INVESTIGATING THE STRATEGIC ALIGNMENT OF KNOWLEDGE MANAGEMENT ORIENTATION IN MALTESE MEDIUM TO LARGE SIZED ORGANISATIONS

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ABSTRACT

Recent studies related to knowledge-based business processes, organisational culture and leadership have shown that a link with business performance exists. However the overall link and alignment with business strategy still needs further research. The objective of this dissertation is to investigate this gap in Maltese medium to large-sized organisations, with the aim of providing evidence that knowledge-based management systems provide direct contribution to both the strategic alignment and organisational performance.

Most current knowledge management literature is based on qualitative research which more often than not has led towards the development of models that contradict each other. In this research a totally different approach will be sustained through the use of quantitative research techniques, which will be applied to existing knowledge management models. Another objective is to investigate how knowledge management strategies relate to strategic orientations in Maltese medium to large-sized organisations.

In order to investigate these objectives, research was conducted by using a questionnaire-based strategic alignment model derived from literature, which focussed on the business environment, business strategy, knowledge orientation and organisational performance of Maltese medium to large-sized private and public organisations.

It is evidently clear from the findings that there is a significant difference in knowledge management practices between Maltese organisations adopting different strategic orientations. It has also been established that twenty-one knowledge oriented components were significantly correlated with organisational performance, which can be classified in terms of performance category. Ultimately this dissertation develops a knowledge orientation typology for Maltese organisations, linking knowledge orientation and business strategy for Maltese medium to large-sized organisations.

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Finally a word of thanks goes to my parents, whose without help, courage and morale, the objective of this dissertation would never have been reached.

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Chapter 1 – Introduction

1.0 Introduction

This dissertation investigates the knowledge management strategies that Maltese medium to large-sized organisations follow and how these relate to their current business strategies and degree of turbulence encountered in their business environments. The objectives of this dissertation are the development of a model that describes these components amongst Maltese organisations, the formulation of a typology of knowledge management strategies and the impact that these strategies have on organisational performance.

1.1 A historical background on knowledge management

Amongst the first to recognise the value of knowledge management in organisations was Smith (1776) who specifically mentioned the utility of 'specialised content of knowledge' to increase organisational efficiencies in the production of the physical object. Marshall (1890) also recognised the importance of knowledge management as 'a powerful engine of production'.

With the advent of information technology systems, knowledge management utilization seems to have become an essential component in contemporary society (Walsham 2001). According to many writers, this has enabled organisations to exploit their knowledge assets to a far greater extent (Swan et al., 1999; Liao 2003). Dissemination and sharing of information in organisations have developed significant benefits which led towards benchmarking procedures and best practices approach. Organisations are no longer being seen simply as a resource-based entity

i.e. lowering costs of products and services or attaining higher quality (Zack 1999a), but have extended further towards knowledge-based systems i.e. understanding and initiating human knowledge in computer systems (Liao 2003). Organisations are being identified in terms of their organisational processes, value chain location, and their relationships with clients and suppliers (Teece et al., 1997). Information sharing is considered as a strategically important tool for the adoption of best practices working procedures, problem-solving processes, organisational governance and competence-enhancing strategies (Teece et al., 1997; Liao 2003).

In line with this change, knowledge management research and practice has increasingly focused on the utility of invisible assets, development of core competencies, creativity and learning from the market in order to address changing client needs, organisational behaviour impact assessment, 'capabilities-based competition', business process-orientation, dynamic networks, relationship management, and appropriate logistic support infrastructure (Miles & Snow 1986; Itami 1987; Hamel & Prahalad 1994; Spender 1996; Løwendahl & Revang 1998). Choosing the right knowledge management interests is now increasingly seen as the essence of strategy (Mason 2008). For example Abernethy and Bouwen's (2005) research focuses on how organisations can implement processes and structures in optimising technologies with the aim to support decision-making. Thus, the objective of this research is to address such issues to a number of Maltese medium to large-sized private and public organisations, with a focus on the strategic alignment of knowledge management orientation adopted, which is the specific

approach to knowledge utilisation an organisation implements in order to create superior and continuous performance (Gatigon & Xuereb 1997).

1.2 The importance of knowledge management as a strategic tool

The Sloan Management School pinpointed the importance of strategic alignment between business and information systems architecture reflected in terms of infrastructure and processes supported by IT (Scott-Morton 1991). Marchand et al., (2001) were amongst the first to extend this and claim a link between information systems management, organisational culture and performance. However, this research did not make use of the categorisation between organisations possessing different strategic orientation as had been suggested by Scott-Morton (1991), and in general, there has been a lack of research that has investigated the relationship between information systems and business strategy with a view to enhancing knowledge management. One of the aims of this study is to address this gap in the literature.

1.3 The scope of this dissertation

The literature review conducted for this dissertation will lead towards investigating what knowledge management strategies Maltese public and private organisations follow and what strategic approaches such organisations adopt when faced with environmental turbulence. It seems that a one-size fits all is not practicable and strategic direction plays a vital role in determining the nature of the organisational knowledge management strategy. The scope of this dissertation is the development

of a model that describes knowledge management strategies within the Maltese scenario and the impact of those strategies on organisational performance. The objectives of this study are:

- To examine and, where appropriate, refine existing conceptions and typologies of knowledge management orientation with reference to the Maltese context.
- To refine existing typologies of organisational strategy with reference to the Maltese context.
- To advance current understanding of the relationship between knowledge management orientations and organisational strategy in Malta.
- To determine common associations/alignment between types of knowledge management orientations and organisational strategy.
- To determine the types of knowledge management orientation organisation strategy that is associated with high organisational performance.

In terms of the study's methodology, structured interviews were conducted with a number of respondents selected from Maltese medium to large-sized organisations before a final survey was undertaken. The objective of the structured interviews amongst ten selected Maltese organisations was to enable respondents to provide feedback on the survey design. In order to investigate these objectives, research was conducted by using a questionnaire-based strategic alignment model derived from literature, focusing on the business environment, business strategy, knowledge orientation as well as organisational performance on Maltese medium to large-sized organisations.

1.4 The Maltese business context

Many Maltese organisations have either passed through reengineering processes, downsizing and/or restructuring, in order to align themselves with Malta's entry in the European Union (Calleya 2000). The issue of competitiveness currently dominates parliamentary debate as competitive pressures continue to build on stakeholders and shareholders due to increased market growth, competition itself and the ability to respond to opportunities and market threats. Private organisations are increasingly demanding better returns and are adopting faster mechanisms to respond to such pressures (Economic Policy Division 2007). The public sector is no exception and the issue of privatisation and downsizing amongst such organisations has been and still is on the Maltese government agenda. This new way of thinking has brought Maltese organisations to look for new ways in improving their capacity for strategic thinking as well as addressing both opportunities and threats in an open European market. Information and communication technologies are reshaping the Maltese scenario in many aspects, especially in customer relations, free competition and supply-chain management fields. Throughout 2007, the Innovation Relay Centre, hosted by Malta Enterprise since January 2005, has succeeded in assisting and creating collaboration between European and Maltese organisations in technological related areas. The Business Technology Network has also assisted a number of Maltese organisations in discovering appropriate technologies available that would enhance their competitiveness (Economic Policy Division 2007).

The issue related to the dissemination of information and knowledge has generated complex processes, which has demanded greater co-ordination and rapid response to new challenges both at a national and global level between organisations (Miles & Snow 1986; Quinn 1992; Løwendahl & Revang 1998). This complexity is expressed in both the technological 'machinery' aspects and the knowledge gained by employees in organisations (ILO 2003; Teck-Yong 2004). These issues have become highly relevant for Maltese organisations (Economic Policy Division 2007). For many writers, this is a trend being faced by countries across the world (Liao 2003).

1.4.1 Setting the scene: The Maltese economic growth in productive and services activities

During the first six months of 2007, the real Gross Domestic Product of Malta rose by 3.6 per cent. In nominal terms the Gross Domestic Product advanced by 6.1 per cent to reach €2.5 billion (Economic Policy Division 2007). The challenge to traditional manufacturing and the need to respond in some way is a problem being experienced across Europe and globally (IDC 2008). The domestic manufacturing industry is facing a number of challenges instigated from trade liberalisation and globalisation processes. This has generated calls for a greater need of knowledge management amongst Maltese organisations. The relatively subdued foreign demand also had an impact on the performance of this export-oriented industry. Within this scenario, the Maltese manufacturing industry registered a 4.1 per cent increase in turnover compared to the first six months of the previous year

(Economic Policy Division 2007). The services categories remain one of the main pillars in Maltese economy, with tourism being the largest contributor followed by financial services (Economic Policy Division 2007).

1.4.2 The structure of the dissertation

The structure of this dissertation is shown in figure 1.1.

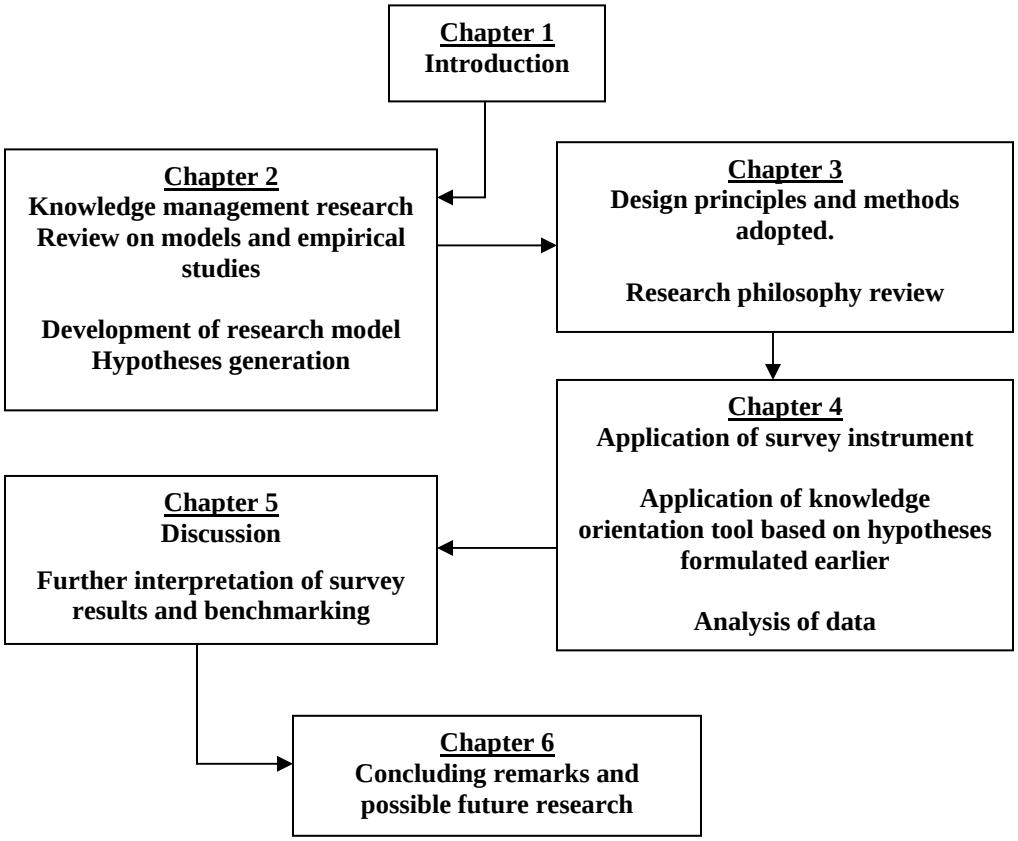


Figure 1.1: The structure of the dissertation

Chapter 2 offers a literature review based on theoretical background, models and other empirical studies that have a direct bearing on the research being investigated. This includes key themes related to knowledge management, the relationship between business strategy knowledge management and performance, and the

utilisation of performance management tools. The development of organisation business strategy is discussed through the Miles and Snow typology (1978), Hansen's et al. (1999), and Conant et al. (1990) models. Building knowledge management into strategy is also discussed through the different characteristics, cultural variations encountered, creation and knowledge conversion which led towards the development of hypotheses related to strategic orientation for Maltese medium to large-sized organisations. This chapter also provides the research model design. The formulation of broad hypotheses generated, is used for further testing purposes. These hypotheses are designed to probe organisational knowledge strategy, strategic alignment, strategic fit and performance in Maltese organisations, together with what role IT plays and environmental turbulence encountered, human resources aspects related to reward mechanisms, recruitment, training and termination of staff issues. Other issues investigated are related to the characteristics of knowledge orientation and the management and organisation of knowledge management strategy-types in Maltese organisations. Chapter 3 outlines the design and methods that were used for the survey investigation as well as the research methodology conducted. This chapter also discusses the design of the survey tool based on existing tools identified in the literature review including the knowledge management orientation instrument based on Truch's (2004) study. Chapter 4 provides statistical analysis of the survey conducted amongst Maltese medium to large-sized organisations. Chapter 5 provides a discussion of the results on the data analysis and the findings from the previous chapter, which will eventually lead towards the comparison with other knowledge-based models and

theories and the creation of a knowledge orientation taxonomy that best reflects the Maltese organisational scenario. Chapter 6 provides concluding remarks on the need to advance and refine Truch's taxonomy, the emergence of apparent relationships between strategic-types, knowledge management orientations and performance, limitations encountered as well as possible future research proposals.

Chapter 2 – Literature Review

The objective of this literature review is to discuss current and recent themes in the research relating to knowledge management and organisational strategy. In doing so, it will ultimately demonstrate how the research questions and hypotheses were arrived at. The key areas tackled deal with business and strategy formation, the environment the knowledge-based organisation is in, knowledge management strategy and control, and strategic alignment. The literature review that follows relates to the central research question of how organisational strategy and knowledge management are related to each other and to performance in the Maltese context. Few researchers have attempted to explore the relationship between an organisation's overall strategic orientation and knowledge management orientation.

2.1 A historical overview of knowledge management thinking

"The most successful executive in all history was surely the Egyptian who 4,500 years or more ago, first conceived the pyramid, without precedent, designed it, and built it, and did so in an astonishingly short time" (Drucker 1994: 53). Drucker states that the Egyptians demonstrated the essence of effective knowledge management by balancing creative abilities towards transformed valuable goods (Graham & Pizzo 1996). Drucker's assertion has to be drastically modified as the construction of Maltese megalithic structures aligned with celestial bodies, age a merely a thousand years earlier (Micallef 1989; Micallef 2000). Therefore knowledge management has a longer history than is often assumed.

In the early 20th century, organisational co-ordination was initially perceived to be a command-and-control type, whereby employees were given explicit daily operational instructions, which had to be executed whether they were right or wrong (Kanigel 1997). This type of management style, easily de-motivated employees, as although the strict control mechanism was designed to guarantee that tasks were eventually executed, performance-levels were low (Day & Wendler 1998b). In the 1950s, industrial organisation theory which is based on microeconomic theory brought about the rise of a number of strategic tools namely cost curves, the five forces framework, the concept of sustainable competitive advantage and others (Beinhocker 1997). Starting from long-range planning techniques, followed by corporate planning techniques of the 60s-70s, the 80s were presented with organisational positioning. This was followed by competitive advantage and focus on organisational internal strengths in the 90s. Poynder (1998) outlines three schools of thought regarding the development of knowledge management namely:

(i) An information technology aspect involving networks, groupware, communication tools to aid group knowledge collaboration.

(ii) A human resources aspect with emphasis on organisational culture and teamwork.

(iii) The development of processes (which may not involve information technology) to measure and capture the know-how of organisations.

Although the strategic tools mentioned earlier are still applicable in today's management techniques, a dilemma arises when faced with new technological innovations, which may cause price or consumer fluctuations or instigate different

interpretations of the same information causing uncertainty. In today's highly volatile high-tech, globalisation, deregulation issues and service dominated economy, Marshall et al.'s (1996) equilibrium model[1] is challenged. What may be inapplicable for an investment in a fierce competitive situation may well be applicable if the organisation is strong within the market. Strong organisations are those that at one point or another have violated the traditional closed-equilibrium model and developed an advantage over other competitors (Beinhocker 1997; Bontis 2001).

Before progressing on to a deeper exploration of the development of knowledge management, it might be useful to consider briefly the notion of 'knowledge' itself, as the concept is a contested one. It has been defined as 'sticky' and tends to adhere to people's heads making it difficult to transfer (von Hippel 1994). Knowledge has also been defined as "an ambiguous, unspecific and dynamic phenomenon, intrinsically related to the meaning, understanding and process, and therefore difficult to manage" (Alvesson & Kärreman 2001: 996). However, according to some writers, it also offers increasing returns by providing a framework for evaluating and incorporating new experiences and information, which continuously changes and providing a culture and environment in which organisational knowledge can evolve through values and beliefs (Davenport & Prusak 1998; Osborne 2004). The issue about belief dates back to traditions of Western objectivist epistemology, which suggests that knowledge, is objective, absolute and

[1] Marshall et al., (1996) mention that in a closed loop system, the industry structure is known, all organisations are perfectly rational and that the law of diminishing returns applies (Beinhocker 1997).

context-free. This position has increasingly received criticism from those who claim that knowledge cannot exist without human subjectivities and contexts faced. In fact it is argued that the different values that people possess and seen differently, eventually leads towards the creation, organisation, and transcending of their knowledge through their values (Davenport & Prusak 1998; Nonaka et al., 2000; Nonaka & Toyama 2005). Although Styhre et al., (2001) state that knowledge and knowledge management do not sufficiently recognise the social, political and emotional aspects of knowledge, knowledge is still considered of strategic major importance by successful organisations (Dyer 2000). It is therefore of little surprise that so much has recently been written about how it can be effectively managed. Indeed, many writers observe, the importance of managing knowledge is becoming ever more important as organisations become increasingly exposed to shifts in the global economy.

Organisations are no longer being considered as being closed or in equilibrium (Alvesson and Kärreman 2001). Many researchers have cited the issue of a discontinuous, unpredictable and changing turbulence in social, economic, political and global contexts, which may vary from one industry to another (Ansoff & Sullivan 1993b). Previously in the industrial age period, Marshall et al., (1996) mention that in a closed loop system, the industry structure is known, all organisations are perfectly rational and that the law of diminishing returns applies (Beinhocker 1997). It has been claimed that there is a different success formula for different environmental turbulence levels.

Knowledge-based theory is becoming more dynamic beyond production and resource-based theories. According to Andersen's research (1998), it is perceived that intellectual capital[2], will enable an organisation to transform a bundle of information pertaining to financial and human resources into one of increasing stakeholder value (European Commission 2006), and that knowledge management would improve organisational performance. This is in accordance with Vera (2001) and Marr and Schiuma (2001; 2003), who highlight the apparent rise in learning organisations, which implement and sustain knowledge management tools and measure intellectual capital. But still the question remains; what *is* knowledge management?

Trying to provide a concise interpretation of what is knowledge management is a daunting task, as this means different things to different people who work in different organisations with different environmental scenarios, and is too ambiguous to neatly organise, co-ordinate and control it (Alvesson and Kärreman 2001). Knowledge management is a concept that has been used to cover a broad terrain from organisational learning to database management tools, which can be used in a variety of ways i.e. sharing of ideas, for prescribed interpretations, for information exchange, continuous improvement and as a means of action where individuals are engineered and controlled to the behavioural level, rather than values and ideas (Alvesson and Kärreman 2001). Reference here is made to Hansen's et al., model (1999) where knowledge management is implemented

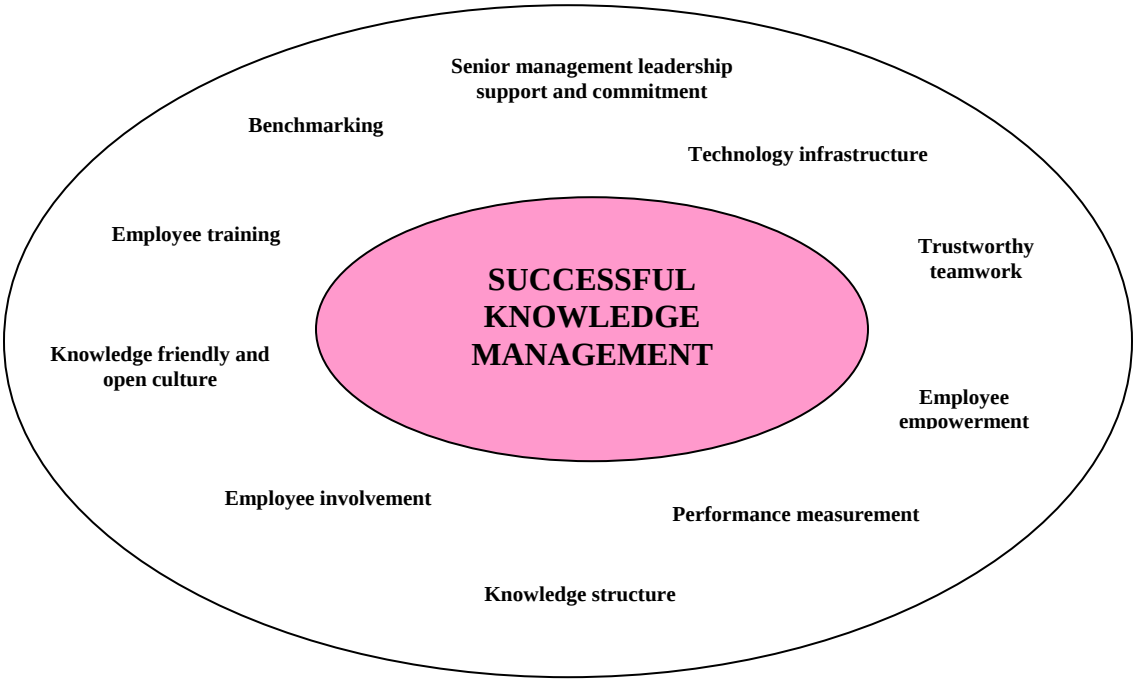
[2] Intellectual capital is defined as the combination of intangible resources and activities.

through codification or personalisation strategies, which is explored in more detail in a later part of this review.

2.2 Key themes relating to knowledge management

The features that define knowledge management are numerous as different schools of thought yield different meanings and dimensions (Salleh & Goh 2002; Halawi et al., 2006; Maier 2007). Academic debates related to knowledge management have focused on three main perspectives namely techno-centric that is technology focused that enhances knowledge sharing and creation, organisational that focuses on knowledge processes facilitation and ecological which focuses on people interaction, identity, knowledge and environmental factors as a complex adaptive system.

One of the most concise definitions that address the scope of knowledge management is provided by Swan et al., (1999) who identify it with the proper exploitation of knowledge to ultimately enhance organisational learning and performance. In a wide-ranging review, Chong & Choi (2005) synthesised several knowledge management models with the aim of developing a unified framework. Their research based on Davenport et al. (1997), Ryan and Prybutok (2001) and Moffett et al., (2003) identified key themes for successful implementation of knowledge management (figure 2.1).



Source: Adapted from Chong & Choi (2005: 4-21)

Figure 2.1: Critical success factors for successful knowledge management

Unfortunately there is lack of unifying theories on what are the critical success factors that sustain organisational knowledge management. Chong & Choi's (2005) identification of critical factors that address successful knowledge management aims at the better organisation of knowledge management activities. However it is assumed by the authors that this model addresses all organisations across the board, besides the invitation for practitioners to check the extent of implementation of these success factors in their respective organisations. Based on Davenport's et al., (1997) research, Chong and Choi's model also fails to add other key themes such as balance of flexibility, ease-of knowledge accessibility, and the importance of shared knowledge through a motivated workforce. March (1991) identifies an exploration-exploitation typology in relation to knowledge-enhancing learning. Exploration or

radical learning is linked with variation, risk-taking, experimentation, long-term improvement, diversity, flexibility, discovery of new resources, increase in organisational stock of knowledge and innovation referred to as knowledge generation (Spender 1992; Maier 2007). On the other hand, exploitation or incremental learning is linked with efficiency, effective use of resources, short-term improvement, choice, implementation, production, refinement, deploying existing knowledge to create value and extension of existing competencies and execution, referred to as knowledge application (Spender 1992; Maier 2007). March (1991) argues that exploitation strategies will become more common with organisations as the proper understanding of their environment will improve. Generally exploitation returns are positive, proximate and predictable. The same cannot be said of exploration as returns are uncertain, distant and often negative. The creation of knowledge capital from exploration develops new niches, whereas the exploitation of such knowledge maintains the financial capital necessary for further innovation and exploration. These innovations and explorations become the fuel for the organisation's drive and successful implementation of knowledge strategy (Edvinsson & Sullivan 1996; Maier 2007).

