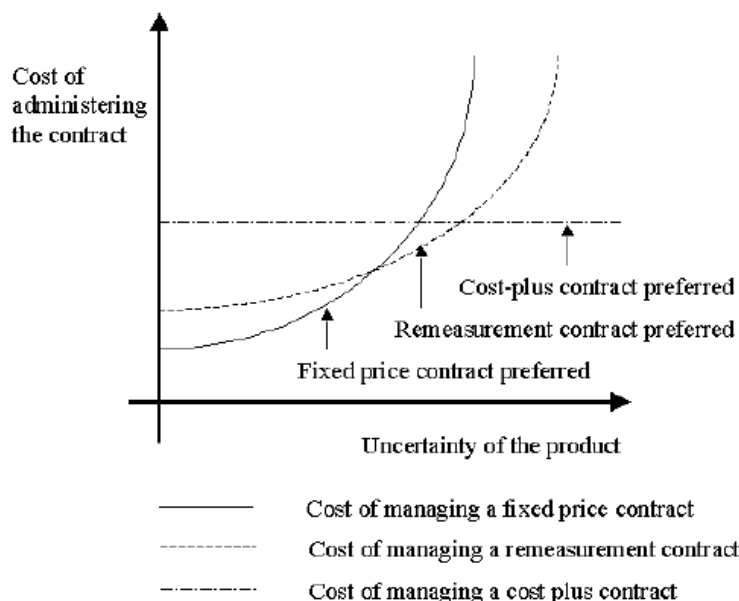


Figure 40: Relative cost of managing fixed price, remeasurement and cost-plus at different levels of uncertainty of the product

Source: Turner (2001), p.13

10.4 Roads And Transport Authority Employees

To minimize uncertainty, the surrounding employees can follow a communication plan and contain ad-hoc requests through planning for projects and tasks with an appropriate estimation of time and effort.

Other tactics to minimize uncertainty are through planning employees' careers , provide them with training and developing them. Additionally, documenting all activities and tasks, as well as socializing with others and sharing information and knowledge are vitally important.

10.5 Roads And Transport Authority Contractors/Sub Contractors

Contractors and sub contractors can help minimize uncertainty through proper handover of projects following project management standards implemented in RTA. Other strategies such as seeking opportunity through alliances can also be discussed and initiated by contractors and sub contractors. Finally, building a knowledge base for RTA is important.

10.6 Strategy Consultant

Strategy consultants play a major role in preparing strategic plan and drawing a road map for execution for years to come. Strategy developers share responsibility in execution. A mechanism to share knowledge and discuss progress on a yearly basis with clients will help to minimize uncertainty in execution. Providing intelligence and insights on external environment changes could also prove to be beneficial in updating strategic plans. The value added from consultancies is what builds and sustains relationships over the long run.

10.7 Providers of IT Tools and Software

To minimize uncertainty information technology software providers can focus on knowledge discovery systems and knowledge application systems to fulfil the planning and socialization needs of RTA. These systems include expert systems, trouble-shooting systems, case based reasoning systems and decision support systems such as a dashboard which summarizes information and performance in a very sophisticated manner.

Information management in RTA requires an integrated framework of IT Tools and Software for managing its information needs. It is recommended that this is implemented at the corporate level to increase the role of knowledge management in RTA. This information management framework is suggested to be reinforced by all

IT Tools and software providers complying with its requirements during the project initiation phase to ensure that the information component is handed over to RTA through a systematic and effective approach. Through this approach, RTA will be more capable and effective in managing information/knowledge resources.

The framework presented in Figure 40 suggests that the information needs for any project in RTA have to be aligned with its business objectives and strategic goals. For example in order to improve maintenance effectiveness by 5%, an application called Maximo has to be configured for recording maintenance costs. This also helps to calculate the associated Dirham value for the information and enable an appropriate level of investments in knowledge.

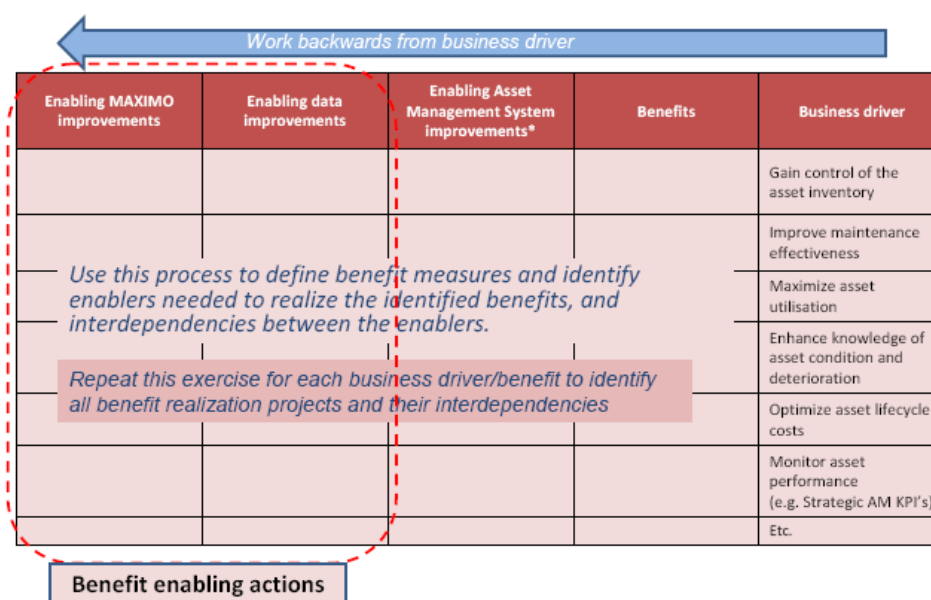


Figure 41: Business Benefit Realization and Technological Needs

Source: Atkins (2010), p.50

10.8 Performance Dashboard Tool for Minimizing Uncertainty

My suggestion of performance dashboard tool is designed to support knowledge management specifically packaging and utilization information to support direction process. This tool could help senior management in making use of information in decision making process. It supports providing directions to subordinates aiming to minimize uncertainty and fulfilling needs of RTA in sharing and using information. The suggested milestone for collecting and consolidating dashboard information are as follows:

1. Conduct Performance Workshop
2. Collect Information and Clean
3. Validate Dashboard Information
4. Ensure dashboard is continuously updated and is administrated
5. Verify the information credibility against received reports from concerned department and close the gaps

The proposed dashboard is for RTA executives including section managers, directors and CEO. The structure of the dashboard has two main interfaces:

1. CEO interface is a macro view of agency's departmental performance. It also contains historical results of performance indicators of the department distributed on 5 main criteria including risks, system, resource and strategic performance.
2. Director's interface is a micro view of departments performance. It contains details of performance indicators in relation to the 5 criteria mentioned above and a number of projects in execution.

The content of the dashboard/information can differ depending on the requirements of the business agencies and sectors.

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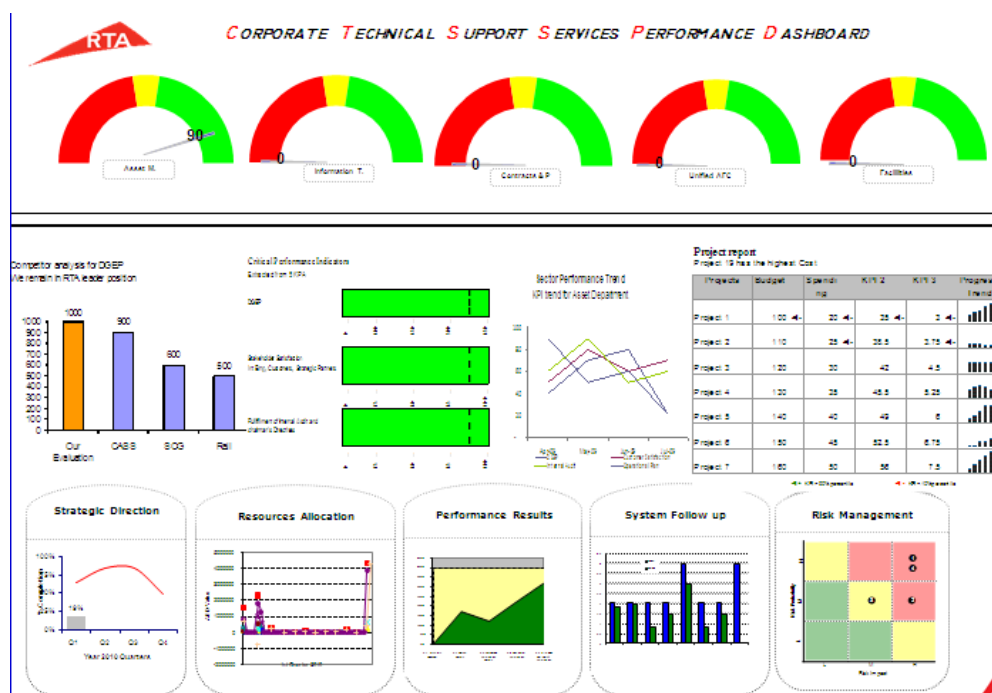