For most writers successful implementation of knowledge strategy, means proper strategic alignment as to what the organisation knows or enhancing and developing the organisations' capabilities towards the desired strategy for the eventual closure of knowledge gaps (Segev 1987; Grant 1991; Davenport & Prusak 1998; Zack 1999a; von Krogh et al., 2000; 2001; Maier & Remus 2002). Knowledge

management literature is rich about the importance of knowledge strategy. However the proper link between organisational knowledge and business strategy is still lacking and most knowledge management initiatives are perceived simply as information systems projects (Davenport & Prusak 1998; Ruggles 1998; Zack 1999a; Truch & Bridger 2002; Maier & Remus 2002; Halawi et al., 2006). Therefore, there is a need to understand better the relationship between knowledge management and organisational strategy, and it is to this issue that the discussion now turns.

Davenport and Prusak (2000) state that assessing the connections between knowledge management and business strategy can lead to practical methods that improve the effectiveness of both. As such writers observe, linking knowledge to strategy is unlikely to happen by chance. It is often claimed that a key source of sustainable competitive advantage is the formulation of a clear knowledge strategy so that maximum resource allocation, such as installing new technologies or the use of better management techniques are derived (Rusk & Barber 1988; von Krogh et al., 2000). Although the von Krogh[3] et al., model provides a proactive structured approach built on the old political virtues of justice and visionary organisations, one should note that existing knowledge management literature generally does not address gender issues, general political aspects of knowledge or other form of influences and is still considered in its' infancy (Styhre et al., 2001).

[3] The von Krogh et al., (2000) model provides accounts on building classless societies, total involvement, mutual trust and active empathy sustaining a 'complete political vision of the good and sane society' (Styhre et al., 2001: 72).

2.2.1 The influence of cultural diversity on knowledge management

One of the issues that must be addressed in business is the cultural diversity on work-related attitudes and values as well as the impact of cultural diversity on knowledge management (Robbins and De Cenzo 1998). Efficient and effective knowledge management will depend to a large degree on stakeholders and management in creating an environment in which employee cultural diversity is taken into account.

Culture is a term used by social scientists that refers to a set of parameters to distinguish between nations, organisations and groups in a meaningful way (House et al., 1996). There is a general agreement that an organisation's culture is evolved over time following group interaction in order to achieve a common purpose or organisational goals following clear differentiation between basic values and behaviours (Bechtold 1997). Hofstede (1980) focused on work culture, management and organisational development in multinational companies in different countries and claims local cultural and institutional factors are crucial in shaping the development of management and organisation especially employees' attitude towards working life.

Bhagat et al., (2002) note that effective inter-organisational knowledge is influenced by many factors. These include knowledge-specific factors such as complexity and tacitness, knowledge generation and utilization which are constrained by embedded social and cultural contexts, as well as knowledge transfer

which are generally influenced by cultural, organisational distance and prior experience (Szulanski 1996; Simonin 1999).

According to Hofstede et al., (1990), culture is a multi-level phenomenon that manifests at the societal, national, corporate and occupational levels. This is followed by the diversity of cultural contexts at the same level and the manner in which culture influences the behaviours central to knowledge transfer that is knowledge valuation, structure, contextuality and actualization (DeLong & Fahey 2000). Knowledge transfer is considered as a multi-stage phenomenon in which cultural-specific factors appear in a certain order of occurrence (Szulanski 1996). The role of these cultural-specific factors either facilitate or inhibit knowledge transfer activities.

Hofstede proposes a model in which worldwide differences in national cultures are categorized according to five dimensions which helps towards the better understanding of management encountered, although one should mention that the situation in each country has its' unique characteristics that no model can account for. Hofstede's (1993) analysis of IBM subsidiaries identified four bipolar dimensions of cultural difference and added a fifth which is based on Bond's work (table 2.1) (Batista 2008).

Dimension	Description
Power distance	The extent to which the less powerful members of organisations accept and expect the unequal distribution of power within a country. All societies are unequal, but some are more unequal than others.
Individualism	The degree to which people in a country behave as individuals rather than taking action as cohesive groups. Collectivism is the opposite of individualism.
Masculinity	The degree to which tender values which generally are associated with women's role are gauged against tough values generally associated with men's role. Typical tender values include care for the weak, service, personal relationships and solidarity. Tough values include performance, success, assertiveness and competition. These values differ between countries.
Uncertainty avoidance	The degree to which people in a country prefer structured clear rules over unstructured scenarios and is the tolerance people give to risk and unconventional behaviour in society. Structured situations refer to how one should behave. The adoption of one over the other leads to different kinds of behaviour.
Orientation	Short-term orientation is associated with social obligations fulfillment, and respect for tradition. Longer-term orientation is associated with perseverance and thrift.

Adapted from Hofstede (1993); Robbins & De Cenzo (1998); Batista (2008).

Table 2.1: The primary dimensions of cultural difference

According to Hofstede (1993), culture is defined as the collective programming of the mind that distinguishes one category of people (or nation) from another. Hofstede states that differences only arise between different national contexts. This has been criticized by Garsten (1994) who states that Hofstede did not take into account the changing relationship between parent and subsidiaries in a globalized economy and in fact ends up with a different view of the parent company's impact on its subsidiaries. The difference is that Garsten (1994) sees culture as a dynamic process whereas Hofstede (1980) sees culture as a categorization of attitudes according to pre-established theoretical dimensions. Hofstede's approach has been

criticized for giving biased emphasis of the influence of national culture on employee values (Fleming & Søborg 1999).

Hofstede concludes that culture at national level and at organisational level are indeed two different phenomena. He states that national cultures are to be taken as invisible values acquired in early childhood and change very slowly if at all, whereas organizational cultures reside mainly in the visible practices of organisations acquired through socialisation which may be consciously changed though not outright in an easy manner. Thus if cultural diversity impacts on employee values and work-related attitudes it would also influence how employees value, participate and support organisational knowledge management.

2.2.2 A critique on knowledge management

Over the last few centuries deskilling appeared to be essential to sustain progressive economic growth. However the history of the capitalist organisation shows that changing social conditions and class conflict sustained Marx's perspective. Studies on the nature of work, particularly the literature on the labour process, date from Braverman's (1974) path-breaking 'Labor and Monopoly Capital', related to deskilling of work and management control intensification under 'Taylorised' forms of capitalist work organisation. Braverman (1974) describes Taylorism along three main abstract principles namely:

(i) Workers' knowledge, the rendering of the labour process independent of craft and their replacement with experiments.

(ii) The separation of conception from execution and

(iii) The use of the managerial monopoly over knowledge to control the labour process.

Braverman, and other academics helped free Marxists from a simplistic view of capitalist technological advancement towards a universal achievement. In this field, technology is conceived as a construction of social actors which help towards addressing social interest better. They argued that technology design was shaped by capitalism. This spread of technology into social life provided increased popularity for Foucault and Marcuse's new perspective related to power and knowledge.

Braverman's (1974) account of the division of labour provides a distinction between mental workers who control others and manual workers who are controlled by mental workers. In essence Braverman argues that the extent of difficulty of specialised knowledge and skills transfer from workers to managers predicts the degree of power that managers possess over workers. Fundamentally Braverman (1974) states that there is always a fixed amount of power in any social relationship. Thus if management acquires knowledge of some sort of process, the workers are either supposed to lose this knowledge or be incapable of regaining it. Thus Braverman conflates acquisition of knowledge with knowledge monopoly and examines control historically in terms of worker to employer control which can never be complete and predictable.

Altmann et al., (1992) confirm parts of Braverman's thesis related to 'skill polarisation', work rationalisation through skill substitution and upgrading. This lack of general fit reveals an important limitation of Braverman's work related to the universal division of labour, occupational and training systems. In essence Braverman undervalues the way the 'labour process' is embedded within socio-cultural contexts.

Braverman (1974) argues that the logic behind capitalism, is to provide managers in using technology to increase both the control of workers and productivity. Braverman is not saying that technology produces social relations but states that the manner in how labour processes are organised and executed is the product of the social relations we know as capitalist. Thus the use of organisational knowledge repositories can lead towards a power shift away from employees towards management.

Braverman's treatment of scientific management and Taylorism is also strongly debated following the rise of knowledge economy and its presumed paradigmatic break on old capitalism. Braverman is heavily criticized by Burawoy (1979) on skills, class and occupational structures and the neglect on the consciousness theme, claiming that there should be an understanding of the labour market and process prior to understanding class perceptions. Buroway claims that employees use work as a form of resistance, games and ingenuity offering ways of managerial control modification and capitalist production values simultaneously. However one should

also note that Braverman also focussed on the limited effect such struggles have in preventing capitalism in transforming jobs into routine activities.

Thus Braverman's work refers to the way in which key knowledge and skills can become divorced from employees and stored within systems of technology, This 'deskilling' is said to increase management control over the labour process. It seems that knowledge repositories will have a considerable influence as to how organisations will operate in the future notwithstanding the effect of managerial control, employee power and the structure of knowledge work which ultimately address the distribution of power and organisational knowledge systems.

2.2.3 Environmental turbulence and organisational strategy

The positioning strategic theory proposed by Porter (1980), brought with it a revolutionary way of thinking as the five sources of competitive pressure namely competition from the suppliers of substitutes, the threat of competition from new entrants, competition from established producers and the bargaining power of buyers and suppliers are addressed in one model influencing competition and the level of profitability.

Porter proposed that the overall cost leadership, differentiation and competitive focus can occur at industry level. It was thought that organisations should study their competitive environment with the aim of setting up objectives that reflect their position with other key players in their market. This resonates with one of the key

themes of knowledge management theories, which states that to remain competitive, organisations must explicitly manage their intellectual resources and capabilities, besides developing a knowledge-oriented culture, possess the right technical and organisational infrastructure as well as the development of multiple channels for knowledge transfer (Davenport & Prusak 1998; Zack 1999a; Dewhurst et al., 2001).

Although Drucker (1995) and Conner & Prahalad (1996) predict knowledge as the key economic and dominant resource of competitive advantage, Keep (1999) argues that organisations do not necessarily follow a high-skills route in order to compete, being rather a minority of organisations that in fact do. Some organisations compete with the lowest cost base, achieving profitability from a narrow range of standardised goods and services in price-driven markets as much depends on the research and development investment which is correlated with high skills level needed. Skills development 'hardwires' onto the vocational training (VET) system which projects towards skills requirements (Keep 1999). However according to the 2007 EU Industrial Research and Development Investment Scoreboard, world-wide corporate R&D investment increased to 7.4% from 5.3% in EU countries in 2006 and by 11.1% from 7.7% in non-EU countries in 2006 (Hernández et al., 2007). According to Hernández et al., (2007) it also seems that R&D investment in many world-wide organisations is gaining ground and paving its' way towards more knowledge-based organisations. Knowledge-based organisations start with the primary intangible resource, the competence of people. People are increasingly seen

as the only true agents in business; all tangible physical products and assets as well as the intangible relations are results of human action, and depend ultimately on people for their continued existence (Sveiby 2001).

2.2.4 The different types of knowledge

Discussing different types of knowledge provides insights on how knowledge can be leveraged for improved organisational performance. A marked difference exists between individual and collective, tacit and explicit knowledge, which relates to the different knowledge management approaches that can be adopted by organisations. Individual tacit knowledge can usually be deciphered through individual schemas, skills, habits and abstract knowledge. On the other hand collective tacit knowledge is deciphered through principles and routines, organisational and professional cultures held in common within the employees of the organisation, achieved through comprehensive and updated shared directories of experts that may provide information about their work and experiences, consensus on past experiences, cultures and competition itself (Quinn et al., 1996; Davenport & Prusak 1998; Matusik & Hill 1998; Hansen et al, 1999; Sherif 2006). Generally tacit knowledge is mainly learnt through experience and produces difficulty levels when trying to communicate, articulate and formalise it (Polanyi 1966). On the other hand explicit knowledge can be transferable and codified using systematic procedures. As regards to individual tacit knowledge this comprises of knowledge and skills that can be transmitted using learning techniques or reproduced in written format, whereas collective explicit knowledge resides in written documentation, information systems

and standard operating procedures (Brown & Duguid 1991; Lyles 1988; Starbuck 1992).

The manner in which tacit or explicit knowledge can be leveraged determines a number of issues that will be addressed through a number of hypotheses that will be investigated in Maltese organisations. This includes the type of staff recruited, the rewards mechanism and the appropriate training that can be adopted and how knowledge is retrieved if an employee terminates his/her employment from an organisation. This also has a bearing on the type of strategy adopted that is whether a personalisation or codification-type strategy, which will be discussed in a later part of this literature review.

2.2.5 Types of knowledge management strategy

The purpose of this section is to introduce Hansen et al's (1999) typology of knowledge management strategies, and Miles and Snow's business strategy typology, both of which form part of the analytical base of this study. The scope for identifying areas of alignment between these two typologies is also explored. Using research conducted in consultancy, healthcare and computing organisations, Hansen et al., (1999), identified two different types of knowledge management strategies. On one hand are those organisations based on information technology strategies and adopting codification strategies, where data is codified using the 'people-to-documents' approach and stored in databases, whereby it can be accessed by anyone in an organisation (Lee & Yang 2000) and retrieved without the person who

developed it being contacted. This research is similar to Nonaka and Takeuchi's (1995) interaction from tacit into explicit knowledge referred to as externalisation, which includes the formal development of operational activities which lead towards proper recording of knowledge and evaluation of documentation. On the other hand, personalisation strategy involves the creation of knowledge, is synonymous to the person who creates it, and is disseminated on a 'contact-to-contact' basis.

According to Lee & Yang (2000), the choice of strategy-type adopted by organisations is rather a delicate process and generally depends on how clients are to be served, the marketplace in which the organisations is involved, and the kind of staff employed with the organisation. Any wrong strategic choices made by an organisation, may lead to strategic misalignment and subsequently its' downfall (Hansen et al., 1999). Their study found that it is more likely that consultancy organisations focus on personalisation strategy, as they derive information from people through network building such as dialogue between people, video-conferencing, brainstorming sessions, telephone, e-mail and other networking modes to mention just a few (Hansen et al.,1999).

Further organisational analysis along the three main domains of Hansen's et al., model (1999) that is:

(i) customisation versus standardisation in serving clients,

(ii) cost efficiency versus high margin in organisational business economics, and

(iii) the implementation and creativity in the type of staff hired to work in such organisations.

brings forward common issues between Miles and Snow's (1978) prospector/defender-types and Hansen's et al., (1999) personalisation/codification-types i.e. prospector/personalisation-type and defender/codification-type organisation (this typology is examined below).

In order to address strategic alignment in a quantitative manner particularly between strategic-type and knowledge orientation, Truch (2004) identified that the associations between elements of different constructs in the research model could be addressed using Hansen's et al., (1999) description of personalisation and codification knowledge strategies and Miles and Snow's (1978) description of prospector and defender-types related to knowledge management. Using Truch's work as a guide and a starting point, the following discussion further examines the potential areas of alignment between the different strategic types and knowledge orientation types. This ultimately, is one of the core interests of this study.

The prospector-type organisation focuses on market opportunities to serve clients, seeking higher margins through innovation in business economics and developing a problem-solving attitude. The type of people usually hired in prospector organisations, is very similar to the personalisation-type of knowledge strategy. In fact highly customised solutions to unique problems for serving clients, higher margins for business economics and development of creative analytical specialists for the type of staff hired, are attributes adopted by the personalisation-type of organisation according to Hansen et al., (1999). The defender and codification-type

of strategy organisations are in more than one way similar. Both of them adopt a narrow focus approach on issues related to the reuse of resources in serving clients, cost effectiveness, economies of scale as regards to business organisational economics and the hiring of specialists suited to work in a standardized and controlled working environment without pursuing further opportunities. In distinguishing between codification and personalisation-type of knowledge strategy, Hansen et al., (1999) identified five main fields, namely information technology, knowledge management strategy, economic model, competitive strategy and human resources (table 2.2).

Type of field	Codification knowledge strategy	Personalisation knowledge strategy
Information technology	For organisations using a codification knowledge strategy generally invest heavily in information technology. The aim of such a strategy is in connecting staff with reusable codified knowledge. Electronic fast tracking and wide access of documentation (Hansen et al., 1999)	Provides a link between innovation and knowledge management. On the other hand information technology investment is moderate for organisations using personalisation-type of strategy and the primary aim is in the exchange of tacit knowledge and the facilitation of appropriate conversation that eventually helps to pin down tacit knowledge (Greiner et al., 2007).
Knowledge management	Retrieval of codification information without contacting individual who created it. For organisations who adopt the codification strategy-type, a system that manages to codify, store, communicate and reuse knowledge is developed (Lee & Yang 2000; Malhotra 2004; Greiner et al., 2007).	For organisations using a personalised type, networks are developed to link people so that sharing of tacit knowledge is possible and disseminated between interested parties (Hansen et al., 1999).
Economic model	Organisations using the codification strategy-type make sure that the proper investment takes place so that it can be reused several times. Large teams are generally used comprising of associates and partners (Hansen et al., 1999)	The creation of large revenues in the process is a primary concern for such organisations. On the contrary organisations using a personalised knowledge strategy use small teams, focus on high profit margins and provide unique customised solutions (Hansen et al., 1999).
Competitive field	Organisations who adopt the codification strategy-type provide reliable, fast information-systems and high-quality knowledge by re-using codified knowledge (Hansen et al., 1999).	Organisations who adopt a personalised knowledge strategy are generally creative and analytical in their advice given, on issues pertaining to high-level strategic problems (Hansen et al., 1999).
Human resources (Recruitment / Training / Reward systems)	Organisations who adopt codification knowledge management strategy generally hire graduates who are well versed in the reuse of knowledge and solutions implementation. Training on the contrary is performed in groups, generally through distance learning and rewards are given to staff, providing a contribution towards the building of the organisation's databases (Hansen et al., 1999).	Organisations adopting personalised knowledge management strategy, hire staff adapted to problem solving and ambiguity situations. Training is provided on a one-to-one basis and rewards are given to those who disseminate information appropriately (Hansen et al., 1999).

Source: Various authors

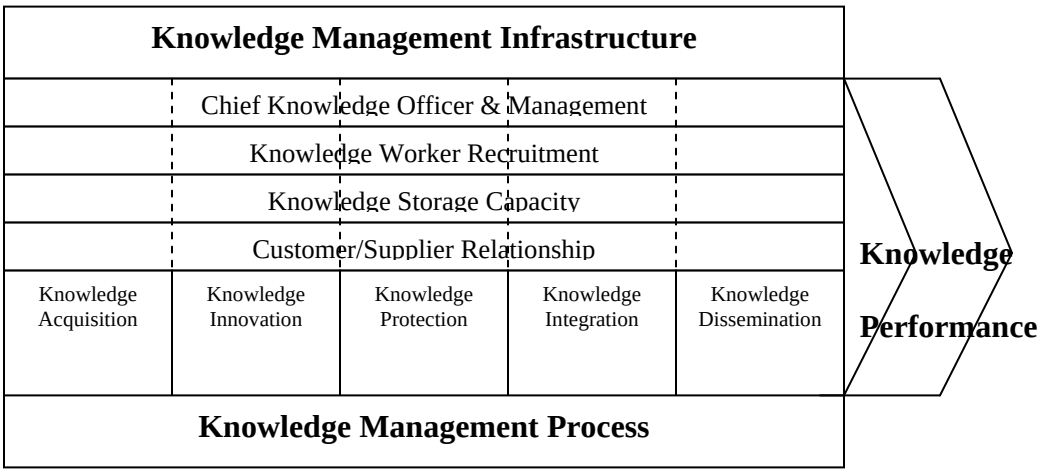
Table 2.2: The five main fields in adopting a codification or personalisation-type of knowledge strategy

According to Hansen et al., (1999) the choice of strategy is fundamental to the success, or downfall of an organisation. Hansen et al., (1999) believe that the choice between personalisation and codification strategy and the components shown in table 2.1 is central to knowledge-based organisations.

2.2.6 The knowledge-value chain typology

Hansen's et al., (1999) knowledge management codification strategy where data can be codified using the 'people-to-documents' approach and personalisation strategy where knowledge is created from a 'contact-to-contact' basis together with Miles and Snow's (1978) strategy-types, bring forward issues related to how tacit and explicit knowledge can be retrieved from the type of staff recruited, the organisation's business economics and how clients are served. The knowledge-value chain provides an inventory of these vital knowledge assets which are identified through the different stages of the model (Lee & Yang 2000). It also helps to identify between tacit and explicit knowledge assets.

The building blocks of the model, is composed of knowledge management infrastructure, which supports knowledge management process activities, and knowledge performance. Customer/supplier relationship which ultimately determines who is the business leader and follower, knowledge storage capacity or organisational memory where knowledge can be stored and reused and knowledge worker recruitment (shown by dotted lines) are associated with specific knowledge management process activities and support the entire chain (figure 2.2).



Source: Lee & Yang (2000: 786)

Figure 2.2: The knowledge value-chain

Table 2.3 shows the identification of the knowledge value-chain components.

Knowledge acquisition	Leads to tracking and analysing all explicit available knowledge using scanning, focused search and performance monitoring techniques (Huber 1991).
Knowledge innovation	Knowledge created by individuals is amplified which eventually crystallises into the organisation's knowledge network and aligned so that interesting product or service innovations are realised (Maier 2007). The conversion from tacit to explicit knowledge reminds us of the SECI model created by Nonaka et al., (2000). This may well aid towards the development and communications of human meaning.
Knowledge protection	Protects creativity and interests through intellectual property rights.
Knowledge integration	The appropriate translation of raw knowledge to address the organisation's business context is maintained. This also well may aid towards the development and communications of human meaning.
Knowledge dissemination or knowledge-sharing environment	Both tacit knowledge through people and explicit knowledge through an IT system can be shared. This can be instigated through a proper reward structure and performance metrics mechanisms.

Source: Various authors

Table 2.3: Knowledge value-chain components

Truch (2001) refers to the knowledge-value chain that can be used to map knowledge assets within an organisation. Unlike Marchand et al's (2001) information management practices, Truch tries to distinguish between tacit and explicit knowledge value chains and recognises five stages namely:

(i) The data collection mechanism which relates towards the contribution to the system.

(ii) The storage of data and information which can be easily assessed.

(iii) The appropriate analysis, retention and disposal of such data.

(iv) The data transfer mechanism of information.

(v) The application of such knowledge whereby such information can be used to set strategies and from which experiences can be derived which ultimately creates value.

Although similar to Marchand et al's (2001) and Lee & Yang's (2000) models, the distinction between tacit and explicit knowledge is not drawn. The knowledge value-chain framework is important as it has the potential to aid in mapping the organisations' knowledge assets. Through cost-benefit analysis individual assessment of each component in the value-chain can be assessed which eventually serves as a decision-support tool for information systems investment.

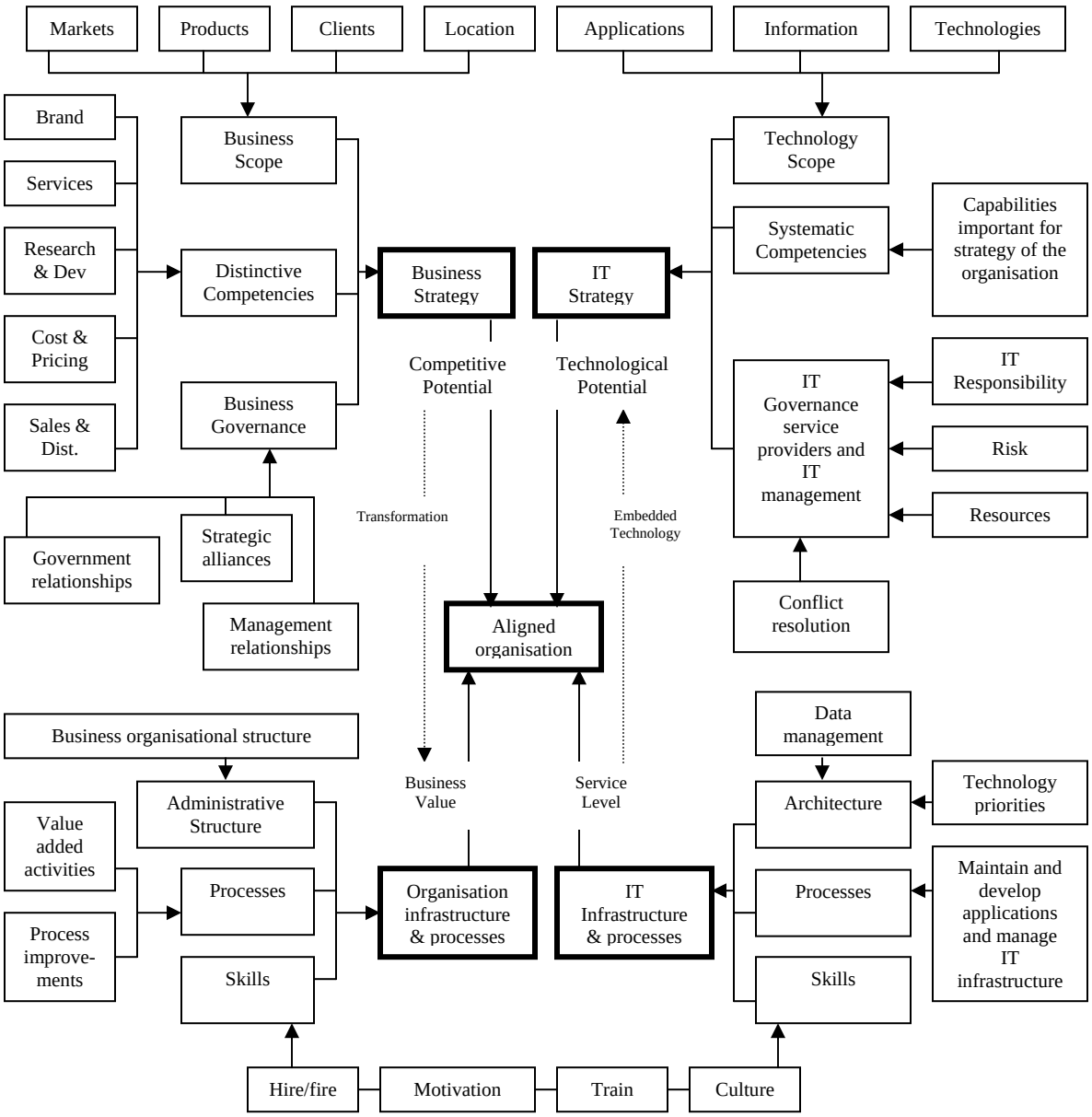
The components generated from the knowledge-value chain model are used to probe the different knowledge management infrastructures which support the different process activities pertaining to organisational knowledge strategy, strategic alignment, strategic fit adopted and performance in Maltese organisations. The type of staff recruited, the role of information technology and the characteristics of knowledge orientation within an organisation related to scanning, capturing,

storage, retrieval, application, transfer and sharing of knowledge in Maltese organisations will also be analysed through the hypotheses generated in this study.

2.2.7 The relationship between information technology and knowledge management

A key concern for many businesses is the balancing act and alignment between continuous evolving technologies and dynamic business strategies (Scott-Morton 1991; Papp 1995; Luftman & Brier 1999; Maier 2007). Successfully aligned organisations through their information systems are generally those which adopt an open communication culture approach, senior executive support in IT and appropriate leadership, IT deployment in strategy development to create customer value, skills development and team-work agreement in IT-enabled projects, as well as the equal importance of IT and business capabilities in an organisation (Henderson & Venkatraman 1990; Earl 1993; Luftman & Brier 1999; Barber et al., 2006).

Figure 2.3 provides a schematic view of relationships proposed by Scott-Morton (1991) and Luftmann and Brier (1999) that exists in an organisational business-IT strategic alignment. It also gives an initial indication of how business strategy and knowledge management activities can be related.



Source: Adapted from Scott Morton (1991: 162) and Luftman & Brier (1999: 111)

Figure 2.3: The organisational alignment process components

The model provides an illustration of how strategic alignment can occur. Specifically, in this model, the alignment occurs between:

(i) Business strategy

(ii) Organisation infrastructure and processes

(iii) IT strategy

(iv) IT infrastructure and processes

The business scope includes all competitors that effect the environment. For an effective business strategy distinctive competencies are essential and this includes all critical success factors and core competencies that provide the competitive edge to the organisation. The organisation infrastructure and processes need to be identified, together with their relationship to strategies (Scott-Morton 1991). These are made up of how the organisation organises its' business and the processes involved that is how business activities within the organisation operate through value added activities and process improvements. The IT infrastructure and processes is composed of the necessary infrastructural architecture that allows the applications, software networks, hardware and data management to be holistically managed into a cohesive platform. The IT strategy is made up of the technology scope which comprises of appropriate IT technologies platform and applications to help in the execution of strategy and systematic competencies which are distinctive capabilities that aid towards the creation or achievement of the organisations' strategies through appropriate technological exploitation. IT governance is also essential as project selection and prioritization issues are discussed following a clear understanding of how risk, conflict resolution, resources and responsibility are shared between all parties concerned for the execution of the IT strategy within the organisation.

According to Scott-Morton (1991), the strategic alignment of these various elements is achieved through a series of cycles and stages. The first stage ‘competitive potential’ develops into a general confirmation of business strategies, taking into account IT opportunities and IT strategy shortfalls and assessing organisational structure fit, processes and skills for strategy support and needs for change. This is followed by ‘business value’ which aims at fitting these business transformations implied by strategic requirements from the competitive potential stage, to the organisational infrastructure and processes so that the necessary human resource management processes can be addressed and the necessary fit regarding information systems infrastructure and processes are achieved. The third stage ‘service level’ which establishes a fit between the improved organisational infrastructure and processes and the information systems infrastructure and processes besides the identification of changes needed to the IT strategy that will support technology transformation requirements. The fourth stage ‘technological potential’ establishes the fit between the required IS infrastructure and processes and the IT strategy which have been addressed in the previous stages.

The above stages are repeated through another cycle with the intention of reviewing these processes and action taken in order to address strategic alignment. Only through these appropriate communicative relationships can business and technology capabilities be aligned with overall business strategy, and thereby sustained in creating effective solutions (Luftman & Brier 1999). The model suggests that organisations must develop the right skill to understand both the current and future

business and IT environments by the assessment of the components shown in figure 2.3. This is no easy task as these components are in continuous flux and unique to every organisation. Communication is an essential ingredient for success and brainstorming sessions help to facilitate communication further as both IT and business strategies are discussed, analysed and gaps prioritised (Scott-Morton 1991). The contribution that IT can provide to the business strategy as regards to market-place competency development, leads towards increased visibility, a valuable precursor to budgeting, development and commitment towards HRM policies, skills acquisition, IS planning, efficiency and profitability (Henderson & Venkatraman 1990; Scott-Morton 1991; Faltermayer 1994; Luftman & Brier 1999). The evidence, it seems, begins to highlight the importance of alignment between business strategy and knowledge management activities. The following section will, however, add some qualifications to this picture.

2.2.7.1 The benefits and limitations of knowledge management technologies

Liao's (2003) research on the future development of knowledge management technologies suggests development towards an expert-orientation manner and their applications develop along a problem-orientation manner. Liao's research also suggests that the different methodologies adopted by different social studies disciplines are implemented in knowledge management as another form of technology and that the integration between change and 'knowing' will continue to strengthen the application of knowledge management technologies.

Research conducted in the strategic orientation of information (appendix 1) concludes that satisfactory management of information practices and information behaviours and values, need to work simultaneously together with each other and not individually, if effective business performance and full information utilization is to be achieved (Marchand et al., 2001). Marchand et al.'s (2001) research tentatively provides a model that addresses information orientation. This includes focussing on distinctiveness in IT resources, maintaining the information lifecycle, and sustaining information integrity. Although Marchand et al., claim that a link exists between business performance and information systems; they fail to take account of the different strategic types and organisational strategic alignment in their research. However the variables quoted in this model are synonymous with other variables shown in other knowledge management models.

Overall the evidence seems to suggest that leveraging knowledge through ICT is neither easy nor straightforward (Walsham 2001). Walsham's research on the human-centered view of knowledge, focussing on human tacit knowledge, complex sense-reading and sense-giving communication processes and knowledge-sharing carried out, concludes that computer-based systems aid knowledge-based activities only if proper attention is given on the development and communications of human meaning. There are no definite prescriptions but a set of circumstances of needs, methods and processes for different organisations (Walsham 2001). Lee and Yang (2000) proposed the use of the knowledge value chain model (figure 2.2) that they derived from Porter's value chain analysis in order to map organisational

knowledge assets and knowledge-creating mechanisms, which may be used to bridge the gap identified by Walsham.

2.3 Is there a relationship between strategy, knowledge management and performance?

Organisational performance is multifaceted which makes it difficult to measure as it depends on viewpoints taken either by clients or stakeholders, depends on the period of observation plus a host of other variables (Snow & Hrebiniak 1980). However, many writers have observed that a key element to strategy formulation involves the setting of business objectives that require some definition of performance (Bracker & Pearson 1986). And as Johnson and Scholes (1993) point out, corporate objectives are mostly expressed in financial terms.

At the organisational level accounting data is still serving as a means of performance measurement and thus suffers from two main drawbacks for the researcher, namely non-homogeneity and non-availability of data for smaller organisations (Bracker & Pearson 1986). Furthermore, according to some writers, the use of financial performance measures is too narrowly focused. McKiernan & Morris (1994), Kargar (1996), and Peel & Bridge (1998) sustain that organisational goals should be used as a means of performance measures and mention a set of measures related to perceived performance, strategic planning intensity, environmental turbulence and capital budgeting techniques. Table 2.4 shows

conditions of when performance measurement can be achieved and when it becomes problematic.

Possible performance measurement	Problematic performance measurement
Simple products/services	Multiple products/services
Product/Services-oriented organisation	Process-oriented organisation
An organisation has products/services	An organisation has obligations and is highly value oriented
Production is autonomous	Products or services are generated with other organisations
Known casualties	Unknown casualties
Isolated products/services	Interwoven products/services
Stable environment	Dynamic environment
Definable quality in performance indicators	Indefinable quality in performance indicators
Uniform products/services	Variety of products/services

Source: Adapted from De Bruijn (2002: 13)

Table 2.4: Criteria for performance measurement occurrence

Research findings regarding the relationship between business performance and strategic planning, has been faced with mixed reactions and conflicting results, as some sustain that a relationship exists between the two, whereas others sustain that no relationship exists (Robinson & Pearce 1983; Dollinger 1984; Bracker & Pearson 1986; Greenley 1986; Piëst 1994; Miller & Cardinal 1994; Peel & Bridge 1998). Some authors also state that enforcing the relationship between strategic planning and business performance is dysfunctional or irrelevant and that strategic planning creates a rigid organisation which militates against all forms of innovative thinking (Miller & Cardinal 1994; Peel & Bridge 1998). Mintzberg (1987) sustains that since all organisations pass through the uncertainty stage, this would make them in a difficult position to steer strategy since a predetermined strategy would have already been pinned down, leaving little room for manoeuvring and innovation. Mintzberg sustains that in unpredictable environments an explicit strategy would be hard to conceive before the trial and experience process is

maintained. On the other hand, strategy should not be made explicit in environments which are unpredictable. This gives room for the 'emerging strategy' school of thought (Ansoff 1993a).

Miller and Cardinal's (1994) study concludes that the impact of strategy upon performance is contingent on several factors. In their empirical analysis they found that when strategic planning measurement, involving high quality assessment and performance data is collected from key personnel, a strong correlation between planning and profitability exists, which is stronger in turbulent environments. This suggests that in turbulent environments, strategic planning affects organisational profitability more strongly than in stable environments. They suggest that both larger and smaller organisations tend to benefit from adaptive thinking, integration and control.

2.4 The utility of performance measurement tools in organisations

While the previous section began to explore the nature of the relationship between performance and knowledge management strategies, the purpose of this section is to outline some of the ways in which researchers and organisations have attempted to measure performance and its determinants. This will lay the ground for a more detailed discussion of the ways in which knowledge management, strategy and performance may be related.

Performance measurement systems are used for a wide range of objectives within organisations namely for external and internal monitoring, to track change implementation, to develop a continuous system improvement and personnel levels and to monitor the overall organisational performance (Dixon et al., 1991; Barber et al., 2006; Sharma & Bhagwat 2006). Apart from the benefits derived in performance measurement i.e. innovation, accountability and external orientation of public/private organisations, negative effects such as rewarding mechanisms that stimulate strategic behaviour have also been registered. Organisations may indeed minimize their throughput at the expense of innovation as this generally results into an exploration of the unknown with the risk of either accepting what was perceived or less, or develop a tendency to reward the constant reproduction of the existing (Behn & Kant 1999; De Bruijn 2002).

Another contentious issue concerns the relationship between individual and organisational performance which has become a dominant issue in the field of human resources management (Guest 1997). However the issue is still in flux as no consistent picture has emerged yet (Wood 1999b). Some critiques suggest that some reward mechanisms such as performance-related-pay may be flawed, providing difficult implementation with negative outcomes (Cooke 2000). The problem lies in the frequently-made assumption that the link between individual and organisational performance is simple and linear. Some researchers argue that organisations should adopt well conceived human resources policies that address employee performance in order to address organisational competitiveness (Wood 1999a). Research is

supporting the view that a positive correlation exists between high performance work practices and enhanced business performance using measures such as productivity and profitability across a range of countries and industries (Ashton & Sung 2002; Harley 2005). Osbourne and Plastrik (1997), state that when reward mechanisms are linked with individual performance measurement, employees are driven towards process optimisation and efficient performance, as bureaucracy is prevented. This may drive public organisations in delivering services, which generate the most important values to clients. However this is still debatable according to De Bruijn (2002).

The approach adopted by most writers is that effective performance measurement attempts to measure individual as well as organisational performance. Thus a macro level of performance measurement is achieved rather than a micro level. This may lead towards lack of co-operation causing 'compartmentalization' i.e. a lack of communicating knowledge sharing between compartments as performance is optimised (De Bruijn 2002), as organisational units optimize their own performance and co-operate insufficiently or block various forms of value-chain co-operation hindering the creation of new knowledge (Inkpen 1996).

In such an environment, it has arguably become imperative that organisations learn how to change employee assumptions and learn about cause-and-effect relationships (Argyris 1991). To survive and prosper, every organisation must have the capability to maintain an acceptable alignment with its environment (Snow &

Hambrick 1980). According to this line of argument, success in the marketplace rests on organisational learning. Thus the need for both operational and financial measures is said to become imperative. In order to promote organisational learning, organisations need detailed, micro-level data about individual performance and activity as well as meso- and macro-level data. Besides both managerial and staff behaviour are affected to a great extent by the performance measurement system adopted (Kaplan & Norton 1992). According to Snow and Hambrick (1980) relying on multiple sources of information such as:

- investigator inference where the organisation's strategy is assessed,
- self-typing where the organisation's strategy is characterised,
- external assessment where competitors, consultants, industry analysts and expert panels are sought for advice, and
- objective indicators where strategy is measured and is not relying on the individual's perception such as collective product-market data,

help to enhance strategic validity as a single source data that will provide a limited view of the organisation's current basis for competing.

Management rarely thinks that an essential part of strategy is its measurement (Kaplan & Norton 1992). In an attempt to overcome this, Kaplan and Norton present the balanced scorecard system, which attempts to measure organisational performance along four main perspectives, compared to the nine[4] used by most researchers (Kaplan & Lamotte 2001; Barber et al., 2003), and seems to succeed

[4] These include leadership, people, people and strategy, processes, customer results, key performance indicators, people results, society results, partnerships and resources (Kaplan & Lamotte 2001).

where other financial performance models just address the financial aspect only or do not involve strategic learning. According to Kaplan and Norton the scorecard system helps to translate strategic objectives into performance measures and can motivate staff towards improvements through its perspectives. Perhaps the strongest point of the balanced scorecard system, relative to other models of performance measurement, is that elements that have been considered as unrelated in the strategic control element of an organisation are brought together such as client orientation, teamwork, quality, response time, and long-term strategic management, besides a holistic approach of the organisation of where improvement can be sustained and if so at what expense. The balanced scorecard system includes aspects of knowledge in performance measurement, and in this sense is different from many other types of performance measurement tools. The balanced scorecard attempts to integrate knowledge, strategy and performance. The balanced scorecard basic model is comprised of four main perspectives (table 2.5).

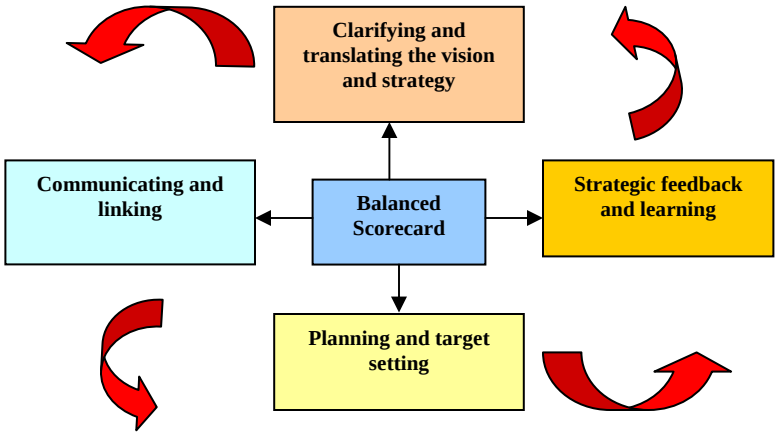
Financial perspective	To succeed financially, how should the organisation appear to its shareholders/stakeholders?
Client perspective	To succeed with the organisation's vision, how should the client be looked at?
Internal perspective	To satisfy the organisation's shareholders/stakeholders and clients, at what internal business processes must the organisation excel?
Human Resources perspective	To succeed with the organisation's vision, how will the organisation function?

Source: Kaplan & Norton (1992: 172-180)

Table 2.5: The four perspectives of the balanced scorecard

Thus, an explicit vision and strategy underlies all four perspectives. And for each perspective, strategic aims, measures, specific goals and action plans are

formulated. According to the proponents of the balanced scorecard system, these perspectives allow management to focus on work, allocate resources and set targets. It also allows follow-up results in learning, which will lead organisations in turn to re-examine its vision. Strategic learning is comprised of gathering feedback, hypotheses testing by analysing cause-and-effect relationships on which the strategy is based and making the necessary arrangements. The balanced scorecard system aims to enhance strategic learning at every step, serves as a means of communication and to identify explicit cause-and-effect relationships between outcome measures and the performance drivers of those outcomes, (figure 2.4).



Source: Derived from Kaplan & Norton (1992: 172-180)

Figure 2.4: The balanced scorecard process

According to Kaplan and Norton, the balanced scorecard helps organisations facing turbulent environments to operate with complex valid strategies which may lose their validity in such conditions. As Arygris (1991) observes, organisations in turbulent conditions may benefit if they create an organisational environment in which assumptions and theories about cause-and-effect relationships can be

challenged i.e. in which double-loop[5] learning occurs. Performance management tools based solely on financial measures are far less likely to promote double-loop learning as strategic learning is not addressed. The balanced scorecard is a comprehensive attempt to provide an integrated multi-dimensional performance measurement model (Brignall 2003) and can describe either what is achieved (outcome) or what effects outcomes (performance drivers) besides the capability of addressing strategic learning through:

a) A compact *structure* for communicating strategy.

b) Facilitates discussion of the *cause-and-effect relationships* among different factors including the combination of service and performance measures of how the organisation's products contribute towards the creation of value for its clients.

c) Circulates strategic hypotheses underlying the organisation's intent.

d) Provides for a *systematic procedure* for conducting information sessions with the aim of replacing traditional financial planning and control.

However the balanced scorecard system latest upgrade by Kaplan & Norton (2000) comprising of human capital (employees' skills, talent knowledge), information capital (information systems, networks and technology infrastructure) and organisation capital (culture, leadership, employee alignment, teamwork and knowledge management) might be stirring an adverse effect as according to Marr

[5] Double-loop learning is "the questioning and rebuilding of existing perspectives, interpretation frameworks or decision premises" (Nonaka & Takeuchi 1995: 45-46). As opportunities and threats continuously challenge the environment, organisations must be capable of 'single-loop learning' or first order generation strategies and 'double-loop learning' or second order generation strategies, which address the cause-and-effect relationships and change in assumptions faced by organisations (Argyris 1991; Hovland 2003).

and Adams (2004), literature on intangible assets pertaining to the learning and growth perspective was not acknowledged in the process. Besides Brignall (2003) also states that insights of institutional theory focussing on relative bargaining power and consequent effects of performance measurement is also lacking. Brignall (2003) identifies the lack of environment and social matters in the scorecard system, which if included will require a more sophisticated approach than the current linear one-way causal approach of the balanced scorecard strategy map proposed by Kaplan and Norton (2004).

Kaplan and Norton (2004) rectified this gap and addressed the intangible assets issue that had been omitted previously. In fact Kaplan and Norton concede that the learning and growth perspective is indeed the 'black hole' of their balanced scorecard, with sparse and meaningful strategically relevant performance measures[6] being created for this perspective (Marr and Adams 2004).

Although Kaplan and Norton (2000) are of the belief that in essence the balanced scorecard system provides for the review of measures, provides a forward-looking approach to the organisation's management, provides the operating performance bridge between strategy development and financial control and provides strategic planners with rapid feedback during management committee meetings, the issue of value creation is still in flux.

[6] In fact this perspective has been addressed with measures pertaining to absenteeism, staff training metrics and innovation by a third of balanced scorecard users (Speckbacher et al., 2003)..

In fact Marr and Adams (2004) sustain that the introduction of intangible assets in Kaplan and Norton's framework has instigated further confusion. They claim that the different intangible assets classifications are rather confusing which although in essence pin down the strategy, accounting, human resources management, information systems and knowledge management amongst others (Marr 2004), the choice can lead to different perspectives leading to different emphasis made by different organisations (Marr et al., 2003). In fact Marr and Adams (2004) comment on:

- why organisational capital is separated from information capital,
- Kaplan and Norton's incorrect definition of information capital comprising of strategic IT portfolio of infrastructure and applications, and
- the lack of relationship capital concept within the scorecard model.

Including these perspectives to accommodate all intangible assets may indeed question the logic of the balanced scorecard framework (Norreklit 2000; Brignall 2003). Brignall also states that the causal relationships in the strategy maps proposed by Kaplan and Norton are not always linear and one-way but a fuzzy web of interactions and interdependencies which fail to capture performance improvement initiatives. Therefore, the balanced scorecard approach clearly has its critics. However, it does represent a concerted attempt to integrate notions of knowledge and strategy into performance measurement, which is relevant to this study. In fact the strategic fit link between knowledge strategy, business strategy and performance is investigated for Maltese medium to large-sized organisations.