Figure 42: Sector or Agency CEO's Dashboard View

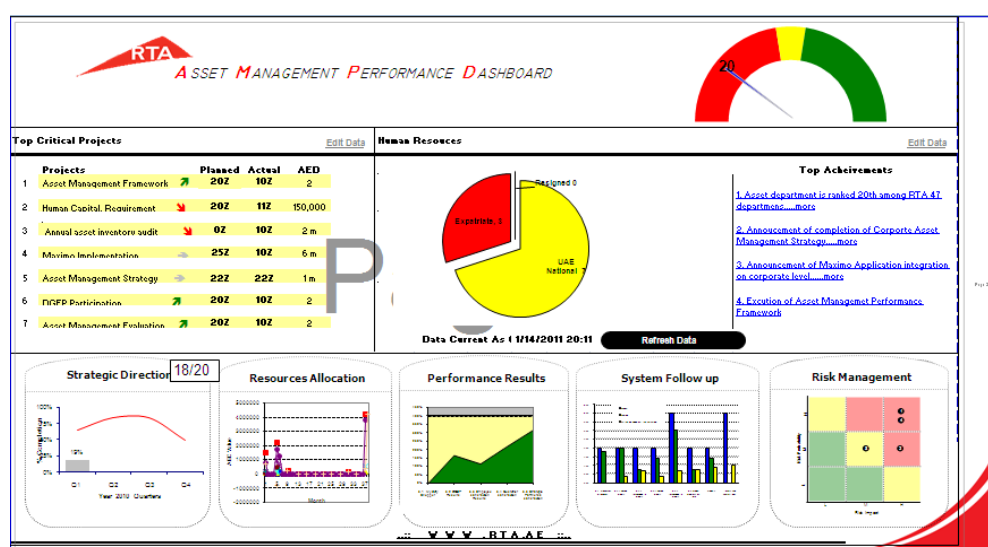


Figure 43: Department Director's Dashboard View

11 Conclusions

The factors influencing uncertainty in RTA organizations include both internal and external factors. These factors influence transportation domain and internal environment of RTA. Internal uncertainty can be managed within RTA, while influencing the external environment would be a real challenge. Minimizing or increasing uncertainty is largely impacted by the inner system of the organization and the external factors influencing the domain.

With regard to understanding factors influencing uncertainty in an organization, most of the interviewees demonstrated satisfaction about the flexibility of the strategic plan. A strong strategic plan forms a foundation for the success of RTA. Additionally, setting up a strategy which draws a map of changes for the coming years was accepted by the majority of managers. This indicates that RTA provides the execution culture through making it a challenging environment, bringing change through projects and encouraging managers to execute them. Interviewees agreed that RTA is a results-oriented organization which suggests that a proper project execution culture and environment have been established. The interviewees estimated their satisfaction with the strategic plan at above 60%. Areas for improvement suggested were clearer leadership of chosen strategic options and operational priorities on a long-term plan.

Adaptability, realism and demonstrating understanding of business environment are qualities found in managers of RTA. Reality in projects is sustained through communicating a sense of realism over what can be achieved and avoiding over-commitment of scarce resources. Another example of understanding the business environment is given by the Safety manager who suggested outsourcing execution of the safety plan for granting naming rights due to the overall lack of funds. Managers showed evidence on willingness to adapt to multiple situations through execution of

multiple projects designed to bring change to the transportation environment. Planning for operating the new intercity bus lane involves selecting bus drivers who drive properly on the road. Such selection decisions indicate an appropriate realization of employees' capabilities. It was also explained that drivers are motivated through incentives and these help to sustain continuing required levels of motivation.

Other section managers complained generally of unavailability of planned career paths for employees. In conclusion, it is understood that employees in RTA are receiving training in certain areas, however, a proper road map for career development in technical skills remains currently unavailable to employees. Training programs are not designed to be consistent with the career objectives of employees.

The characteristics of tasks contributing to uncertainty in RTA are high interdependency and high coordination requirements. The risk level can be transferred to the other party through selection of contract type. Thus, the other party needs to have the knowledge to execute technically complex tasks so that the risk of execution failure is applicable but uncertainty remains low on RTA part. On the other hand RTA is required to carefully select contract type for different projects part of RTA standards. This will classify projects to low, medium or high uncertainty projects that requires high coordination and integration requirements.

Further to linking uncertainty to strategic elements and execution of plans. It can be concluded that with low environmental uncertainty either low cost or low differentiation strategies are recommended for RTA. Both strategies can be used together in low environment uncertainty only. It has been argued in this dissertation that RTA is a transportation industry similar to aerospace therefore it involves high uncertainty unlike other industries such as health. RTA, like aerospace, is highly unstable and involves environmentally complex elements, thus sometimes requiring high cost and high differentiation strategies.

A differentiation business strategy is best suited for high uncertainty environments. To illustrate, RTA is likely to execute typical road and traffic projects. This involves a low cost strategy for providing road services to customers which may or may not involve high interdependency while task uncertainty is considerably low. On the other hand, a differentiation strategy involves introducing new services than typical response which is, for instance, Salik services that involves high uncertainty, high interdependency and is environmentally uncertain.

Most of the knowledge management strategies used in RTA include: combination, socialization for knowledge discovery, direction and routines. Services provided to customers include both differentiation and low cost strategies.

Turner (2001, p. 2) discusses contract selection based on risks. “Conventional wisdom is that at low risk fixed price contracts are best, moving to remeasurement and then cost plus as risk increases” In a fixed contract the risk is transferred to the other party while in other contracts the risks is handled by RTA. Contract type and risk are highly inter-related. When the risk is high, requirements for information and knowledge sharing are high and therefore uncertainty often will remain high. Turner further adds that: “Appropriate channels of communication need to be maintained, and these are one of the main transaction costs in project contract management, and do seem to be minimized by adopting the appropriate pricing mechanism as suggested” (p.10).

Uncertainty in transportation sector of the United Arab Emirates mainly relates to organizational policies and procedures, physical systems, transport processes and all working functions of RTA organization. While external uncertainty relates to those factors that can not be so readily influenced such as freight demand, weather conditions, road conditions, transport microeconomics and market conditions.

Differences between uncertainties can generally be categorized into external and internal categories in order to invest in internal strengths to overcome external threats and make use of opportunities. Simultaneously acknowledging the weaknesses and working on improving them.

The transportation industry is complex in nature due to many external elements impacting environment and these are unstable because they change frequently. Benchmarking RTA with other industries across the world will result in RTA being considered as a highly uncertain industry like aerospace or the airline industry. External elements include natural disasters such as weather conditions, unforeseen environmental conditions or changing public demands which largely impact transportation business. Other factors impacting transport industry are market changes, tourism, fuel prices and economic conditions of the country.

Further to approaches used by RTA experts to manage uncertainty, strategies worth highlighting are strategies are prioritization, risk management and outsourcing strategies. Additional strategies or mechanisms were service marketing, coordination and usage of other business tactics. Public sector privatization, commonly referred to as public private partnerships (PPP) is one strategy that RTA is adopting.