Dent (1990) notes other strategic management and measurement tools that can be used. This includes value-based management accounting (Donovan et al., 1998) and strategic management accounting (Bromwich 1990). Brouthers and Roozen (1999) propose a tool whereby strategic management in a varying turbulent environment could be maintained with informed decisions as well as assess strategic aggressiveness and management capability responsiveness. This tool is a hybrid from strategic management and accounting fields (Ansoff 1979; Ansoff & Sullivan 1993a; Brouthers and Roozen 1999). Effective strategic management occurs when the environmental turbulence and the capabilities needed in the future could be effectively addressed (Varadarajan et al., 1992; Ghoshal & Kim 1986; Vera 2001). The strategic accounting model proposed by Brouthers and Roozen has the capability of performing several information key functions namely the generation of a strategic alternative and its' selection, internal and external environmental analysis, planning, implementing and strategy control. Unfortunately this tool has not been exploited enough. In their research, Brouthers and Roozen (1999) conclude that strategic accounting needs more future-oriented, qualitative and timely information and capable to retrieve a broader range of information, in order to be more effective.

Effective strategic management can be implemented once future environmental turbulence faced by an organisation can be addressed, so that appropriate monitoring of an organisation's progress towards its current objectives can be maintained. Strategic decision making for planning and implementation can only be effective if the right information is retrieved. Having discussed knowledge

management, and its possible connection to organisational performance, the discussion now turns to the other key theme in this study: the issue of strategy.

2.4.1 The possibility of a relationship between knowledge management and performance

According to O'Regan & Ghobadian (2002), top performance organisations strive to develop their talented employees in reaching higher levels of achievement by analysing the "black box" of organisations, and focusing on what motivates and what needs to be done to co-ordinate human activity, based on meeting customer needs and satisfaction. This has increasingly drawn attention to knowledge co-ordination and employee motivation as two of the most important components that effective modern management practice must possess, as the lack of one or both of these components (depending on the industry-type), seems to make corporate performance suffer (Day et al., 1998a).

However, apart from a few isolated examples (e.g. Truch 2004), researchers have consistently found it difficult to show a relationship between knowledge management strategy and performance. The adoption of the term knowledge orientation rather than knowledge management strategy agrees with the information orientation construct as identified by Marchand et al., (2000, 2001) (appendix 1). This study was amongst the first to link information orientation with business performance (Truch & Bridger 2002).

A novel approach (see pp. 35-39) which combines the complex co-alignment of elements related to IT strategy, business strategy, organisational and information technology infrastructure and processes, was through the MIT 90's framework developed by MacDonald (Scott-Morton 1991). In essence the model addresses the objective of building an organisational structure with appropriate skills and resources and with internal focused processes that reflect both the IT capability of the organisation as well as the organisation's strategy. The MIT 90's framework identifies that organisations should address the social, political, technical and economic changes in order to be effective (Scott-Morton 1991).

Therefore it is considered essential that management practice is flexible enough to address such changes within a continuously changing turbulent environment and be prepared to take the necessary action to address such changes (Muralidharan 1997). Besides utilising control systems to monitor implementation, systems are established to respond to environmental changes and change planning assumptions. In turn, it is claimed that this will ensure that such flexible knowledge management strategies are implemented efficiently (Bungay & Goold 1990; Muralidharan 1997; Davenport et al., 1997). According to Muralidharan (1997), strategic control can be subdivided into:

(i) The control and validation of strategic planning assumptions on a continuous basis.

(ii) The management of strategic issues or environmental scanning of opportunities and threats, which is caused by a changing environment, which if not addressed properly might make a strategic plan obsolete.

(iii) The interactive control of strategy content whereby actual performance and deviations from the planned are discussed when environmental scenario changes take place.

(iv) The periodic review of strategy which helps to address opportunities and threats if environment changes occur.

Strategies are based on assumptions, since the elements involved and their interactions defy complete understanding in the organisation's environment. Therefore verification is necessary. Thus, Muralidharan's model consolidates the control of both strategic content as well as strategic implementation and safeguards that the strategies chosen are in fact appropriate to the organisation and facilitates better monitoring, which suggests the possibility of a relationship between knowledge management and performance. Kaplan and Norton (1992) state that although the impact of certain measures have on performance is realised by managers, they still lack in making measurement as an essential part of their strategy.

2.5 The development of organisational business strategy

Although strategic war tactics were used since Greek, Roman and Carthaginian rule both at sea and on land, the concept of organisational business strategy was put

forward by Harvard Business School in the 1950s (Snow & Hrebiniak 1980) and the business policy concept was formally developed by Learned, Christiansen, Andrews and Guth in 1965 (Maier 2007). The perception is that business strategy is an integrative process comprising of a number of complex decisions put together in a coherent manner. Chandler's (1962) perspective of strategy concluded that strategy is a way of visioning a new direction achieved through basic long-term goals and the allocation of resources so that these objectives can be executed. Evans and Wurster (1997) mention the fundamental shift in the economics of information, which affects entire businesses and the manner they will compete as new opportunities are created. However, considerations of business strategy are still relatively under-represented in the knowledge management literature (Maier 2007).

The manner in which new technologies and innovations are being created, enhancing connectivity and allowing real-time interaction irrespective of distance (Alvesson and Kärreman 2001), the manner in which information is unbundled, and the way in which organisational behaviour is responding to new market needs, may indeed challenge established value chains[7] (Lee & Yang 2000; Maier 2007). Organisational value chains depend on a host of activities namely the design, production, marketing, delivery and support of products and or services. These interactions build the industry's value chain, supply and distribution, competition and the clients being served. This is eventually seeing the end of channels and hierarchies and the rise of the so-called NET technologies instigated through better

[7] A value chain is made up of a chain of activities. As products pass through all the activities of the chain, at each activity the product gains some value. This chain of activities gives the products more added value than the sum of added values of all activities.

connectivity (Scott-Morton 1991), such as internet, intranet and extranet[8] (Bishop et al., 2006), which are leading towards a 'hyperarchy' structure. This challenges all hierarchies whether of logic or power and as a platform to implement knowledge management systems not only as a repository of unstructured information but a tool enabling effective information and knowledge accessibility and an opportunity in creating new knowledge (Buniyamin & Barber 2004; Barber et al., 2006). Knowledge management is being seen as a means of connecting people so they can think together (Alvesson and Kärreman 2001). This is causing many organisations to address fundamentally their rethinking of the organisation's strategies including positioning strategies as well as corporate organisation and identity.

One of the most critical and pertinent questions in strategic management is the manner in which organisations sustain their competitive advantage (Maier 2007). Three existing frameworks have been identified (Teece et al., 1997). The first is Porter's (1980) 'competitive forces' approach. This mainly addresses organisational processes and routines. Then there is the 'strategic conflict' approach, in which competitors are challenged through strategies related to price, entry into the market, investments and information control. This broadly defined, covers specific assets of organisations, their positioning along the value chain, suppliers and clients relationships. The third is the 'resource-based' approach, which contrary to the strategic conflict approach, focuses on lowering costs of products and services or attaining higher quality (Zack 1999a). These resources produce competitive

[8] An extranet is a private network that uses the Internet protocol and the public telecommunication system that securely share part of a business's information or operations with suppliers, vendors, partners, customers or other businesses (Maier 2007; Alexandrou 2008).

advantage when a unique value is created, are rare and imitable when access to unique superior resources is available (Barney 1991; 2001). A resource-based strategy provides a sustainable longer-term approach based on product and marketing positioning, which is more robust in uncertain and dynamic competitive environments (Barney 1986; 1991; Zack 1999a; Greiner et al., 2007). The resource-based view[9] of knowledge pleads further improvement in organisational competitiveness, effectiveness and efficiency which in essence reflects today's business environment. Teece et al., (1997) mention the shift of 'clever strategizing' or positioning towards problem-solving, organisational governance and competence-based strategies. However Keep (1999) and Mason (2004) mention that some organisations (and countries) find success and profit in low-skill strategies, which suggests that sustainable competitive advantage is not only achieved through making use of a knowledge-intensive strategy. Some writers argue that the better understanding of organisational strategic typologies, eventually help towards interrelating organisational structure, strategy and process variables.

2.5.1 The development of strategic typologies

Although several typologies are available as regards to the proper understanding of organisational behaviour (Etzioni 1961; Blau & Scott 1962; Chandler 1962; Ansoff 1965; Segal 1974; Anderson & Paine 1975; Conant et al., 1990, Wiig 1997, Teece 1998, Evans & Wurster 1997, Jolly 1998 and Lukas 1999), Miles and Snow's (1978; 2003) strategic model was developed with the aim of how an organisation

[9] 'The resource-based view is an economic tool used to determine the strategic resources available to a firm. This translates into valuable resources that are neither perfectly imitable nor substitutable without great effort' (Hoopes et al., 2003: 891). The term resource-based view was coined by Wernerfelt in 1984 who built on the ideas presented in Penrose's theory (1959) regarding the growth of the firm (Maier 2007).

should be viewed, based on *strategic orientation*, that is how organisations perceive what they have to do. Strategic orientation has been defined as the organisational direction in order to create and/or adopt the right behaviours for a more favourable alignment to sustain continuous superior organisational performance (Scott-Morton 1991, Manu & Sriram 1996; Gatigon & Xuereb 1997). Miles and Snow's (1978) framework, provides the richest of the various taxonomies of strategy and information systems associated with organisational arrangements, its support in empirical studies and predictive utility (Conant et al., 1990; Dent 1990; Zahra & Pearce 1990; Slater and Narver 1993; Croteau & Bergeron 2001). As their typology plays a central role in shaping the methodological and analytical frameworks of this study, it is worth considering it in a little more depth. The Miles and Snow's classification is useful when conducting empirical research as it is possible to cluster organisations with homogenous features into category types (Engelland & Summey 1999). But its advantages extend further.

According to the Social Sciences Quotation Index 1989-1998, the Miles and Snow's model has been quoted more than 650 times in recent years (Garrigós-Simón et al., 2005). Although McKee et al. (1989: 22) contend that the Miles and Snow typology "constitutes a continuum of increasing adaptive capability ranging from the reactor (with relatively little adaptive capability) to the prospector (with the highest level of adaptive capability)", Croteau et al., (1999) remark that the reactor-type is excluded from this continuum since no specified strategy is identified with this type. However the simultaneous consideration of structure, organisational processes variables, strategy and their relationships with performance

makes it one of the strongest models that cannot be ignored and which have been used in a variety of organisations and industries (Smith et al., 1989; Segev 1989; Zahra & Pearce 1990; Dent 1990; Stathakopoulos 1998; Garrigós-Simón et al., 2005).

The adaptive cycle of the Miles and Snow framework operates along three main criteria. The first deals with what entrepreneurial parameters the organisation is in, based on the product-market domain. The second deals with the engineering/technological aspect which focuses on the selection of the best technologies/processes needed to carry out the processes for the production and distribution of products/services, and addresses the issue of efficiency. The third deals with the administrative aspect of the organisation, in the sense of what should the ideal organisational structure and policy processes be, in order to adapt to the current market the organisation is in to reduce uncertainty (Engelland & Summey 1999; Truch & Bridger 2002). By dealing with an organisation in a holistic manner, Miles and Snow (1978; 2003) state that this adaptive cycle which is 'intrinsically interwoven', provides a means whereby the major elements of adaptation and relationships are conceptualised and visualised, whereby a strategic pattern emerges over time. Strategic patterns reflect the strategy realised rather than what was intended (Mintzberg 1987). Intended strategies translate competitive priorities whereas realised strategies are implemented following structural investments over a given time-frame (Boyer 1998).

The Miles and Snow typology consists of four categories i.e. prospector, defender, analyser and reactor (table 2.6). Although more than one strategy-type can be adopted in an environment and in reality, organisational strategies are unlikely to fit exactly into one of the four categories, Gupta et al., (1997) state that the implementation of an organisational strategy which is identified with one strategy-type for appropriate planning and organisation is indeed a weakness of all typologies as this is a risk of over-simplification of the complex nature of business strategy. However McKee et al., (1989) state that the Miles and Snow typology captures the business-level strategic trade-off between the internal and external orientation.

Type	Description
Prospector	The objective of the prospector is the search capability that certain organisations possess in finding new products and services, seek markets and technologies opportunities. These organisations create change and uncertainty in the marketplace to which other competitors are forced to react. **Organisational type**: Externally oriented or entrepreneurial firms. **Emphasis**: Product and market effectiveness development i.e. doing the right thing, trading efficiency for growth and focus on innovation. **Strengths**: General management; product research and development; market research and basic engineering. **Structure**: Low degree of formalisation and routine, decentralisation and lateral, vertical communication emphasising innovation and flexibility.
Defender	Is usually the type of organisation which works and searches for economies of scale in scenarios that are stable, strong and predictable. Have a restricted market and stress production efficiency. They protect their narrow product-domain through lower prices, higher quality and superior delivery and focus on improving the efficiency of existing operations. **Organisational type**: Internally oriented. **Emphasis**: Manufacturing efficiency, excellence in products, quality of services and lowering of prices. Improving efficiency of existing operations. **Strengths**: General management; production; applied engineering; financial management expertise. **Structure**: Elaborate formal hierarchy and high degree of centralisation. These organisations are not completely efficient due to their availability of multiple options, low behaviour programmability, high cause-effect ambiguity and outcome uncertainty.
Analyser	These are organisations which base their operations on well established products and which carefully choose the right product at the right time to include in the market. They also blend the characteristics of both defender and prospector organisations characterised as following a combination strategy (Lumpkin & Dess 2006). **Organisational type**: They adopt structures that can accommodate both stable and changing domains and those that appear the most promising in turbulent situations. **Emphasis**: Imitation of most successful innovations by key prospectors in the industry. Analysers are predicted to share the defender's strengths in production and applied engineering and the prospector's marketing strengths. **Strengths**: General management; production; applied engineering; marketing/selling. **Structure**: Formalised structures and processes.
Reactor	These organisations find it difficult in changing environments, as their structures and processes do not support the strategic focus needed in such situations. They are the type of organisations that find it most difficult to change since they are prisoners of their own past successes. **Organisational type**: There is no consistent approach to an entrepreneurial problem. **Emphasis**: No consistent patterns as change and uncertainty are frequently perceived. Unstable behaviour and decisions oriented towards the short as opposed to the long term. **Weakness**: General management. **Structure**: Lack of consistent strategy-structure relationship. Adjustments made are forced by environmental pressures.

Source: Miles and Snow (1978; 2003); Snow and Hrebiniak (1980: 317-336); Garrigós-Simón et. al., (2005: 22-38)

Table 2.6: Development of strategic orientations types

According to the Miles and Snow model, organisations can be perceived as having either a high or low competency in technological, administrative and entrepreneurial skills depending on past decisions taken within the organisation (table 2.7).

Type	Organisational competencies		
	Technological	Administrative	Entrepreneurial
Prospector	Low	High	High
Defender	High	High	Low
Analyser	High	High	High
Reactor	High or Low	Low	High or Low

Source: Engelland and Summey (1999: 21)

Table 2.7: Miles and Snow strategic-types classification

The typology described by Miles and Snow (1978; 2003), addresses both codification and predication aspects as well as the unique adaptive strategy of each typology (Hrebiniak & Snow 1980). Conant et al., (1990) also propose a model whereby the relationship between strategic-types, distinctive marketing competencies and organisational performance can be analysed more effectively. These have been classified along three major dimensions as identified by Miles and Snow's model (table 2.8) namely:

(i) Entrepreneurial problems and solutions,

(ii) Engineering problems and solutions,

(iii) Administrative problems and solutions.

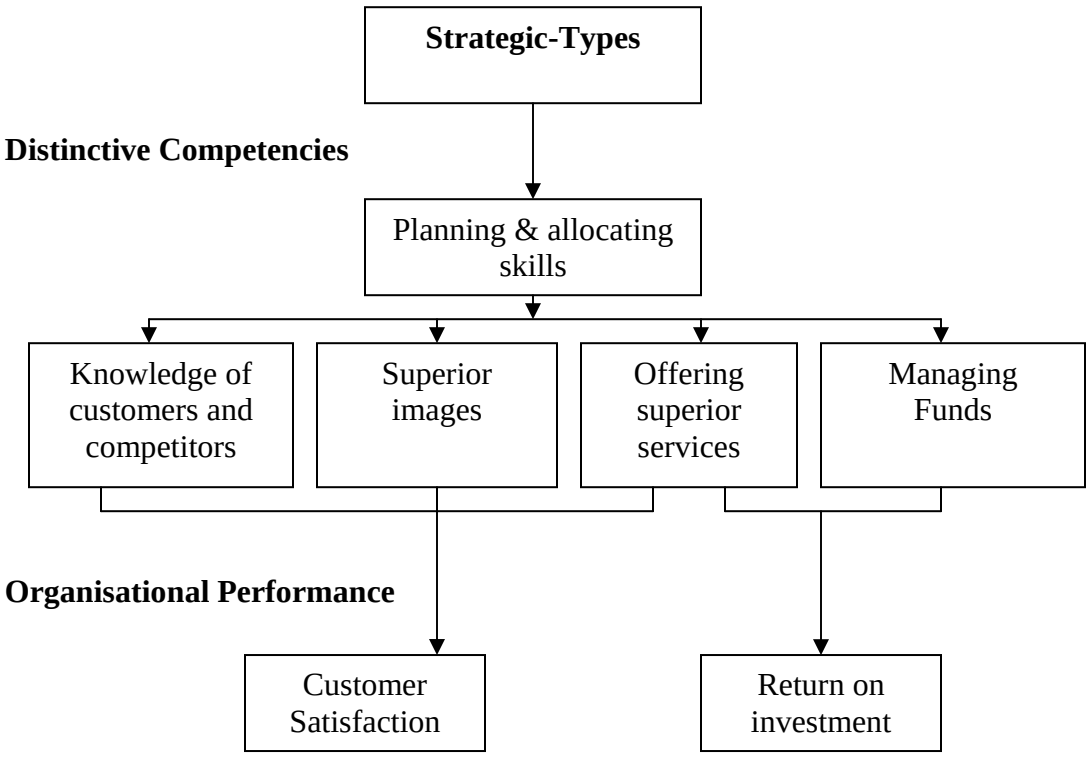
Adaptive cycle components	Dimensions	Strategic-types			
		Defenders	Prospectors	Analysers	Reactors
Entrepreneurial problems and solutions	Product-market domain	Narrow. carefully focused.	Broad. Continuously expanding.	Segmented and carefully adjusted.	Uneven and transient.
	Success posture	Prominence in their product market(s).	Active initiation of change.	Calculated followers of change.	Opportunistic trusts and coping.
	Surveillance	Domain dominated. Cautious. Strong organisational monitoring.	Market and environment oriented. Aggressive search.	Competitive oriented and thorough.	Sporadic and issue dominated.
	Growth	Cautious penetration and advances in productivity.	Enacting product market development and diversification.	Assertive penetration and careful product market development.	Hasty change.
Engineering problems and solutions	Technological goal	Cost-efficiencies.	Flexibility and innovation.	Technological synergism.	Project development and completion.
	Technological breadth	Focal, core technology. Basic expertise.	Multiple technologies. Pushing the edge.	Interrelated technologies.	Shifting technological applications/fluidity
	Technological buffers	Standardisation. Maintenance program.	Technical personnel skills. Diversity.	Incremental and synergism.	Ability to experiment and provide solutions.
Administrative problems and solutions	Dominant coalition	Finance and production.	Marketing and R&D.	Planning staffs.	Trouble-shooters.
	Planning	Inside/out control dominated.	Problem and opportunity finding. Program perspective	Comprehensive with incremental changes.	Crisis oriented and disjointed.
	Structure	Functional/line authority.	Product. Market centred.	Staff dominated. Matrix oriented.	Tight formal authority. Loose operating design.
	Control	Centralised and formal. Financially anchored.	Market performance. Sales volume.	Multiple methods. Careful risk calculations. Sales contribution.	Avoid problems. Handle problems. Remain solvent.

Source: Derived from Conant et al., (1990: 367)

Table 2.8: Breakdown of the Miles and Snow model

Snow and Hrebiniak (1980) and Conant et al. (1990) state, that the Miles and Snow's model produces value to both strategists and organisational characteristics. Woodside et al. (1999) used the Miles and Snow strategic typology and their findings amongst Finnish organisations suggested that strategic-types are related

mainly to organisational performance through their development and implementation of distinctive competencies[10] (figure 2.5).



Source: Adapted from Woodside et al., (1999: 145)

Figure 2.5: Linking strategic-types, distinctive competencies and organisational performance

This model builds on distinctive competencies taking into account both organisational structure internal aspects and strategic orientation. Previous studies have shown that organisational success is achieved through congruence in strategies, distinctive competencies and environmental conditions so that optimal performance is achieved (Conant et al., 1990; Lumpkin & Dess 2006). However

[10] Selznik (1957) first used the term distinctive competence to describe the character of an organisation and describes what an organisation excels at in relation to competitors.

Woodside's et al., (1999) model needs further additional research to examine whether the five distinctive competencies relate to the strategic-types and organisational performance. In another study, the development of strategic orientation types amongst organisations, although perceived to be complex in nature, was also sustained along four main types as identified by Miles and Snow (Lukas 1999). Lukas however points out that the strategic market orientation of a business is more pronounced than its environmental variables.

As will be seen in subsequent chapters, the survey instrument adopted for this research study incorporates the four strategy-types. However the extreme strategic-types of prospector and defender-types are selected in drawing up the hypotheses for investigation as these have been defined clearly by Miles and Snow (1978; 2003). The analyser-type is a hybrid between the prospector and defender-types whereas the reactor-type lacks consistent characteristics and was identified by Miles and Snow as the residual-type. This is empirically supported by research from Doty et al., (1993) Abernethy & Guthrie's (1994) and Truch (2004).

Lukas (1999) explains that in the case of ties between a potential defender, prospector, and/or analyser, the organisation was classified as an analyser. In the case of ties involving reactor response options, the business was categorised as a reactor. Both decision rules involving ties are theoretically supported by the Miles and Snow typology and were used by Conant et al., (1990) and Lukas (1999). Having outlined Miles and Snow's model of strategic types and its centrality to this

study, the discussion now turns to a further central consideration: the relationship between an organisation's strategy and its environment.

2.5.2 The business environment and organisational strategy

A turbulent business environment requires constant learning and updating of the knowledge base (Hall and Paradice 2005). According to Ansoff (1965), he observes that environmental turbulence can be caused by several factors such as:

- the rate of technology development,
- innovation and competition intensity between competitors,
- discrimination by clients,
- political pressure from governments and other groups, and
- market environment changeability.

Although it may seem logical to conclude that as turbulence increases the aggressiveness of the organisation increases (Ansoff 1965), the extent to which an organisation responds 'aggressively' to turbulence in the market will depend on that organisation's strategic orientation. Ansoff and Sullivan (1993b) state that in order to optimise the performance of an organisation, alignment between the organisation's strategies and environmental turbulence level should be attained first. Strategic aggressiveness[11] is determined by two elements namely the information used for strategic moves to be made and the degree of change between an organisation successive strategic moves in the particular environment (Ansoff &

[11] Strategic aggressiveness was defined by Ansoff (1965) as being made up of five main domains namely stable based on precedents; reactive based on experience; anticipatory based on extrapolation; entrepreneurial which is discontinuous and based on observable opportunities and creative which is also discontinuous and based on creativity.

Sullivan 1993b). This strategic behaviour is not strictly adhered to, as it is also a known fact that there are organisations that adopt the position of laggards when such situations of aggressiveness arise (Keep 1999; Mason 2004). As the focus of turbulence is on the environment, the focus on strategic aggressiveness is on the organisation. Ansoff and Sullivan's (1993b) model outlines five perceived environmental turbulence change levels (table 2.9).

Repetitive	No change is envisaged and aggressiveness is stable
Expanding	Change is slow and incremental and aggressiveness is reactive
Changing	Change is fast and incremental and aggressiveness is anticipatory
Discontinuous	Change is predictable and aggressiveness is entrepreneurial
Surpriseful	Change is registered as discontinuous and unpredictable and aggressiveness is generally creative

Source: Ansoff and Sullivan (1993b: 11-23)

Table 2.9: The five environmental turbulence change levels

It should also be noted that Ansoff and Sullivan (1993b) had concluded that there is no single success formula which guarantees profitability amongst organisations, and that a different success formula exists for every environmental turbulence level in order to optimise organisational performance.

Ansoff and Sullivan's environmental turbulence model (1993b) is not unique, and is echoed elsewhere in the literature. For example, Miller (1987) emphasises the importance of competition intensity, deciphering client needs and identifying the predictability of changes in technology (Burns & Stalker 1961; Mintzberg 1987). Similarly Andrews (1971) stated that organisational value increases over

competitors as proper business positioning relative to organisational competencies, matching internal resources with environmental opportunities and addressing appropriately market demands is maintained. The link between strategy, environment and organisational design was highlighted also by both Miles and Snow (1978; 2003) and Porter (1980) who mention that once value is maximised competitive advantage is achieved.

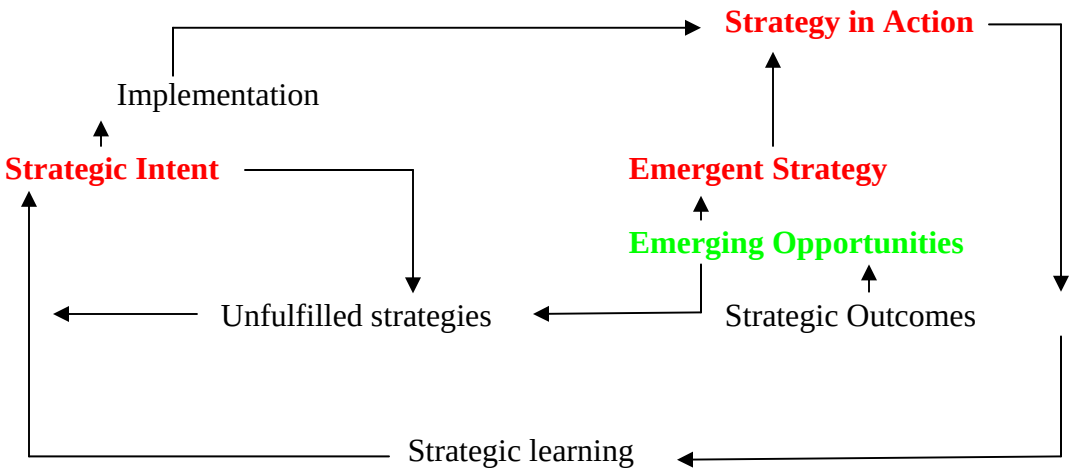
Environmental turbulence is something that has certainly had an impact in the Maltese context in recent years. Sectors in Malta involved in direct production, specifically the manufacturing sector have in recent years continued to experience turbulence due to job losses, but this was offset by growth in employment opportunities in market services activities such as real estate renting and business activities, other community, social and personal services activities and the financial sector. In June 2007, unemployment[12] stood at 3.9%, down to 0.6 percentage points compared with the previous year. Furthermore the increased trend in part-time employment continued to rise to 7.2% in twelve months till June 2007. Growth recovery in Malta was echoed in the labour market despite continuous global competitive pressures which produced a negative effect on specific sectors of the economy (Economic Policy Division 2007: 4-5). The changing employment patterns in Malta have been triggered mainly due to the rate of technology development and market environment changeability due to Malta's entry in the European Union (Economic Policy Division 2007). Therefore, one can conclude that the nature of environmental turbulence and its relationship to

[12] The figure quoted here is from the Employment & Training Corporation (Malta), Part I register.

strategy/knowledge management depends on several factors as outlined by Ansoff (1965) and upon the organisation's strategic orientation (Ansoff & Sullivan 1993b), although much depends on the updating of the knowledge base for an effective strategy/knowledge management in turbulent environments.

2.6 Building knowledge management into strategy

As the previous section has illustrated the environmental context within which organisations must form their strategy, the purpose of this section is to discuss the ways in which that strategy can be connected to knowledge management. The nature of strategy formation (appendix 2) addresses the 'design versus process' debate, which emphasises the difference between 'emergent' and 'deliberate' strategies. The three main sources of strategic outcome includes 'strategic intent' implementation which covers Mintzberg's (1978; 1980) 'intended and deliberate strategies', intentional replies to issues emerging within the competitive environment or as otherwise termed as 'emergent strategy', which Mintzberg refers to as 'strategic learning' and the response generated by people working totally blindfolded and unaware of any strategy that the organisation might embrace labelled as 'strategy in action' (figure 2.6) (Moncrieff 1999).



Source: Derived from Moncrieff (1999: 274)

Figure 2.6: The dynamic process of strategy

'Emergent' strategies in the absence of any form of intentions produce evolving strategic patterns, whereas on the other hand 'deliberate' strategies are intentions with formal, systematic and rationally based approaches (Mintzberg & McHugh 1985; Harrington et al., 2004). Strategy as a pattern helps in pursuing information on performance, planning and organisational structure (Snow & Hambrick 1980). The creation of a knowledge map also helps in the creation of systematic benchmarking, "pointing to people, documents and databases" (Barber et al., 2006), which leads towards a form of audit.

One way in which knowledge management can be explicitly and systematically connected to business strategy and used for strategic performance measurement is through the balanced scorecard mentioned earlier (Kaplan & Norton 1992; 1996; Marr & Adams, 2004). These missions serving for management decisions and control (Drew 1999), are translated to objectives, sub-objectives and planned targets

as identified in the balanced scorecard system, which seeks a balance between financial and non-financial matters. The four perspectives of the balanced scorecard (p. 47) are interlinked in a way that the financial perspective is driven by customer satisfaction, which in turn is driven by internal processes based on the learning and growth perspective which explicitly deals with training and development, teamwork and technology. These links are sustained through strategy-maps (Marr & Adams 2004).

A knowledge-based strategy maximises an organisation's value creation by seeking to improve knowledge transfers between intangible assets related to external and internal structures and individual competencies (Sveiby 2001). Increasingly, it is being argued that successful knowledge management should be based on people, who are encouraged to develop and share their knowledge through 'communities-of-practice' (Lave & Wenger 1991; Maier 2007) which can critically interpret, evaluate and adapt knowledge to new contexts (Zack 1999d). Being inherently dynamic, the success of an effective knowledge-based strategy rests on sources that provide competitive advantage, which apart from being far more difficult for competitors to replicate creates value to clients (Drew 1999). Drew draws out a paradox as on one hand organisations are motivated towards the creation of a knowledge-based type, but on the other hand organisations are reluctant in releasing too much knowledge with the fear of falling in the hands of potential competitors. With the advancement of information technology and globalisation, such threats are

gaining in strength; with the result that competitive advantage is hardly ever sustainable anymore in fierce environments.

A possible solution that was put forward by Drew (1999) to address a knowledge management framework for competitive advantage, is the creation of organisational deep pools of knowledge which are filled rapidly with new knowledge and creating sustainable sources of advantages. This includes strategic assets, nurturing of employee management relationships, developing appropriate culture, brands, skills etc., which develop into a dynamic competitive advantage as even if products are copied, the knowledge pool created is always greater than that of competition. Two main concerns are to what extent is this being done and the applicability of deep pools of knowledge, which may not be adaptable for all types of industry. One also needs to consider people's knowledge and the dynamics involved between group social strategic formulation, the political environment of the organisation and paradigms which become entrenched within an organisation (Drew 1999).

Many writers have promoted the suggestion that successful strategy implementation means continuous dialogue and collaboration in order to promote effective knowledge-sharing. Despite the wide acceptance of strategic alignment, (i.e. alignment between knowledge management and business strategy), few references detail the process, with the most notable being presented by Luftman & Brier (1999) and Gutierrez et al., (2006). This neglect of the process of strategy implementation has caused, among some writers, a further assumption that the

process of implementing a knowledge-based strategy is an unproblematic process. As the following section explains this is not the case.

2.6.1 The barriers to strategic knowledge management

Although information technology can enable employees to surpass communication, time and distance obstacles, it is perhaps less able to provide an intrinsic motivation for employees within an organisation to share their knowledge (Desouza 2003). Barriers and disincentives to knowledge sharing often arise from business units within an organisation who are reluctant in sharing and disseminating knowledge, unless there is direct interest for them. This eventually leads to the undermining of strategic management at the highest organisational management level (Day & Wendler 1998b). In response to such concerns, common themes have emerged showing organisations that need to consider while pushing IT-driven initiatives.

(i) Desouza (2003) observes that organisations still face a dilemma in trying to find the appropriate reward mechanism that will enable employees in sharing their knowledge. Although examples like Lotus Notes can help towards tracking usage and contributions which may lead towards the identification of an expert within an organisation, experience has shown that employees may become reluctant towards knowledge contribution as it is perceived that this hampers the employees' career.

(ii) In their research Bishop et al., (2006) connect organisational cultures and workplace learning with a view of understanding 'learning-supportive culture' better. They claim that knowledge-sharing in organisations depends on the

organisation's culture and a tendency towards collaboration. However the issue is still in flux as to how knowledge is managed and what assumptions constitute useful knowledge and where should it reside in organisations.

(iii) The changing culture of an organisation is considered as a barrier and is rather difficult to pin down. However this issue is still in flux as some authors believe that in essence human beings are social beings in nature, and a knowledge-oriented culture has not been precisely defined (Desouza 2003).

(iv) It is rather difficult to assess whether knowledge is used effectively and is considered as a barrier (Zander & Kogut 1992, 1995; Desouza 2003).

(v) The lack of clear, adequate communication and action has also been identified as a knowledge barrier (Day & Wendler 1998b; Walsham 2001; Desouza 2003). Managing knowledge appropriately is essential so that employees feel less pressured and eventually engage in dialogue (Desouza 2003).

These are some of the often-cited barriers to effective knowledge management in organisations. Bearing these in mind, some writers have presented the idea of a 'knowledge-based organisation', where such barriers, it is claimed, are overcome as the organisation's overall strategy becomes increasingly aligned with its orientation towards knowledge management. It is to this concept that the focus of attention turns in the following section.

2.6.2 Characteristics of a knowledge-based organisation

With some of the barriers to strategic knowledge management in mind, the discussion now turns to a more detailed exploration of the possible features of a

knowledge-based organisation. While recognising the contradictory meaning to the term knowledge-based organisation (von Krogh & Roos 1995; 1996), Menzies (in NAHO 2001) identifies three main dimensions by which knowledge-based organisations can be analysed:

- The actual knowledge shared by organisation members and the utility of knowledge resources or relations to others.
- The distinctive ways of knowing and knowledge sharing within the organisation.
- The social relationships involved in gathering, sharing and applying knowledge.

Further issues related to knowledge-based characteristics include innovation, management role, autonomy of decisions taken, and organisational co-ordination/ structure as all lead towards the sustainability of competitive advantage (Chong & Choi 2005; Falshaw et al., 2006). Some organisations are showing interest in implementing knowledge management processes and technologies that recognise such principles, and are even beginning to adopt knowledge management as part of their overall business strategy (Zack 1999a). All this may provide knowledge synergy and increasing returns, which may not be available to competitors (Teece 1998; Zack 1999a). However this issue is still one over which there is some disagreement according to Keep's (1999) research. Scarborough et al., (1999) and Marr et al., (2003) state that effective knowledge management is not just about making sure that the correct mechanisms are in place to facilitate knowledge-sharing but also involves individual and corporate mindsets alignment.

Another possible feature of knowledge-based organisations is the ability to capture and exploit tacit knowledge. Polanyi (1966), Grant (1996) and Tsoukas & Mylonopoulous (2004) see explicit knowledge dissemination through communication aids, whereas tacit knowledge becomes available through its application, as knowledge is created among individuals with heterogeneous knowledge sets. Grant (1996) states that tacit knowledge transfer is slow, deeply rooted in action, involves commitment, is costly and uncertain and the ability to transfer and collate knowledge is indeed a critical factor for decision-making authority within any organisation. Thus the distinction between tacit and explicit knowledge can be described as the epistemological dimension to the creation of organisational knowledge.

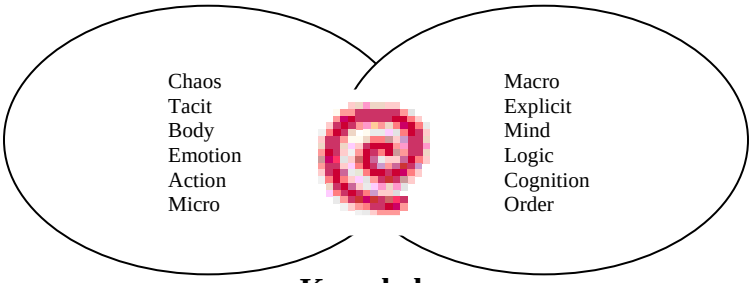
This makes the organisation's role as a knowledge-integrating mechanism, as knowledge is created through social interaction between the mutually complementary entities of tacit and explicit knowledge (Nonaka & Takeuchi 1995). Nonaka (1994) refers to this as 'communities-of-interaction' whereby contribution to the development of new knowledge is created. The extent to which this social interaction takes place is referred to as the 'ontological dimension'. Knowledge created interacts in a 'spiral of knowledge' conversion through the SECI process, which can be identified along four main paths (table 2.10).

Socialisation (existential-face to face interaction)	From tacit to tacit knowledge as individuals share tacit knowledge directly with each other's ways of feeling and thinking. This is rather a limited form of knowledge creation since knowledge never becomes explicit and cannot be leveraged in a way that the whole organisation may benefit.
Externalisation/Articulation (reflective-peer to peer)	From tacit to explicit knowledge. It is here where the knowledge base of an organisation is extended as tacit knowledge is converted to explicit knowledge that can be understood by others and shared between all individuals. Once knowledge is crystallised, sharing of this knowledge becomes possible. Dialogue, listening and contribution, metaphor use and analogies are most common here (Bohm 1980; Edvinsson & Sullivan 1996).
Combination (systematic-collaborative)	Conversion from explicit to more complex sets of explicit knowledge. This generally occurs when parts of an explicit knowledge is combined from either internal or external sources or both and combined, edited or integrated to form a whole part. This combination does not extend the knowledge base of the organisation. 'KMS can help the receivers of explicit knowledge to reconstruct its context' (Maier 2007).
Internalisation (Collective-on the site)	From newly created explicit to tacit knowledge of individuals. Once knowledge becomes explicit, individuals can eventually start re-moulding it by broadening, extending and internalizing this knowledge that will become tacit knowledge again. Internalisation is coined with learning by doing. Organisations generate hypotheses based on tacit knowledge which are then tested against knowledge held by customers or suppliers.

Source: Adapted from Nonaka et al., (2000: 12) and other authors

Table 2.10: The SECI Process

Thus knowledge-intensive organisations provide the right environment whereby the creation of a 'spiral of knowledge' (figure 2.7), can be facilitated and mobilized in a dynamic and continuous manner, which in essence drives knowledge creation (Nonaka 1994; Hall & Andriani 1998). The 'spiral of knowledge' enables knowledge conversion from personal (tacit) knowledge to a formal systematic knowledge (explicit), which can eventually be shared at all levels within the organisation and eventually crystallized at higher ontological levels (Nonaka & Takeuchi 1995; Nonaka et al., 2000; Tsoukas & Vladimorou 2001).



Knowledge

Source: Adapted from Nonaka et al., (2000: 6)

Figure 2.7: The knowledge created through the spiral of knowledge

Polanyi (1966) identified three important components that induce commitment, namely intention which is how individuals take view and interpret their environment, autonomy which provides freedom to absorb knowledge and environmental fluctuation or turbulence where chaos can facilitate new modes of interaction which may give rise to new knowledge. On the other hand Grant (1996) identified four mechanisms for integrating specialised knowledge and increasing efficiency in organisations, namely sequencing of expert inputs, developing regulations which include norms and procedures, peer group problem identification and solving as well as co-ordination by mutual adjustment where specialised tasks can be facilitated and adopted.

Once the utility on communication, integration and knowledge transfer within an organisation is maximised to the full, will organisational efficiency be achieved. This will eventually create competitive advantage as the scope of knowledge becomes broader which will become more difficult to imitate (Grant 1996). However this is still debatable as it has also been claimed that resource-based organisations do not go in great depth and treat knowledge generically rather than specialised (Conner 1991).

An additional factor that can impact on the extent to which an organisation is 'knowledge-based' is that of decision-making processes. The quality of decisions taken in organisations has a direct bearing on the accumulation of relevant knowledge within an organisation (Mintzberg 1979; Mintzberg & McHugh 1985;

Grant 1996; Dewhurst et al., 2001). It has been shown that internal processes involving strategic decision-making may be more inclined towards being driven bottom-up and incremental rather than being formulated and implemented (Garrigós-Simón et al., 2005; Halawi et al., 2006). According to these writers centralised decision-making is possible if knowledge focus can be maintained from a single point within an organisation as in the defender-type (Miles & Snow 1978). There is thus an obvious connection here between the organisation's strategic approach and its orientation towards knowledge use. Although explicit knowledge is transferable its' aggregation at a single point remains dubious. This means that decisions on explicit and quantifiable knowledge are generally centralised whereas decisions pertaining to tacit and idiosyncratic knowledge are generally decentralised as in the prospector-type as this is generally located in the operating units not at top-management level (Miles & Snow 1978; 2003). Besides prospector-type organisations permits a considerable amount of self-control for their own performance in a timely manner, which instigates short, horizontal feedback loops. The scope of the defender-type is to spot performance deviations in order to maintain efficiency (Miles & Snow 2003). Defender-type organisations 'normally restrict information flows to vertical channels' (Miles & Snow 2003: 44). Generally defender-type organisations control their operating units through long-looped vertical information systems where information from the lower-level is transmitted towards top-management.

Day and Wendler (1998a) argue that this tendency towards centralisation/decentralisation is increasing within many contemporary organisations, and consequently the objectives of knowledge management are becoming more complex as the certainties of the role of knowledge in value creation becomes less clear. Although on one hand disaggregation helps to increase the number of points where knowledge can be tapped, (whereby it has been registered that knowledge is more manageable in smaller units within an organisation), this may also instigate barriers, as value maximisation may become biased, as this will be based on individual business units rather than as a holistic corporate organisation (Stacey 1996; Tsoukas 1996).

This organisational capability is viewed as a strategic resource (Foss 1997), as individuals with diverse knowledge, exchange and recombine existing knowledge in order to create greater knowledge (Tsoukas & Mylonopoulos 2004). Thus the key to achieving co-ordinated knowledge, depends not only on those pertaining to the higher rungs of the organisational structure but also those at the lower rungs and in finding ways where knowledge can be disseminated, integrated, distributed and interrelated to one another.

In essence therefore, the knowledge-based organisation is one where the overall strategic approach relies on the effective management of knowledge. More specifically, some of its key features might include:

- appropriate knowledge flows especially from the bottom-rungs of an organisation where hierarchy levels become flatter,
- two-way market driven customer relationships,
- creativity instigated from chaos generated by employees,
- use of net technologies for better control of information flow,
- better availability of information throughout the organisation, as well as
- knowledge sharing instigated through appropriate reward structures within an organisation.

These knowledge-based organisational characteristics will help to focus on particular issues related to strategic fit as regards to what kind of staff capabilities are required in order to sustain a particular knowledge management strategy that fits the business strategy (Maier 2007), and the necessity of organisational strategic alignment within its marketplace. It also helps to question the strategic alignment requirements so that better availability of information is sustained through either exploration or exploitation-type strategies. Another issue that will be investigated is the management and organisation of knowledge strategy-types through its structure i.e. the utility of short-looped horizontal feedback, the use of project teams and the utility of vertical long-looped chain of events for appropriate knowledge flows. The reward mechanism issue will also be investigated i.e. whether staff deposit knowledge on the organisation's electronic medium or knowledge is based on employees sharing knowledge directly with other employees. This will focus on whether personalisation or codification-type strategies are adopted in the Maltese

context. The role of net technologies for better information flow will be investigated through the type of recruitment taking place that can enhance tacit knowledge through facilitated communication (personalisation-type) or linking employees for knowledge re-use (codification-type). In general, therefore, one of the primary foci of this study falls upon the extent to which the various aspects of organisational practice, structure and strategy can be effectively aligned with its orientation to knowledge management.

2.6.3 Cultural variations in the knowledge-based organisation

According to some writers, the creation of a 'knowledge-based society' has been progressing for several years (Toffler 1990, Nonaka 1994). In fact the development of an organisation using specialised processes for the creation and application of knowledge can lead towards efficiencies in the production of intellectual products in the form of new designs, technologies and products (Sanchez & Mahoney 1996).

However research has shown that a difference exists between Western and Japanese cultures as to how knowledge management is perceived, and it is this cautionary note that this section addresses. Western cultures have a tendency to view the organisation as a machine for 'information processing' based on formal and systematic hard data (Nonaka 1991; Nonaka et al., 2000). Such organisations can have difficulty in the capture of the dynamic knowledge creation process. According to Nonaka et al., (2000), Japanese cultures have realised that knowledge creation respond in a unique manner to clients needs, by creating new technologies,

and by developing new markets, products and services. Thus, from 'information processing', in the Western culture, contrasted with the appropriate tapping of tacit knowledge in the Japanese culture, which includes subjective hunches and intuitions from employees. The creation of knowledge from the production of innovative technologies, products and services and its' transfer from tacit towards explicit mode, depends on the organisational design, managerial role definitions and their responsibilities within an organisation (Nonaka 1991).

Nonaka claims that an organisation can possess a sense of identity and thereby focus on ideals and ideas which in reality address innovation. In fact it is when the 'spiral of knowledge' is actuated, that is when tacit and explicit knowledge are exchanged, is the most salient component that Japanese organisations are reckoned to excel. Nonaka (1991) also discovered that organisational redundancy instigates and enhances communication at all levels, by creating information transfer, sharing of tacit knowledge, speeds up concept creation and helps to articulate new explicit knowledge as seen through different perspectives and various combinations generated. Therefore it seems that Japanese organisations (which is not representative of Asian organisations), due to their different view of knowledge creation are better at managing knowledge and therefore closer to being knowledge-based organisations. It is not stock of knowledge that counts but the dynamic capability to continuously create new knowledge from the organisation's capabilities and responding to changing market circumstances (Barney 1991; Lei et al., 1996; Marr et al., 2003; Tsoukas & Mylonopoulos 2004). It is believed that

cultural factors as well as organisational culture play a vital role and have a substantial influence in the knowledge management process as they decide to a great extent about the atmosphere that is created within an organisation.

2.6.4 The connection between knowledge management, business strategy and performance

Defining and measuring corporate performance is an essential part of assessing knowledge management value. It is often claimed that successful organisations are those that have the capability of using their valuable intangible assets faster and appropriately (Brown & Duguid 1991; Drucker 1994; Nonaka 1994; Zack 1999b; Bontis et al., 1999; Lev 2000). These writers argue that in order for organisations to remain competitive, knowledge management must be aligned with overall strategy so that knowledge is created, located, captured and shared to address problems and opportunities (Rifkin 1996). Miles and Snow (2003) had contended that organisations choose deliberately their appropriate strategy, so that a fit with their environment is maintained with the aim of excelling in performance. However, the connection between knowledge management and overall business strategy, and subsequently performance, has to some extent been under-researched (Davenport & Prusak 1998; Ruggles 1998; Zack 1999b).

In an attempt to address this gap, Capon et al., (1994) argue that organisational performance is enhanced through better planning process sophistication such as formal thinking of strategic issues and resource allocation priorities. This practice is

believed to lead to the better identification of opportunities and threats, and appropriate organisational action. Thus appropriate resource allocation creates appropriate teamwork, managerial culture, sharing of resources, addresses change and facilitates the ability to think long-term (Ansoff 1993a). In a similar vein, in Wiig's (1997) research amongst US organisations, it was concluded that not only was knowledge the most valuable asset of an organisation; the way in which the organisation applies that knowledge in light of its overall strategic objectives and broader cultural/structural characteristics is crucial in determining the extent to which it remains competitive.