There are different mechanisms and techniques of managing uncertainty during strategy execution. A communication plan and its development can facilitate more effective utilization of time and focus efforts towards a results orientation. However it does not mean that ad-hoc requests will not remain an issue as there can be many other reasons for their occurrence.

As mentioned by The Safety Manager, the problem with communication is not concerned with delivering the information but obtaining information (27 May 2010).

Two-way communications involves exchange of thoughts, ideas and information. Communication occurs when two parties effectively give information and it is not said to be occurring enough within the Safety section. A communication plan helps to organize work and streamline meetings and communications internally and externally, and therefore saves time and assists with setting priorities. Having said that developing a communication plan can also be overly cumbersome for small sections which involve no more than 5 individuals such as the Mobility Section.

If risks are increasing then information/knowledge requirements are also likely to increase. Information/knowledge are core requirements as inputs to decision making process and clarifies the intentions of the agent. Managers demonstrated the need for information to support decisions related to safety. Lack of information raises uncertainty in managing contracts and certainly the performance of the agents undertaking the work.

Additional strategies found helpful in minimizing uncertainty for RTA are integration strategies, organic management system and focus on knowledge management processes and managing corporate information needs. Information management tools such as the performance dashboard can be used to ensure proper monitoring targets and achieving acceptable levels of performance through information sharing.

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12 Suggestions for Future Research

This research has highlighted some interesting areas for future research which are as follows:

- Business benefit realization for effective execution and updating of plans in government organizations
- Strategic risks management through selection of contract type for government organizations
- Information Management technologies for planning and forecasting demands

The above mentioned topics address critical issues in many government organizations in the UAE practicing strategic planning. These topics are worthy of exploration and further research for their expected impact and improvement in strategic planning activities.

References

- Anderson, J. (2010). *Cognitive Psychology and Its Implications*. New York: Worth Publishers.
- Atkins (2010). Asset Management Strategy Rollout. October 2010. London: Atkins
- Auster, E. & Choo, C. (1994). CEO, Information, and Decision Making: Scanning the Environment for Strategic Advantage, *Library Trends*, vol. 43 (2), pp. 207-224.
- Becker, B. & Gerhard, B. (1996). The Impact of Human Resource Management on Organizational Performance, *Academy of Management Journal*, vol. 39 (4), pp. 779-801.
- Booz & Company. (2009). The Roads and Transport Authority Strategic Plan. January 2009. New Zealand: Booz & Company.
- Birkinshaw, J. (2001). Making Sense of Knowledge Management. *Ivey Business Journal*, vol 4 (65), pp. 6-32.
- Burnes, B. (2000). *A strategic Approach to Organizational Dynamics*, England: Financial Times/Prentice Hall
- Clampitt, G. & Berk, R. (1991). *Strategically Communicating Organizational Change*, vol 2, pp. 5.
- Courtney, H. Kirkland, J. & Viguerie, P. (1997). Strategy under uncertainty. *Harvard Business Review*, pp. 81-90.
- Crumbling, D. (n.d.). *Managing Uncertainty* [online]. White Paper [Accessed 16 May 2010]. Available at:
<http://www.triadcentral.org/mgmt/splan/uncert/index.cfm>
- Dagblad, F. (2002). *Dealing with uncertainty in strategy and valuation*. [online]. [Accessed 28 May, 2010] Available at:
http://www.valuebasedmanagement.net/articles_dejonge_strategy.pdf
- Duncan, R. (1972). Characteristics of Perceived Environments and Perceived Environmental Uncertainty, *Administrative Science Quarterly*, Vol. 17, pp. 313–27.

Eisenhardt, K. & Kahwajay, J. (1997). Conflict and Strategic Choice, How Top Management Teams Disagree, *California Management Review*, vol. 39 (2), pp. 42-62.

Emmitt, S. & Gorse, C. (2003) *Construction Communication*. Hoboken: Blackwell Publishing

Fernandez, I., Gonzalez, A. & Sabherwal, R. (2004). *Knowledge Management*. New Jersey: Person Education, Inc.

Fitzsimons, M. (2007). The Problem of Uncertainty in Strategic Planning, *Survival*, vol. 48 (4), pp. 131-146.

Flick, U. (2009). *An Introduction to Qualitative Research*. Los Angeles: Sage.

Garson, G. (2008). *Principal Agent Theory* [online]. [Accessed 16 May 2010]. Available at: <http://faculty.chass.ncsu.edu/garson/PA765/agent.htm>

Gray, R. (2001). Organizational climate and project success, *International Journal of Project Management*, vol 19 (2), pp. 103-109.

Greenhuizen, M., Geerlings, H. & Premus, H. (2003) Transport Innovation Coping with the Future, *Journal of Transportation Planning and Technology*, vol. 26 (6), pp. 437-447.

Hansen, M., Nohria, N. & Tierney, T. (1999). What's Your Strategy for Managing Knowledge? *Harvard Business Review*, vol 77(2), pp. 16-160.

Johnson, G., Scholes, K. & Whittington, R. (2008). *Exploring Corporate Strategy*. Harlow, England: Prentice Hall.

Khan, A. (1989). Realistic Planning for Transportation, A Flexible Approach, *Long Range Planning*, vol.22 (5), pp.128-136.

Levey, C. (2010). Charismatic leadership in Resistance to Change, *Leadership Quarterly*, pp. 127-143.

Lewin, K. (1947) Frontiers in group dynamics, *Human Relations*, vol. 1 (1), pp. 15-41.

Lorsch, J. & Lawrence, P. (1972) *Organizational Planning; Cases and Concepts*. Michigan: R. D. Irwin

McKenna, E. (2006). *Business Psychology and Organisational Behaviour*. New York: Psychology Press.

Miller, D. (1987). Strategy Making and Structure-Analysis and Implications for Performance, *Academy of Management Journal*, vol. 30 (1), pp. 7-32.

Ministry of Economy and the Central Bank non-oil sector (2007). *Economic Development Year Book UAE*. Abu Dhabi: Abu Dhabi Economic Department.

N. A (2011). *Strategy Execution* [online]. shared presentation slides [Accessed 16 May 2010]. Available at: <http://www.slideshare.net/nusantara99/strategy-execution>.

Oreilly, A. & Chatman, J. (1986). Organizational commitment and Psychological Attachment, *Journal of Applied Psychology*, vol. 71, pp. 492-9.

Saarinen, T. (1990). Systems Development Methodology and Project Success, *Information and Management*, vol 19, pp. 183-193.

Smart, J. (1989). Managing Uncertainty: Environmental Analysis/ Forecasting in Academic Planning, *Higher Education: Handbook of Theory and Research*, Vol. 5, pp. 334-382.

Srivastava A. (2008). Effect of Perceived Work Environment on Employees' Job Behaviour and Organizational Effectiveness, *Journal of the Indian Academy of Applied Psychology*, vol. 34 (1), pp. 47-55.

Strategic Team at Abu Dhabi Government (2010). *Abu Dhabi Department Of Transport Announces Its 5 Years Strategic Plan* [online]. GulfNews Article [Accessed 10 June 2010]. Available at: http://www.dot.abudhabi.ae/show_image.html?./media/news_coverage/news_873569040.jpg

Stead, D. & Bainster, D. (2003). Transport Policy Scenario Building, *Transportation Planning and Technology*, vol. 26 (6), pp. 513-536.

Sull, D. (2007). Closing the Gap Between Strategy and Execution, *Sloan Management Review*, vol. 48 (4), pp.30-38.

The Impact of Change on the Organisation, tutorial handout distributed in the module 7, PMJ01507 People and Culture, the British University in Dubai, Dubai on 24 April 2009

Turner, J. (2001). Project Contract Management and A Theory of Organization, *Erasmus Research Institute of Management (ERIM)*, vol. 85, pp. 3-15.

Westerveld, E. (2003). The project Excellence Model: Linking success criteria and critical success factors, *International Journal of Project Management*, vol. 21 (6), pp. 411-418.

Zaltman, G., Duncan, R. & Holbek, J. (1973). *Innovations and Organizations*. New York: Wiley.

Appendices

Appendix 1: Performance Dashboard-CD

Appendix 2: Summary of the Collected Data

Appendix 3: Interviews Voice Notes-CD