Wiig (1997) identified five basic knowledge strategies based on organisational priorities, capabilities and culture (table 2.11). For these strategies to be adopted, the proper infrastructure and facilitation of knowledge-related activities, motivation, monitoring and incentives are laid down beforehand (Lee & Yang 2000). Smooth strategic adoption is registered when culture, leveraging knowledge assets in the proper realisation of their value priorities and recognition of organisational capabilities are properly maintained.

Strategy-type	Description
Personal knowledge	This accounts on the personal responsibility of the individual to cherish knowledge related investments, their effective use regarding innovations created and competitive knowledge application within the organisation.
Knowledge-business	The provision and creation of the best possible knowledge through proper capture, renewal, dissemination and use in the organisation's operations.
Knowledge creation	Improved competitiveness is generated through proper motivation of staff to innovate and learn from their experiences, development of basic and applied research and organisational learning in general.
Intellectual asset management	This includes emphasis on patents, best practices adopted and technologies, client relations and other structural knowledge assets. The scope of management here is the building and continuous renewal, marketing, protection and evaluation of such knowledge.
Knowledge transfer	Knowledge sharing and adoption of best practices gained through systematic knowledge transfer approach.

Source: Wiig (1997: 400)

Table 2.11: The five basic knowledge-centered strategies

According to Wiig, only when such alignment occurs will there be a significant impact on performance. Wiig's research is therefore of central interest to this study as it directly addresses the key themes of knowledge, strategy and performance, and the possible connections between them. According to some writers the way in which knowledge management affects organisational performance can be classified along four types of knowledge architectures namely knowledge repository, knowledge refinery, knowledge management roles and information technologies role (Davenport et al., 1997; Zack 1999b; Zack 1999c). In an ideal-type knowledge-based organisation (as summarised in previous sections), the knowledge repository is composed of a structure which provides different interpretations for accumulated content. Knowledge-as-objects are transformed to knowledge-as-process once these interpretations are applied to new contexts and circumstances (Zack 1999b). The

knowledge refinery architecture possesses the ability to create, refine value-added knowledge to the process, distribute and present this knowledge. Information technologies play a vital role in knowledge management as they should aid in the flow of explicit knowledge within the organisation (Zack 1994; Zack 1999b). This instigates further exploitation of knowledge and helps to address competition.

The successful exploitation of knowledge and learning capabilities within an organisation, in order to address competition, is the crux of strategic context of knowledge (Miles et al., 2000). According to Zack (1999b), whereby he describes the strategic context of knowledge as that which exploits knowledge, learning capabilities and intent better than the competition, states that this can be achieved by linking performance, knowledge dissemination between staff at all levels and organisational strategy development. The strategic context of an organisation provides impetus of knowledge management initiatives to be actuated in favour of its mission, competitive positioning strengthening, by addressing current or future gaps and the creation of stakeholder or shareholder value. Zack's (1999b) proposal fits with Miles and Snow's (1994) view, whereby the articulation developed between performance, knowledge and strategy leads towards the proper use of organisational and technological resources, which ultimately increases value. This brings forward the issue that organisational strategy is possibly the most important driver for guiding knowledge management.

Zack's (1999b) classification of knowledge management architecture into interactive and integrative approaches provides a broad set of knowledge-processing management capabilities in both tacit and explicit knowledge fields. Interactive approaches are focused on supporting interaction among employees holding tacit knowledge. In contrast to an integrative approach which provides a sequential flow of explicit knowledge into and out of the repository where knowledge is accumulated, the interactive approach repository is a by-product of interaction and collaboration. Explicit knowledge can be managed better in the repository, through integrative applications, whereas through interactive applications, tacit knowledge can be integrated better. Zack's proposal is also shared by other authors such as Graham and Pizzo (1996) and Hansen et al. (1999). According to Hansen et al., (1999) interactive knowledge management system functions support the personalisation strategy and integrative knowledge management system functions support the codification strategy. Knowledge interaction is facilitated through the creation of common knowledge or overlapping knowledge as interacting individuals with different backgrounds and mental models help to sustain this interaction (Nonaka & Takeuchi 1995; Grant 1996). Again, we can begin to see how some writers have drawn the connection between knowledge management activities and strategic approach, so that performance can be enhanced.

According to Zack (1999b), when an organisation's resources and capabilities attain a dominant position within its product market, a situation arises whereby, from a

knowledge exploration stage the organisation passes to a knowledge exploitation stage. Exploration leads towards the investigation of new market niches and useful adaptations, whilst maintaining current niches. On the other hand exploitation leads towards further innovation, use and propagation of known adaptations. This clearly shows that exploration and exploitation are not mutually exclusive from one another and shows the symbiotic nature of their existence (Zack 1999a). Exploration depends on exploitation as this provides financial capital for successive rounds of exploration whereas exploration without exploitation is not economically viable.

Knowledge management in the information age requires the simultaneous linking of tacit and explicit knowledge along four main domains namely by mapping the knowledge embedded with the organisation's infrastructure, culture, content and processes (Lee & Yang 2000; Birchall & Tovstiga 2002; Buniyamin & Barber 2004). The focus is on marketplace competition and knowledge mapping, which may eventually aid towards how competitive advantage may be attained as knowledge creation, storage, and application is systematically addressed through a strategic knowledge map (Lee & Yang 2000; Buniyamin & Barber 2004). Tovstiga and Korot (1998) also claim that whereas 70 per cent of knowledge is tacit, the remaining percentage is explicit. They also state that the organisational knowledge theory proposed by Nonaka and Takeuchi (1995) remains the most comprehensive framework for knowledge creation and conversion. On such evidence, we can perhaps base the argument that aligning knowledge management with an overall

strategy has the potential to promote competitive advantage. The next section, deals on the aspect related to knowledge creation and conversion.

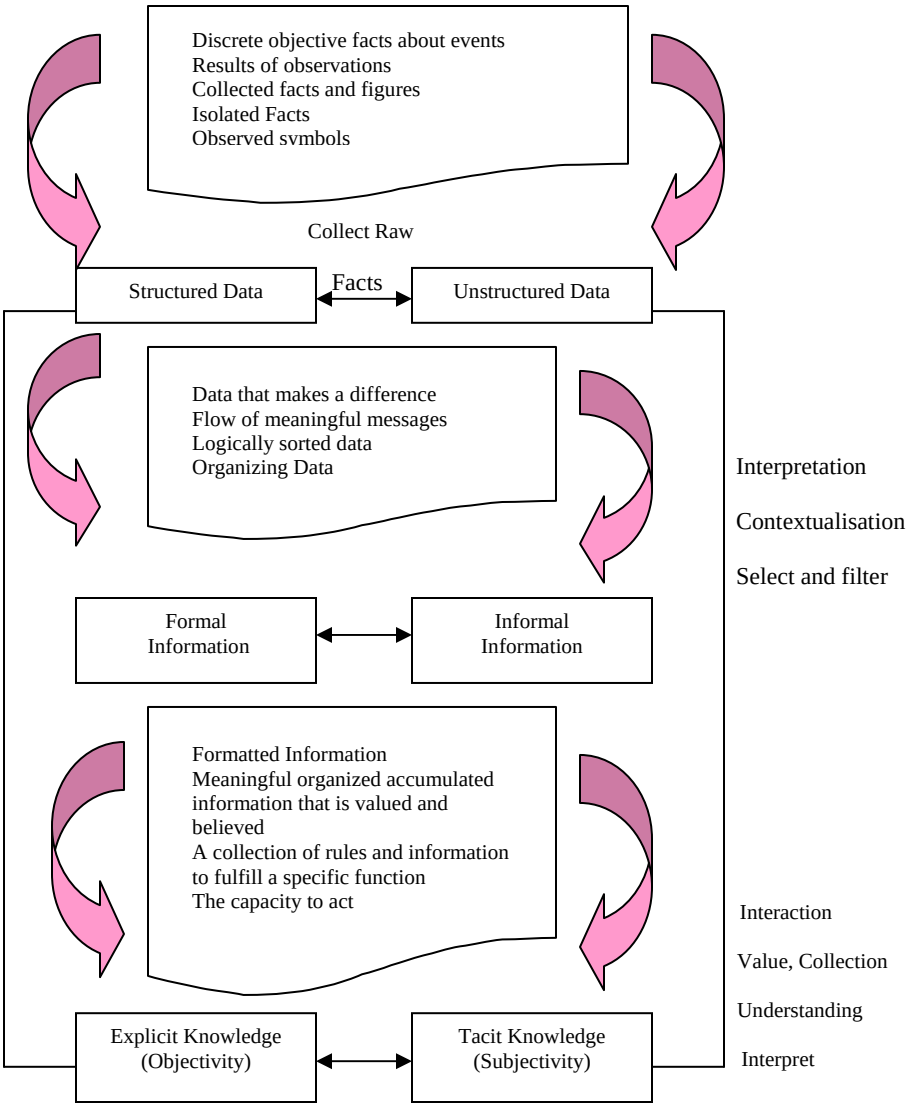
2.6.5 Knowledge-based strategies and the creation and conversion of knowledge

In a changing environment, knowledge intensive organisations create knowledge as a result of knowledge conversion between the tacit and explicit modes (Nonaka 1991; Nonaka et al., 1998; 2000). According to Nonaka and Takeuchi (1995), knowledge is created as a result of the spiral dynamic interaction along the externalisation process from tacit to explicit knowledge, which when shared, amplified, and disseminated amongst all staff of the organisation, instigates and creates new learning.

The most important levels in this spiral knowledge activation are the externalisation-articulation level and the internalization level since personal commitment of the self is vital for success (table 2.9). Nonaka (1991), Quinn (1992), Inkpen (1996) and Styhre et al., (2001) agree that this dynamic interaction across all organisational levels has become a managerial priority and an essential component for effective knowledge creation to address competitive advantage. However Alvesson and Kärreman (2001) argue that knowledge management serves more as a practice of managing information or people rather than facilitating knowledge creation. Styhre et al., (2001) extend this argument a bit further and state that through joint effort and conversations relational knowledge is produced. They

introduce a gender dimension into the debate, claiming that it is important to have both men and women contributing to 'knowing' on a particular issue as alternative perspectives are created. As mentioned earlier, many writers contend that knowledge creation depends on subjectivity interaction between humans. This is sustained by '*ba*' (appendix 3) which supports sharing and subjectivity synthesis due to its permeable boundary and which facilitates such interactions to take place. Failure to create new knowledge is likely to lead toward declining performance (Kim 1993).

The issue of knowledge conversion has been described as one of the most complex of processes along the three levels of data, information and knowledge (Holtham 1996). Holtham's interpretation of an organisation's corporate memory illustrates the hard and soft components along these three levels (figure 2.8).



Source: Adapted from Holtham (1996)

Figure 2.8: Corporate memory defined

Holtham (1996) refers to these links as corporate memory and states that knowledge conversion is much more complex from information to knowledge than from data to information. Since corporate memory is defined as the body of data/information/knowledge that an organisation needs to manage and utilise for its' proper functioning, this model is relevant to this research as a knowledgeable person would be in a far better position to collect, filter and interpret what data is

needed. Heijst et al., (1997) and Maier (2007) state that from an organisational perspective, corporate memories can act as a tool for learning in organisations. This includes learning at an individual level, through direct communications (feedback) and through the knowledge repository.

Despite the importance given by Nonaka et al., (2000) and Lee & Yang (2000) in equating intellectual capital with knowledge as a vital source of competitive advantage, little understanding has been achieved as to how the creation of intellectual capital is facilitated by knowledge management within (Marr et al., 2003). Although knowledge creation is a human process much depends on technological infrastructure, organisation politics, individual rewards and incentives and culture. Organisations need to concentrate on developing knowledge that will be cost effective (Hedlund & Nonaka 1993; Inkpen 1996). Ignoring the issue of cost may only lead towards inefficient knowledge creation. It is therefore viewed as essential that knowledge management initiatives have the support of, and are aligned with, broader organisational structures, processes, practices and strategies.

In summary, this section has highlighted the importance of spiral knowledge activation through internalisation and externalisation focus. This research will investigate the importance of defender-type organisations that are generally internally control dominated thus requiring fewer sources in environmental scanning and the prospector-type which are generally externally market-oriented. The importance of the creation of corporate knowledge will also be investigated

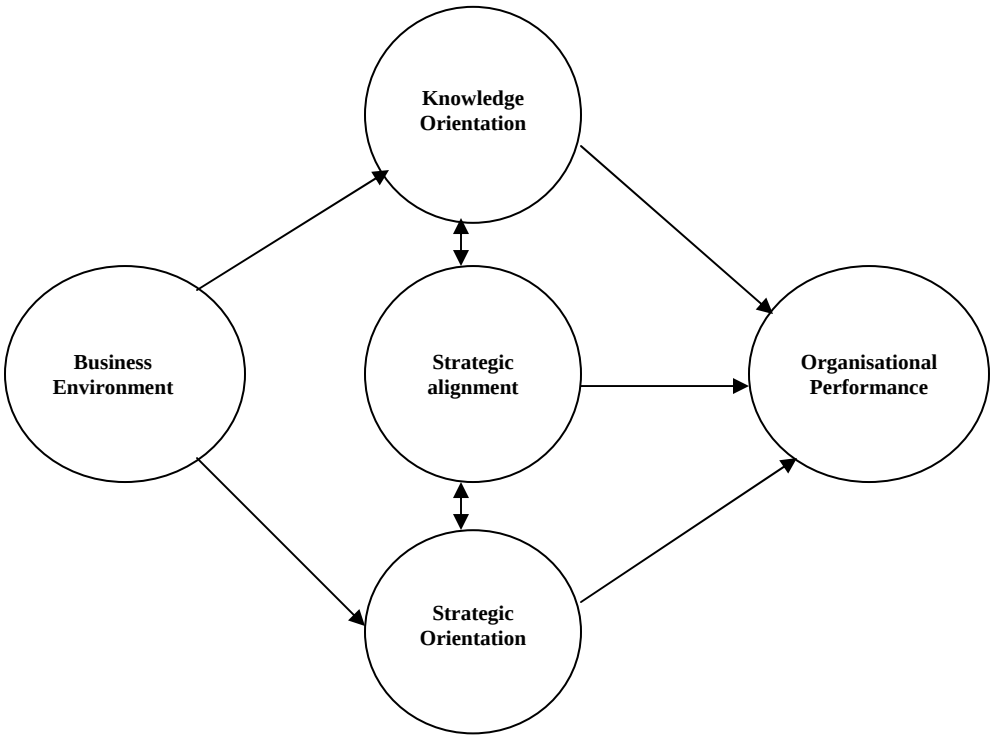
through appropriate reward structures and the necessary technological infrastructure amongst Maltese medium to large-sized organisations.

2.6.6 Strategic orientation alignment

What follows in this section is largely the culmination of the previous discussions in this literature review: a holistic account of how we might envisage the relationship between knowledge management, organisational strategy, environmental turbulence and subsequently, performance. Strategic knowledge orientation which is the specific approach an organisation implements in order to create superior and continuous performance (Gatigon & Xuereb 1997), can be achieved to distinguish the organisation's primary sources of knowledge (Bierly & Chakrabarti 1996). Strategic knowledge orientation refers to the alignment between knowledge management and the overall business strategy. Since industry knowledge is continuously changing, a balance will have to be struck in the creation and exploration of new strategic knowledge, with the aim of closing the internal knowledge gap that is the desired strategic knowledge profile and external competitive knowledge gap vis-à-vis its competitors (Zack 1999d). The internal knowledge gap increases when a certain knowledge threshold is exceeded, in the sense that something has to be done internally in order for strategy execution to take place or to defend the strategic position of an organisation (Zack 1999a).

Not only should the link between business strategy that is the business positioning in a competitive scenario and information systems be strong, but according to some

writers should also be sustained with strategy co-alignment of information technology, organisation and management processes, key skills to implement the business strategy and information systems architecture (MacDonald 1991; Venkatraman 1991). For these writers the ultimate aim is to sustain the position of the organisation and address appropriate action to sustain organisational goals in a competitive market. Truch & Bridger (2002) proposed a model that links business environment change and unpredictability, knowledge orientation that combines knowledge management strategy and implementation, strategic orientation that address the organisation's behaviour to environment changes and strategic alignment which combines knowledge orientation, strategic-type and environment which ultimately influence performance (figures 2.9 and 2.10).



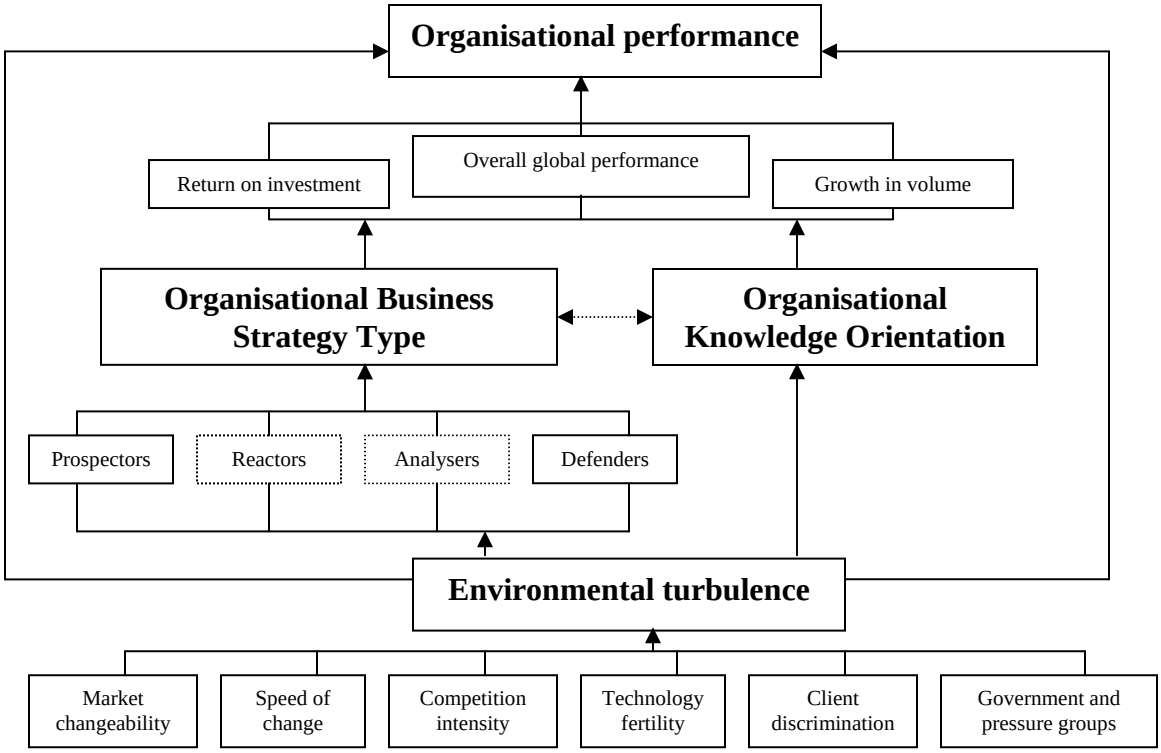
Source: Derived from Truch & Bridger (2002: 906)

Figure 2.9: Research model proposed by Truch and Bridger

In a similar model of strategic alignment, Miles and Snow (1994) identified that fit can be achieved for strategy, structure, and processes in order to maintain logical integrity, both externally and internally. Internal fit is achieved once structure, processes and management are aligned with the organisational strategy. A key concern in many organisations is the internal alignment between business strategies and the application of information technology. According to Scott-Morton (1991), information technology must be seen as part of a system that balances organisational structure, management control processes and human resources policy. External fit is achieved when the organisation and its' environment are aligned. They argue that achieving alignment and fit, brings with it a culture of continual change and flexibility.

Although organisational strategic alignment is a research topic that has been picked up by several authors, the majority of the existing research is based on qualitative research methods. However, Truch's (2004) study links strategic knowledge orientation and strategy-type in a quantitative manner. Truch amalgamates two models dealt with previously, namely the Miles and Snow's model (1978; 2003) where the defender, analyser, reactor and prospector-types were identified and Hansen's et al., model (1999), comprising of personalisation and codification knowledge strategies. The amalgamation of these two models brings forward important issues, when one considers codification with the defender-type and personalisation with the prospector-type of strategy. The two extremes of the Miles and Snow model, that is prospector and defender, have been selected so that ease of

comparison between the Miles and Snow and the Hansen's et al., models could be achieved (Truch & Bridger 2002). Defender-type organisations bear similarity to the codification-type of strategy as the focus is maintained on knowledge reuse of resources, efficiency, staff recruitment that can deal with highly specialised standardised work and internal focus on operations rather than seeking new opportunities (Lee & Yang 2000). On the other hand prospector-type organisations are seen as similar to the personalisation knowledge strategy as their main focus lies on hiring flexible employees who can deal with ambiguity, creativity, focus on tacit knowledge and high margins (Greiner et al., 2007).



Source: Derived from Truch and Bridger (2002: 906); Woodside et al., (1999: 138)

Figure 2.10: Proposed model for research

Miles and Snow (2003) state, that although research on the relationship between organisation and environment has grown significantly, the search for the theoretical paradigm that addresses the behavioural dynamics of total organisational systems remains an ongoing quest. Having outlined the research framework, and discussed the literature on which it is based, the chapter will now outline the specific hypotheses that flow from this framework, and which guided the research process.

The literature review discussed, provides information on the main components of this research study including organisational performance, business strategy-types, knowledge orientation and environmental turbulence. Organisational performance will be taken as the dependent variable. Those independent variables that have a direct bearing on organisational performance namely strategic alignment, which is the influence between type of strategy adopted, environment, and knowledge orientation; environmental turbulence which pertains to unpredictability and change in market conditions; strategy-type which pertains to the organisational adaptation to the environment in which the organisation is in; and knowledge orientation which combines knowledge management strategy and its' implementation will be analysed. The links between these components is provided in figure 2.9.

2.7 The development of hypotheses related to strategic orientation in Maltese medium to large-sized organisations

In the investigation of how knowledge management strategies are linked with business strategies and their surrounding environments, the literature review

conducted earlier helped to formalise the foundation of initial hypotheses in relation to the variables identified for the proposed research model (figure 2.10), whereby an expected relationship between an independent and dependent variable is investigated and which can be eventually falsified. These hypotheses serve as a guideline of how this research intends to tackle the knowledge orientation and business strategies relationships.

The research will develop and test hypotheses in the following manner:

a) The development of statistical hypotheses and the significance level to be adopted.
b) The probability sample involved.
c) The identification of critical region(s) of the null sampling distribution.
d) The utility of the sample statistic to determine whether null sampling distribution is false (Schwab 1999).

Basing the hypotheses on defender and prospector-types of strategies derived from the Miles & Snow's model, and also on Hansen's et al., typology of codification and personalisation knowledge orientations, the relationships between knowledge orientation and strategy-type in Maltese medium to large-sized organisations will be investigated. In order to facilitate comprehension, each knowledge orientation dimension will be treated separately. Thus individual hypotheses will be formulated through the different knowledge orientation components identified. The knowledge orientation variables are listed in appendix 4. The variables were codified as follows

CODXX, which means a variable identifying a codification-type strategy and PERSXX, which means a variable identifying a personalisation-type strategy. XX represents the variable reference number.

2.7.1 The research model comprising of organisational knowledge strategy, strategic alignment, strategic fit and performance

The characteristics of strategy will be examined through a framework composed of knowledge strategy, alignment and fit that lead to improved business performance, and performance links. Research developed by Venkatraman (1989) and Hansen et al., (1999) state that generally an organisation sticks to one strategy as its' major driving force, with the other strategy used to aid in the organisation's strategic thinking, sustaining that both strategies are not used equally. In fact Hansen et al., (1999) claim that organisations use 80% of their knowledge sharing following one strategy with the remaining 20% of the other strategy. Hansen's et al., (1999) model identifies three common criteria namely the manner in which clients are served in organisations, organisational business economics and hiring of staff to work within an organisation. It also seems that the prospector-type is linked with the personalisation knowledge strategy whereas the defender-type is linked with the codification strategy (Truch 2004). Thus the following hypotheses will be investigated (table 2.12).

H_1: Maltese medium to large sized organisations adopting a prospector-type knowledge strategy are linked to personalisation knowledge strategies to a greater significance than codification-type knowledge strategies.
H_2: Maltese medium to large sized organisations adopting a defender-type knowledge strategy are linked to codification-type knowledge strategies to a greater significance than personalisation-type knowledge strategies.

Table 2.12: Hypotheses linking Maltese medium to large-sized organisations with codification or personalisation strategies

Embarking on two simultaneous strategic knowledge management strategies of exploitation and exploration is considered by some writers as the most efficient organisational approach (Zack 1999a). Thus defender-type organisations are more geared towards the efficient use of resources, ensuring better alignment between exploration and exploitation than prospector-type organisations. This leads towards the following hypothesis (table 2.13).

H_3: Maltese medium to large sized defender-type organisations are significantly in a better position to align knowledge that they create with their main operations than prospector-type organisations.

Table 2.13: Hypothesis related to aligning knowledge with organisational operations

According to Hansen et al. (1999) successful organisations are those that develop and sustain a particular knowledge management strategy that fits the business strategy of the organisation. Thus in adopting a prospector or defender-type strategy is equally important to align and sustain the organisation's overall business objectives with knowledge management practices. As identified earlier in the literature review, prospector-type organisations rely more on hired staff capabilities,

whereas defender-type organisations are more routine in nature. This leads towards the testing of the following hypotheses (table 2.14).

H_4: The overall organisational objectives in Maltese medium to large sized organisations are linked with knowledge management practices to the same degree in both defender-type and prospector-type organisations. H_5: Maltese medium to large sized prospector-type organisations show a greater awareness of systems knowledge needs of the organisation than defender-type organisations.

Table 2.14: Hypotheses related to knowledge management link with business strategy

The alignment of an organisation with its marketplace means the sustaining of the organisation's strategic fit. This is achieved by defining appropriately the organisation's strategy (Miles & Snow 1994, 2003). This leads towards the creation of newly developed competencies within the organisation, which ultimately provides the cutting edge needed in the competitive market-place, especially with other competitors (Zander & Kogut 1992; Greiner et al., 2007). Since it was previously established in the literature review, that strategic fit between knowledge and business strategies is significantly better attained through prospector rather than in defender-type of knowledge strategies the following hypotheses will be investigated (table 2.15).

H_6: Maltese medium to large-sized prospector-type organisations adopting personalisation-type knowledge strategies out-perform those adopting codification-type strategies. H_7: Maltese medium to large-sized defender-type organisations adopting codification-type knowledge strategies out-perform those adopting personalisation-type strategies.

Table 2.15: Hypotheses related to performance link with business strategy

Performance in Maltese medium to large-sized organisations will be measured by adopting Dess and Robinson's (1984) and Pearce et al., (1987) framework which comprised of what may be considered as overall/global performance achieved in that last year, return of investment and growth of sales volume in the last three years. Miles and Snow (1978, 2003) state that no difference exists as regards to performance between the stable strategies adopted by defender, prospector and analyser-type organisations. However the reactor-type organisations due to their inconsistent nature and their inability to respond consistently to their environments over time, result in poor performance due to overwhelming changes in environmental turbulence encountered (Conant et al., 1990; Miles & Snow 2003). The following hypotheses will be investigated (table 2.16).

H_8: Maltese medium to large-sized defender-type, prospector-type and analyser-type organisations perform on an equal basis.
H_9: Maltese medium to large-sized reactor-type organisations perform poorly compared with Maltese medium to large sized defender, prospector and analyser-type organisations.

Table 2.16: Hypotheses related to performance between strategy-types

2.7.2 The management and organisation of knowledge strategy-types in Maltese medium to large-sized organisations

The characteristics of Maltese medium to large-sized organisations will be examined through a framework composed of structure, co-ordination, performance measurement and internal-external focus aspects. According to Miles and Snow's model, prospector-type organisations utilise their resources efficiently in order to address environmental change. This is usually achieved through the creation of

project teams whose main aim is to indulge, investigate and report appropriately on product development and timely market analysis (Miles & Snow 1978, 2003). Operational co-ordination and problem facilitation is achieved centrally through:

(i) short-looped[13] horizontal feedback information systems as timely access to performance information is essential, and

(ii) through the greater utility of project teams (Hansen et al, 1999).

The following two hypotheses will be investigated (table 2.17).

H_{10}: In Maltese medium to large-sized prospector-type organisations, knowledge information flows in a horizontal feedback short-loop at all levels is much greater than in the defender-type of organisations.
H_{11}: In Maltese medium to large-sized prospector-type organisations, project teams operate horizontally to a far greater degree than in defender-type of organisations.

Table 2.17: Hypotheses related to feedback loop link with strategy-type

Miles and Snow (2003) mention, that due to the restricted communication adopted by defender-type organisations, relationships between staff are generally hampered. Lack of agreement between staff is generally resolved internally through normal hierarchical channels. There is a sequential and vertical 'long-looped' chain of events in the dissemination of information, as management direction is provided following a top-down approach and reporting from staff follows a bottom-up approach sustaining a vertical information systems approach regarding performance control (Miles & Snow 1978, 2003). This brings forward another hypothesis for investigation (table 2.18).

[13] Short-looped horizontal information systems are adopted by prospector-type organisations who facilitate and co-ordinate diverse functions and exercise discretion effectively (Miles et al., 1978: 63).

H_{12}: In Maltese medium to large-sized defender-type organisations, knowledge information flows in a vertical path from top to bottom hierarchical approach and from bottom to top are much more significant than in a prospector-type of organisation.

Table 2.18: Hypothesis related to organisational information flow

According to some writers the adoption of the right organisational balance between effectiveness and flexibility (for prospector-type organisations) and efficiency and standard procedures (for defender-type organisations) is important. The development of the right mix between the fluid and the institutional domains related to operating efficiencies, flexibility and innovation are also essential components in turbulent environments. This is referred to by Graham and Pizzo (1996) as 'just enough discipline'. Prospector-type organisations adopt a decentralised control approach, as information related to performance is usually tapped from the bottom structures of the organisation, due to their nature of controlling their own performance, rather than coming from the management side (Miles & Snow 2003). On the other hand defender-type organisations adopt a centralised control approach, instigated through specialists working in a functional organisational structure, for fear of generating costly mistakes if done by others. Contrary to prospector-type organisations, information is only found at the top management level in defender-type organisations (Miles & Snow 2003). This calls for the following hypothesis to be investigated (table 2.19).

H_{13}: In Maltese medium to large-sized defender-type organisation, knowledge management co-ordination takes place centrally from the top management level of the organisation to a greater extent, than the prospector-type of organisation.

Table 2.19: Hypothesis related knowledge management co-ordination

In prospector-type organisations, according to Miles and Snow, general skill development with a broad definition of employee job description is present, thus permitting self-governance by the employees themselves as there is less extensive division of labour than the defender-type (Miles & Snow 2003). In a turbulent environment, codified job descriptions, and procedures would be rather difficult to achieve in prospector-type organisations. It may be thought inappropriate that low structural formalisation instigates uncontrolled behaviour, but in prospector-type organisations this behaviour is ideal due to concern and focus on market performance and sales volume (Miles & Snow 2003; Conant et al., 1990). In defender-type organisations, management adopts a 'high degree of formalisation' and centralised line of authority due to codified job descriptions and procedures, thus specifying appropriate specific behaviours from employees due to stability and efficiency emphasis in this strategy-type (Miles & Snow 2003). Consequently the following hypothesis is investigated (table 2.20).

H_{14}: In Maltese medium to large-sized defender-type organisations, operations occur according to established sets of procedures to a greater extent than in the prospector-type of organisations.

Table: 2.20: Hypothesis related to knowledge management procedures documentation

As regards to performance management, it has been argued that defender and the prospector-type organisations adopt different strategies. Market aggressiveness is the main driving force adopted by the defender-type of organisations, as focus is maintained on cost-efficient manufacturing, distribution costs, inventory control, monitoring and quality improvement. Only a single core-technology is established

coupled with quantitative inventory models to control costs. Defender-type organisations focus on efficiency that is doing things right through strong organisational monitoring. On the other hand prospector-type organisations focus on doing the right things. The defender-type organisations compare present efficiency indices with those of previous time periods within the same organisation and not with other organisations as the belief is that no other organisation can do it better (Conant et al., 1990; Miles & Snow 2003). Thus, the following hypothesis will be investigated (table 2.21).

H_{15}: In Maltese medium to large-sized defender-type organisations, information systems provide performance measures significantly greater than the prospector-type of organisations.

Table 2.21: Hypothesis on the provision of information systems pertaining to performance measures

Miles and Snow claim that defender-type organisations are internally control dominated, with few resources used in environmental scanning and geared more towards the provision and engagement of skilled personnel with high salaries, whereas prospector-type organisations are more externally market-oriented and more inclined at window opportunities that might arise in the market (Miles & Snow 2003). The following two hypotheses will be investigated (table 2.22).

H_{16}: In Maltese medium to large-sized prospector-type organisations, knowledge management systems are focussed externally to a significantly greater extent than are the defender-type of organisations.
H_{17}: In Maltese medium to large sized defender-type organisations, knowledge management systems are focussed internally to a significantly greater extent than the prospector-type of organisations.

Table 2.22: Hypotheses related to focussing of knowledge management systems

2.7.3 The human resources aspect in organisations

The characteristics involving human resources will be examined through a framework composed of recruitment, reward mechanisms, employee training and staff termination aspects (Lee & Yang 2000). Earlier it was established that the type of staff recruited by organisations adopting personalisation strategies tend to be different from those adopting codification strategies (Hansen et al., 1999). Organisations with codification strategies prefer to recruit employees, who are well versed with knowledge reuse and work well with standard operating procedures. For organisations adopting personalisation strategies, there is a tendency towards the recruitment of employees such as those with a strong acumen towards problem solving and who can tolerate ambiguity (Hansen et al., 1999). Hansen's et al., model surfaces two important issues. In the defender-type organisations with a formalised set of operations, codified job descriptions, stability and efficiency are the main components that define these types of organisations. The type of employees recruited for prospector-type organisations have more generalised skills, with broadly defined jobs to promote self-governance within the organisation. Prospector-type organisations possess within their low degree of structure formalisation, a number of employees whose skills can be easily transferred to other projects (Miles & Snow 2003). The following hypothesis will be investigated in order to test Hansen's model using the codification and personalisation constructs (table 2.23).

H_{18}: In Maltese medium to large-sized prospector-type organisations, recruited employees are significantly better problem solvers than those recruited by the defender-type of organisations.

Table 2.23: Hypothesis related to types of staff recruited in organisations

Lee and Yang observe that the reward mechanisms involved between personalisation and codification-type of knowledge management systems are different. Organisations with codification-type strategies are said to encourage staff to deposit their knowledge on the organisation's electronic medium, with level and quality of such documents linked with the organisational performance appraisal review. In organisations that adopt personalisation-type strategies, rewards for knowledge sharing, is based on employees sharing knowledge directly with other employees (Lee & Yang 2000). Thus, the effective prospector-type organisation focuses on managerial success, whereas the efficient defender-type organisations focus on personnel planning for rewards allocation (Miles & Snow 2003). These hypotheses will be investigated (table 2.24).

H_{19}: In Maltese medium to large-sized prospector-type organisations, knowledge sharing is encouraged by reward mechanisms to a significantly greater extent than in defender-type of organisations.
H_{20}: In Maltese medium to large-sized defender-type organisations, knowledge sharing is encouraged by the utility of the organisation's databases to a significantly greater extent than in prospector-type of organisations.

Table 2.24: Hypotheses related to knowledge-sharing

Some writers have argued that organisations, who adopt codification-type strategy, focus their training on employees based on efficiency, distance-learning mode and

training tends to occur in groups. On the other hand, organisations who adopt personalisation-type strategies adopt mentoring on an individual basis in conveying tacit knowledge from one employee to another (Hansen et al., 1999; Miles & Snow 2003). Miles and Snow also mention that defender-type organisations keep salaries, training and turnover costs to a minimum when employees possessing limited specialised skills are recruited. Thus the following two hypotheses will be investigated (table 2.25).

H_{21}: In Maltese medium to large-sized defender-type organisations, training relies on documentation to a significantly greater extent than in prospector-type of organisations. H_{22}: In Maltese medium to large-sized prospector-type organisations, training which relies on informal knowledge transfer occurs through appropriate mentoring to a significantly greater extent than in defender-type of organisations.

Table 2.25: Hypotheses related to types of training adopted

As identified by Hansen et al., (1999) prospector-type organisations are preoccupied with loss of corporate memory when skilled personnel leave the organisation. Personalisation strategy-type organisations focus more on tapping tacit knowledge from staff, especially when job movements or job terminations occurs (Hansen et al., 1999). A further hypothesis will be investigated between prospector and defender-types of organisations (table 2.26).

H_{23}: In Maltese medium to large-sized prospector-type organisations, knowledge transfer prior to job movement or termination is given greater importance than in defender-type of organisations.

Table 2.26: Hypothesis related to knowledge transfer prior to job movement

2.7.4 The characteristics of knowledge orientation within an organisation

As established earlier in the literature review, the characteristics of knowledge orientation will be examined through a framework that represents a knowledge value-chain composed of scanning, capturing, storage, retrieval, application, transfer and sharing components.

For the defender-type organisations, environmental scanning occurs from top management and is generally restricted to technological developments, time constraints and specialised staff in scanning other organisations. Defender-type organisations tend to observe the environment in a similar manner as the product-market domain is narrow and stable, and only few important factors can be predicted successfully which will have a large impact on internal operations of the organisation (Miles & Snow 1978). On the other hand the efficient and fluid prospector-type organisations are interested in developing market window opportunities by creating an advanced market scanning system, as the prospector's domain is usually broad and in a continuous and evolving state of development (Sharif et al., 2005). Thus the recruitment of employees in such organisational types generally focuses on the types of skill that enable and support such activities (Miles & Snow 2003). The following three hypotheses will be investigated (table 2.27).

H_{24}: In Maltese medium to large defender-type organisations, client knowledge is significantly greater than in prospector-type of organisations.
H_{25}: In Maltese medium to large prospector-type organisations, competitor knowledge is significantly greater than in defender-type of organisations.
H_{26}: In Maltese medium to large prospector-type organisations, industry knowledge is significantly greater than in defender-type of organisations.

Table 2.27: Hypotheses related to the importance of the types of knowledge adopted

When it comes to the capturing of knowledge, Miles and Snow claim that prospector-type organisations are faced with a multitude of information possibilities that may contradict one another, as the planning process of prospector-type organisations is generally broad, oriented towards problem finding, and depends on feedback generated during experimentation. Also preliminary action is usually based on incomplete information and full market feedback is essential prior to taking subsequent decisions on a larger scale (Miles & Snow 2003). Furthermore the rate of knowledge learning is an essential component in order to exploit new market opportunities especially for the prospector-type organisations (Bierly & Chakrabarti 1996). A further three hypotheses will be investigated (table 2.28).

H_{27}: In Maltese medium to large defender-type organisations, information accuracy is significantly greater than in prospector-type of organisations.
H_{28}: In Maltese medium to large prospector-type organisations, continuously updated knowledge management is significantly greater than in defender-type of organisations.
H_{29}: In Maltese medium to large prospector-type organisations, the creation or acquisition of new knowledge is significantly greater than in defender-type of organisations.

Table 2.28: Hypotheses related to the quality and capturing of knowledge

On the contrary to prospector-type organisations where planning is said to be generated at a broader level, defender-type organisations adopt intensive planning, research and development, and problem solving attitudes prior to any organisational action being taken (Miles & Snow 2003). Research and development and the finance functions are important components in defender-types of organisation, in

order to cultivate and foster internal knowledge within an organisation, so that an understanding of the external environment can be maintained. It might also be expected that defender-type organisations adopting codification knowledge strategy focus on the transfer of knowledge between employees and the utility of electronic depositing of such knowledge (Hansen et al., 1999). Thus, the following hypotheses will be investigated (table 2.29).

H_{30}: In Maltese medium to large defender-type organisations, research and development is significantly greater than in prospector-type of organisations.
H_{31}: In Maltese medium to large defender-type organisations, knowledge transfer between staff and the electronic depositing of this information is significantly greater than in prospector-type of organisations.

Table 2.29: Hypotheses related to research and development skills

Organisations that rely on tacit knowledge are different from those that rely on explicit knowledge. As was established earlier in the literature review, tacit knowledge is difficult to tap by nature (Hansen et al., 1999), and this difficulty is compounded when an organisation needs to capture knowledge in several fields such as technological, market, scientific, operational and business industry. In such a situation the person-to-person contact (i.e. prospector-type) is said to be the most appropriate approach, where this type of knowledge can be more easily tapped through available expertise or appropriate expertise networking. Organisations that develop an explicit knowledge management (i.e. those that follow a codification approach) tend to rely on the 'people-to-documents' approach (Nonaka 1988; Hedlund 1994; Hansen et al., 1999; Lee & Yang 2000).

Organisations who adopt the prospector-type strategy are said to assign projects to well trained employees whose skills can be easily transferred from one project to another quite easily (Miles & Snow 2003). The scope and utility of documents in the electronic format for organisations who adopt personalisation strategies is to speed up knowledge retrieval on knowledge and for accountability purposes (Hansen et al., 1999). The following three hypotheses will be investigated (table 2.30).

H_{32}: In Maltese medium to large-sized prospector-type organisations, tacit knowledge possessed by employees is significantly greater than in defender-type of organisations.
H_{33}: In Maltese medium to large-sized prospector-type organisations, knowledge on available expertise is more readily available than in defender-type of organisations.
H_{34}: In Maltese medium to large-sized prospector-type organisations, expertise networking is significantly more important than in defender-type of organisations.

Table 2.30: Hypotheses on knowledge networking processes

According to Hansen et al. (1999) and Lee and Yang (2000) the retrieval of information becomes easier and faster once information is codified and the appropriate information systems are maintained within an organisation, without having to contact the individual who created the information. This includes the utility of knowledge reuse, and helps to speed up tracking of knowledge management. The following hypotheses will be investigated (table 2.31).

H_{35}: In Maltese medium to large-sized defender-type organisations, knowledge information access through information systems is significantly greater than in prospector-type of organisations. H_{36}: In Maltese medium to large-sized defender-type organisations, knowledge information can be accessed without having to refer to the person who created it, which is significantly greater than in prospector-type of organisations. H_{37}: In Maltese medium to large-sized defender-type organisations, knowledge seeking and information retrieval from electronic databases in order to sustain job effectiveness is significantly more accessible than in prospector-type of organisations.

Table 2.31: Hypotheses on knowledge information access and retrieval

In prospector-type organisations, Miles and Snow observe that recruited employees tend to possess broader skills, with the scope of promoting self-governance where the variety of employee skills can be transferred and the utility of skills judgement to other projects at the workplace, a people-focus approach, flexibility maximisation, and standardisation minimisation can be exercised (Miles & Snow 2003). In contrast, defender-type organisations based on a codification-type of strategy, tap existing knowledge from electronic databases, possibly through vertical integration, rather than developing their own knowledge (Hansen et al., 1999; Lee & Yang 2000; Miles & Snow 2003).

According to some writers prospector-type organisations using personalisation-type strategy generally focus on employee communication rather than knowledge retrieved from databases. This contrasts with defender-type organisations utilising codification-type strategies, where knowledge sharing generally occurs through

documentation and databases. The utility of brainstorming sessions and re-iteration techniques resulting in a list of opportunities and problems and identifying knowledge gaps are most effective when knowledge that cannot be codified is instigated during these conversations (Hansen et al., 1999; Luftman & Brier 1999). It might therefore be expected that defender-type organisations, where such processes of open dialogue about skills and learning are less common, suffer larger gaps in relevant knowledge. The following hypotheses will be investigated (table 2.32).

H_{38}: In Maltese medium to large-sized prospector-type organisations, there is more likely to be a lack of up-to-date work-related knowledge than in defender-type organisations.
H_{39}: In Maltese medium to large-sized prospector-type organisations, knowledge retrieval on a one-to-one basis from employees is significantly greater than in defender-type of organisations.

Table 2.32: Hypotheses on appropriate knowledge seeking

Prospector-type organisations tend to be less efficient in the utilisation of resources thus lengthening the learning process as a result of the complex and uncertain turbulent environment that might be encountered (Miles & Snow 2003). Nonaka (1991) states that an effective organisational design, depends on the effective use of "redundancy", which is the overlapping of organisational information, business processes and managerial responsibilities. Building a redundant organisation to create an effective organisation may sound disconcerting as business and managerial operations may become duplicated. However this is the starting point of building a knowledge-based organisation (Nonaka 1991). According to Nonaka

(1991), redundancy enhances communication by creating a 'common cognitive ground' amongst employees, instigated by enhancing dialogue leading towards tacit knowledge transfer. According to Nonaka (1991), this involves a continuous iterative process whereby mistakes can be anticipated and tolerated. Defender-type organisations tend to be more efficient since they focus on fewer market opportunities and thus utilise fewer resources in the process (Miles & Snow 2003). The following hypotheses will be investigated (table 2.33).

H_{40}: In Maltese medium to large-sized prospector-type organisations, project reflection time and employee sharing of experiences is significantly greater than in defender-type of organisations.
H_{41}: In Maltese medium to large-sized prospector-type organisations, learning from past mistakes and knowledge sharing with others is significantly greater than in defender-type of organisations.

Table 2.33: Hypotheses on the utilisation of resources in organisations

According to Hansen et al., (1999), members of prospector-type organisations that adopt personalisation strategies are expected to respond quickly to information requests from colleagues. This is usually achieved through network development instigated by employee movements within an organisation (Hansen et al., 1999). The following two hypotheses will be investigated (table 2.34).

H_{42}: In Maltese medium to large-sized prospector-type organisations, communication between staff for information requests is by far greater than in defender-type organisations.
H_{43}: In Maltese medium to large-sized prospector-type organisations, the creation of networks that take place due to staff movements is by far greater than in defender-type organisations.

Table 2.34: Hypotheses related to communications and network relations in organisations

Hansen et al., (1999) argue that the reuse of particular knowledge assets in organisations which utilise codification-type strategies is ideal where the organisation is engaged in creating standardised products. On the other hand when client needs vary continuously and customised products are offered by an organisation, it is more appropriate that personalisation-type strategy is adopted. The creation of customised products creates the provision of customised solutions, thus the utility of experts to solve unique problems is essential in such organisations (Hansen et al., 1999). The following hypothesis will be investigated (table 2.35).

H_{44}: In Maltese medium to large-sized defender-type organisations, the reuse of knowledge in the organisation's products or services is significantly greater than in prospector-type organisations.

Table 2.35: Hypothesis related to knowledge reuse and utility of expert knowledge

Product or service development in prospector-type or defender-type organisations occurs with their own characteristics. In defender-type organisations which typically grow by penetrating deeper into their current markets, development occurs by a simple extension of their current product or expansion in product related areas (Miles and Snow 1978). However extension and expansion tends to be limited, cautious, incremental and controlled due the protection from competitors, focus on core operations that are generating success and minimal market penetration. On the contrary, prospector-type organisations rely on the exploitation of market opportunities, as well as by promoting innovation reputation (Lee & Yang 2000; Miles & Snow 2003). Hansen et al., (1999) also claim that the link between

knowledge management and innovation in a personalisation strategy is evident. The following hypothesis will be investigated (table 2.36).

H_{45}: In Maltese medium to large-sized prospector-type organisations, employees with the appropriate knowledge instigate innovation significantly greater than in defender-type of organisations.

Table 2.36: Hypothesis related to the instigation of innovation in organisations

2.7.5 The role of information technology and environmental turbulence surveillance in Maltese medium to large-sized organisations

Hansen et al., (1999) argue that the level and extent of information technology support depends to a large extent on the type of strategy adopted by an organisation, that is whether codification or personalisation-type. Whereas information technology investment may not be considered as important for personalisation-type strategy as its' focus rests on the recruitment of employees that can exchange tacit knowledge through facilitated communication within the organisational environment, the same cannot be said for those organisations that adopt codification-type of strategy, as large investments are required to create an adequate infrastructure that maintains knowledge, such as search engine capabilities, appropriate filing and storage of electronic documents that can be easily retrieved, linking employees as well as for knowledge reuse (Hansen et al., 1999).

Information technology investment is claimed to be an important issue in both defender and prospector-type of organisations. It seems that a conflict exists as regards to information technology investment in defender-type organisations as on

one hand these organisations make it a point to invest in appropriate technologies, whereas on the other they try to keep costs down. Thus efficiency is maintained through the adoption of a single core technology shielded from an external turbulent environment, in order to maintain aggressively its importance in the chosen market segment and to operate continuously and efficiently. The current business activities and the future product mix within an organisation are synonymous with prospector-type organisations whereby the IT infrastructure must allow for people to find other people, whereas for the defender-type organisations IT infrastructure must contain search engines and a large cache of documents to allow for document retrieval (Conant et al., 1990; Miles & Snow 2003). Thus, it is considered imperative that in these organisations, technological capability processes are flexible enough with little attention given towards organisational stability, production and distribution systems efficiency. It could therefore be hypothesised that information technology investment may be reluctant in such organisations when it becomes abundantly clear that more standardised and efficient systems are adopted by competitor organisations (Miles & Snow 2003).

In defender-type organisations utilising codification-type strategies, focus on cost-efficiency and therefore the adaptation and updating of core technologies coupled with basic expertise requirements is thought to be essential for success. In prospector-type organisations utilising personalisation-type of strategies focus is maintained on innovation and flexibility as the core ingredients to operate multiple technologies in turbulent environments and in keeping abreast regarding cutting-

edge technologies (Conant et al., 1990; Bierly & Chakrabarti 1996; Miles & Snow 1978, 2003).

Defender-type organisations adopting codification-type strategies are found to operate in stable organisational environments. This is said to be motivated by the creation of a buffer against uncertainty and vulnerability, due to environmental turbulence (Miles & Snow 2003). In contrast prospector-type organisations adopting personalisation-type strategies appear to embrace uncertainty and proactively seek new business opportunities. For such organisations, growth results from the identification of new markets and product development (Lee & Yang 2000; Miles & Snow 2003). The following hypotheses will be investigated (table 2.37).

H_{46}: In Maltese medium to large-sized defender-type organisations, information dissemination and use of information technology in accessing knowledge is significantly greater than in prospector-type organisations.
H_{47}: In Maltese medium to large-sized prospector-type organisations, employee contact and the utility of information technology is significantly greater than in defender-type organisations.
H_{48}: In Maltese medium to large-sized prospector-type organisations, the utility of cutting-edge information and information technology is significantly greater than in defender-type organisations.
H_{49}: In Maltese medium to large-sized prospector-type organisations, the susceptibility to environmental turbulence is significantly greater than in defender-type organisations.

Table 2.37: Hypotheses related to dissemination, technology, utility of information and environmental turbulence in organisations

2.8 Concluding remarks

The literature review presented in this dissertation, has led to the development of a research model with the scope of further investigation through appropriately defined variables. The development of a strategic knowledge orientation model presented in this dissertation (pp. 95-99) combine effectively both the organisational strategic intent and organisational performance. The conception of strategic approach in this study is based mostly on Miles and Snow, whilst the knowledge orientation model is based on Hansen's et al.,work. Furthermore Truch's model regarding strategy/knowledge management and performance has been drawn, so that research questions and analytical framework were devised accordingly. Ultimately the purpose of this study is to refine these models and take them further so that one can understand better the relationship between strategy, knowledge orientation and performance. The objective of this study is not only to test models and theories mentioned in this literature review through a series of formulated hypotheses, but also to investigate whether any interrelationships are taking place between the selected variables of the proposed model that is between organisational strategy, knowledge management and performance in Maltese public and private sector medium to large-sized organisations. The following chapters of this dissertation will develop into an investigation of the strategic knowledge management orientation instrument amongst Maltese medium to large-sized organisations.

Chapter 3 – Methodology

3.1 Introduction

In this chapter, the use of a predominantly quantitative methodological strategy is outlined and justified. First the approach is explained in broad terms, then the sampling process is described, before a more specific breakdown and explanation of the research instrument is given. The main aim of this research is to analyse strategic alignment of knowledge orientation amongst Maltese medium to large-sized organisations, besides providing support for effective decision-making through the various theories presented.

This chapter explores the relevant philosophical issues through a discussion on positivism and falsification, and outlines the principles of hypotheses formulation through the hypothetico-deductive method related to the research undertaken. A description and justification of the research method adopted and discussion of the sample and the sampling process adopted is also provided. A detailed description and explanation of the survey instrument is provided with a clear connection between the hypotheses identified in the previous chapter and the questions asked in the knowledge orientation questionnaire. This is followed by the definition and operationalisation of performance, ethical considerations taken and the limitations encountered in this research.

3.2 Philosophical background

The philosophical stance of this dissertation is mainly though not purely positivist. This brings with it a number of restrictions and limitations such as taken for granted assumptions which must be understood within their context (Burrell & Morgan 1979). In essence verification must be provided for any propositions to be considered significant, which is the maximum probability of accidentally rejecting a true null hypothesis also known as a Type I error. However, according to some positivists, where knowledge is gained from the observation of an objective reality, significance for a scientific proposition is deductive falsifiability through a process of "conjectures and refutations" and not verifiability, thus adopting Popper's proposition that is of critical rationalism in the sense that all our knowledge is tentative and must be open for empirical falsification (O'Hear 1989; Gardner 2003; Maier 2007). This means that significance would be registered for these propositions put forward in this research, because they would be conclusively falsifiable. Hypotheses are formulated, which are tested using a clearly defined null hypothesis. One of the primary tasks of this study is to determine from the data collected whether there appears to be a significant difference between the different knowledge orientation constructs developed for Maltese medium to large-sized prospector and defender-type organisations.

It is argued that hypothesis testing helps to develop essential factors from data in an organised manner, control extraneous factors and focus on what matters most in the

development of a good research design[14]. One should note that the hypothetico-deductive method used in this research study, is not universally shared, as social scientists who have used this method have adapted it by developing appropriate measuring tools for a less precise discipline. Furthermore interpretevists argue that 'real' progress in social science occurs through obtaining a more qualitative understanding of peoples' subjective orientations and social experiences (Bezera et al., 1998). However the advantage of using hypotheses testing in this research is the clarity on what is to be investigated, which means that data can be collected in the most efficient manner which may be replicated by another researcher. The main disadvantage is that the hypothesis-driven approach runs the risk of placing excessive restrictions on the scope of the research, thus potentially excluding new and innovative areas of research.

It should also be recognised that many writers have criticized the validity of positivist-type explanations in the context of an increasingly post-modern world (Løwendahl & Revang 1998). The rapid global transformation that is continuously taking place, breaking down the old certainties of the previous era, leaves the researcher no option but to accept the possibility of multiple and shifting environmental scenarios (Prahalad & Hamel 1994b). In a post-modern reality, the creation of a holistic model in the field of strategic management research, that provides a general solution embracing all organisations stops short in this environment, and it is 'unlikely that a single paradigm will ever govern the field'

[14] Progress in science is presumed to occur through the hypothetico-deductive method (Roosenburg 2000: 1208; Bezera et al., 1998; Connor & Simberloff 1986).

(Glaser & Strauss 1967; Schendel 1994; 1995; Løwendahl & Revang 1998). Such organisational characteristics are more fluid and buoyant in nature, as much depends on the market competition, the type of clients and suppliers being encountered as well as other variables (Tsoukas 1996). This post-modern reality has been sustained by other researchers who state that the adoption of business concepts such as 'core competence' (Prahalad & Hamel 1990), 'invisible assets' (Itami & Roehl 1987) and 'business process reengineering' (Hammer & Champy 1993), to mention just a few, is much more fruitful than the adoption and identification of universal causal relationships (Løwendahl & Revang 1998). Kriger & Malan (1993) and Barry & Hazen (1996), state that the old positivistic approach is not compatible with post-modern conditions.

3.2.1 Hypothesis-testing

Like gloves, hypotheses come in pairs[15], as one finds the null hypothesis[16] (H_o) and the alternative hypothesis (H_1). Researchers either *reject* hypotheses or *fail to reject them*. A hypothesis failure of rejection means a confidence interval containing a value of 'no difference'. The null hypothesis assumes that any kind of difference or significance in a set of data is due to chance. Therefore the failure of rejecting H_o does not mean that there is no difference or no chance.

[15] 'A variable is a characteristic which has more than one category (or value)', (Burns & Grove 1997; Bezera et al., 1998; Polit & Hungler 1999).

[16] It functions as what debaters call a 'straw man'; something set up solely to be knocked down. A null hypothesis is one which expresses the expectation that absolutely no significant relationship will exist. Once a null-hypothesis is disproved, researchers are able to show that the converse hypothesis is true (Becker 1998).

The alternative research hypothesis evokes a plausible and generalisable explanation for results one would expect to find, when research is conducted. ‘Hypothesis testing is equivalent to the geometrical concept of hypothesis negation’, (Stockburger 2005: 2). This means that if one wants to prove a hypothesis, first one has to negate it. Upon research, if this were shown to be logically impossible, than the researcher would be in a position to accept the original hypothesis. These two hypotheses are not treated equally and much focus is made on the null hypothesis.

The Miles and Snow (1978) typology provides a reliable tool for categorising organisations according to their strategic orientation and which clearly defines the prospector and defender-types on opposite ends of the adaptive scale. These strategy-types will be adopted in formulating the hypotheses in this dissertation. However if significant results are achieved pertaining to the analyser and reactor-types of organisations, these will also be quoted.

The predominantly positivist stance taken in this dissertation means that the researcher aims to be basically independent of the research being conducted and neither affects or is affected by the topic studied, besides enabling quantifiable observations to be statistically analysed. However one should note that interpretevists argue that it is impossible for the researcher to be totally independent of the research process, as subjective judgements are made about what questions are to be asked and how to analyse data are made. This is valid criticism from the

interpretevist point of view. In this research this was minimised to a certain extent through the inclusion of qualitative discussions with ten Maltese medium to large-sized organisations selected from the public and private sectors.

A key belief of positivism is the reductionist approach adopted so that the knowledge orientation variables can be investigated. The reductionist approach in some ways is ideal since it provides a simplification of the real scenario and thus minimises any complications that the real situation might face. However one should also mention that the reductionist approach means that in the positivist research results, complicating factors and possibly others which may be of interest may be eliminated. It is with this in mind that this dissertation was designed, so that objections created by the positivist approach are overcome by the inclusion of an interpretevist[17] element beyond hypotheses testing. The links between the variables pertaining to knowledge orientation such as environmental turbulence, strategy-type and its' implementation, as well as enhancing current information on organisational strategic alignment were investigated.

The utility of initial structured interviews served as a means of pre-testing the survey questionnaire for any form of feedback prior to its launch on a wider scale. This interpretevist approach helped in deriving what are the main issues regarding the research model constructs. The approach for this dissertation included qualitative and quantitative parameters, which served to minimize the limitations imposed by a positivist and a cross-sectional research study (Easterby-Smith et al.,

[17] This was achieved through the structured interviews with the ten selected Maltese organisations.

1991). Positivism works on the premise that the researcher adopts the approach of a passive observer where a better understanding of phenomena in question is sought in order to provide appropriate explanations and predictions. Since this approach is not normative in nature, the neutral position adopted by the researcher is considered as 'conservative' and which may run in difficulties.

3.3 Description and justification of research methods

In the development of the research design for this dissertation, preliminary research in the form of interviews was undertaken to obtain important information in order to increase the validity (appendix 5) of the research undertaken, prior to conducting the main survey amongst Maltese medium to large-sized organisations. The limits imposed on the internal and external validity cause and effect constructs were ensured to be within acceptable limits[18].

Triangulation in the collection of data helps to address both the qualitative and quantitative validity (Erzberger & Prein 1997; Kpinak 1999). Both these different methodologies (questionnaires and interviews), have their particular strengths and weaknesses. These weaknesses are overcome to some extent by the combination of both qualitative, for the generation of hypotheses and quantitative data sources for the testing of these hypotheses. In this research since a hypothetico-deductive model of theory-building was followed, than the hypotheses would have to be rejected or falsified. Therefore triangulation can be perceived as one step towards

[18] 'Validity of a scale refers to the degree to which it measures what it is supposed to measure' (Pallant 2001: 6). In this case Oppenheim's (2006) research as well as other journal articles were used in order to see what scales were used by other researchers in this field (Sinkula et al., 1997; Baker & Sinkula 1999). The reliability of the scale through Cronbach's alpha was also taken into consideration.

theory validation. However triangulation of quantitative and qualitative methods does not automatically lead towards convergent, complementary or divergent results, which can increase validity (Erzberger & Prein 1997). Qualitative methods such as preliminary interviews aid towards the survey improvement such as conceptual framework development, overlapping results verification, validation of quantitatively generated constructs through comparison, discrepancies identification, and appropriate clarification of ambiguously set questions (Kpinak 1999).

As part of this research strategy, discussions were held with identified ten Maltese medium to large-sized public and private organisations in order to gather relevant information that have a direct bearing on the research topic. After these initial discussions, a two-stage research strategy incorporating interviews amongst the ten selected Maltese medium to large-sized organisations, but based primarily on a questionnaire survey, was implemented and analysed. The selected interviewees included an industry-type mix i.e. printing and publishing, manufacturing of electrical parts and appliances, food manufacture and leather manufacture from the private sector and community and business services, electricity/gas and government services from the public sector.

A questionnaire-based survey was adopted for a number of reasons. Apart from being easy to administer, score and code, respondents can provide responses that can be generalised and easily compared with other respondents, besides predicting

behaviour and determining the values and relations of variables and constructs. Besides, quantification of findings of qualitative research and objective testing of theoretical propositions are also permitted (Newsted et al., 1998). The quantitative method can also add to the qualitative approach by identifying representative and non-representative cases, besides overlooked or misinterpreted situations during interviews (Kpinak 1999). This research is based to some extent on existing theoretical models of knowledge management and strategy, which was developed using questionnaire surveys. This helps in ensuring comparability between this research and that previously conducted by other researchers (e.g. Miles and Snow 1978).

3.3.1 Deductive and inductive research processes

The literature review provided in this dissertation serves as a means of developing hypotheses for testing using a positivist-deductive approach. This represents the inductive process of forming research questions and hypotheses based on an exploration of existing research findings. Starting from the development of abstract concepts that represent theoretical aspects or the research problem being investigated, assertions about concept relationships are tested for generalisations once indicators are put forward. The testing stage follows, where these conceived operationalised concepts are tested in new scenarios, as rules are determined for proper observations to take place. The creation of such indicators, facilitate the representation of empirically observable investigative instances. This is followed by the testing of these hypotheses confronted with empirical data, which creates new

observations whereby they are reflected upon. These assertions are compared with the facts collected during observation. Once tested and confirmed through the deductive process, the theory becomes valid. While theories can never be wholly true as only one contradiction is required to falsify a theory, Popper (1967) identifies that scientific theories should be capable of being empirically tested, and provides researchers with situations in an attempt to falsify them rather than confirming situations to the theories proposed.

The phenomenological phase of this dissertation on knowledge orientation is also tested for face validity. The survey results are analysed with the aim of creating a theoretical model with the data retrieved. The creation of new theories is the outcome of inductive research based on observation and analysis. Whereas deductive research which relates to the development of conceptual and theoretical structures prior to empirical research and is more speculative in nature, inductive research derived from empirical information generally allows themes to arise from the data rather than imposing a pre-defined order upon them, therefore potentially making it more useful in practice. Another point why an inductive approach may arguably be more justified is the ability to explain the past and to predict future occurrences, through the use of causal analysis and hypothesis testing (Gill & Johnson 1991). However the causal analysis technique is not so popular amongst social scientists and was not adopted in this research study. This is because causal analysis may be highly complex and may produce contradictory conclusions within a given research.

3.3.2 The research plan adopted

The research plan stages were as follows:

1. A literature review investigation of the issues being proposed in this study.
2. These discussions with the ten identified medium to large-sized organisations, addressed the main themes of organisational knowledge strategy, strategic alignment and fit, performance, management and organisation of knowledge strategy types, the human resources aspect i.e. recruitment, reward mechanisms, employee training and staff termination, the characteristics of knowledge orientation within an organisation the role of information technology and environmental turbulence.
3. The development of research hypotheses.
4. The design of a survey tool used during the research process.
5. Conducting a pilot survey amongst earmarked Maltese medium to large-sized public and private organisations. The objective of the pilot survey is to ensure that it works with the kind of respondents encountered and in checking the validity of concept indicators (Oppenheim 2006; Bryman & Cramer 1990).
6. Conducting the main survey amongst 322 Maltese organisations.
7. Developing an appropriate analytical methodology of the survey results.

The first stage of the literature review served for an initial structured discussion of topics relevant to the research being undertaken with the ten identified officials. These were based on the adopted questionnaire from Truch (2004) (appendix 6a), where views could be expressed on the research topic. Truch's questionnaire was

based on the models identified earlier in this dissertation such as Bierly and Chakrabati (1996), Miles and Snow (1978), Hansen et al., (1999) and Zack (1999a). The business strategy survey instrument was based on work developed by Conant et al., (1990). This was taken primarily to eliminate any bias on issues related to the research topic. Open and closed questions were set with the scope to retrieve opinions, refine and validate the research instrument being proposed. Truch's knowledge orientation questionnaire and Conant's et al., business strategy questionnaire were combined with some amendments to address knowledge orientation in the Maltese context. Certain issues from Truch's questionnaire were eliminated as they were considered as secondary or were incorporated in a broader hypothesis. These included:

- The adherence of knowledge management procedures.
- Recruitment of employees who work with fixed job descriptions and a set of standard operating procedures to implement standard solutions
- The role of skilled employees to capture and deposit knowledge electronically.
- Knowledge information access without involvement of the individual concerned.
- Knowledge seeking and information retrieval by employees, in order to sustain job effectiveness.
- The utility of experts in pooling their relative knowledge and experience.
- Asset exploitation through outsourcing or dissemination to other organisations.

- The creation of knowledge as the primary source.

Further detail on the design of the questionnaire is given later in section 3.5.

In the second stage the information retrieved from the previous stage was used to refine the survey instrument were necessary. Hypotheses were formulated with a two-fold objective. The first objective was to investigate the relationships between strategic-types of organisations and their knowledge orientation. The second objective was to investigate further the other components such as environmental turbulence, performance and strategic alignment within the research model. These objectives were checked against validity and falisfiability criteria identified earlier. The dimensions of knowledge orientation constructs were set up. These were then translated into measures to be used in the survey questionnaire.

In the third stage the knowledge orientation survey tool was finalized following the development of measurement scales to measure the individual components in the questionnaire. These scales were tested for their reliability and validity. The reliability of a scale indicates how free it is from random error whereas the validity of a scale refers to the degree to which it measures what it is supposed to measure. The scale's internal consistency refers to the degree to which the items that make up the scale 'hang together' (Pallant 2001). The Cronbach alpha coefficient was used to test for internal scale consistency, which ideally should be above 0.7 (Nunnally 1978), but which can take low Cronbach values of 0.2 to 0.4 when the mean inter-item correlation is quoted (Briggs & Cheek, 1986). The higher the value between 0

and 1 indicates greater reliability. As regards scale validity there is no one clear-cut indicator. In our research construct validity[19] was used against theoretically derived hypotheses concerning the nature of the underlying variable (Pallant 2001; Netemeyer et al., 2003).

The questionnaire style and types of scales were predominantly based on guidelines provided by Conant et al., (1991), Truch (2004), and Oppenheim (2006). These deal explicitly with question wording, validity, reliability, scale-types and attitudinal or factual types of questions. The survey apart from being easy to administer and provides a means whereby scoring and coding can be facilitated, survey-type questionnaires help towards the better understanding of variables and constructs and allow generalisations with similar or different populations. Other advantages that survey-type questionnaires yield are the prediction of behaviour, objective theoretical testing and the appropriate confirmation of qualitative research findings (Bickman & Rog 1998; Oppenheim 2006).

Given the aim of achieving a large and hence generlisable sample size, it was felt that a survey approach would be more cost-effective than face-to-face qualitative interviews. Besides the survey-type questionnaire is ideal for this research study as more questions are asked, with data being easily analysed with an appropriate software package. Survey questionnaires also reduce bias if appropriate wording is

[19] If a measure has construct validity, it measures what it purports to measure. In line with research practice on scale development, these were generated from theoretical discussion derived from literature review. Both face validity which refers to observational meaningfulness of the construct and content validity which refers to the theoretical meaningfulness of the construct were tested during the pre-testing stage (Bagozzi et al., 1991; Netemeyer et al., 2003). Factor analysis determines whether the test is unidimensional or multidimensional. Test homogeneity tests the internal structure. There are two indices that capture homogeneity i.e. item-to-total correlation and Cronbach's alpha.

used with no verbal or visual indications that may influence the respondent. Questionnaires are also less intrusive than telephone or face-to-face interviews (Oppenheim 2006).

In the fourth stage the questionnaire was pre-tested amongst ten Maltese medium to large-sized organisations. Bickman and Rog (1998) state that the advantages of preliminary testing with a selected number of respondents is the direct interaction involved, which helps in the clarification of the survey instrument prior to its' launch. Having identified the advantages, preliminary testing is also faced with disadvantages. The small number of respondents involved in this preliminary stage limits generalisation to a large population. One has to be extremely careful not to be biased against any undesirable responses.

In the fifth stage the questionnaire survey was sent to 322 medium to large-sized Maltese private and public organisations. This will be further dealt with in a later chapter of this dissertation.

3.3.3 The pilot and main survey

A list of medium to large-size organisations was retrieved from the Labour Market Information Section of the Employment and Training Corporation (Malta) as well as from the International Business Directory of Products and Services, issued by Malta Enterprise in 2007. There are 322 organisations listed as medium to large-sized organisations in the Maltese Islands, from which 41 are government organisations, 14 are parastatal organisations with public majority and, 20 are

independent statutory bodies whereas 198 are Maltese owned private organisations, and 49 are foreign owned private organisations. Initial letters, including a covering note, stamped returned envelope and questionnaire were sent to the 322 organisations. E-mails were also sent to identified staff from Maltese medium to large-sized organisations which helped in reminding them to send in their questionnaire. In fact e-mails were sent to a maximum of three times to the same official. Research has shown that more than 80% of respondents in organisations see e-mail as critical or extremely important for internal and external communication within their organisation (Vile & Collins 2004). This produced an effective response rate of 44.4%.

Ten members from the population surveyed were chosen to form part of the pilot survey questionnaire. Five were from the private sector field and five from the public sector field. This included an industry-type mix i.e. printing and publishing, manufacturing of electrical parts and appliances, food manufacture and leather manufacture from the private sector and community and business services, electricity/gas and government services from the public sector. During the pilot test carried out, scope, clarity, and the completion difficulty of the questionnaire was discussed. Following the pilot-test survey, ambiguities were removed and clarifications sustained so that the questionnaire could be understood better. Statements within the questionnaire were neutrally based[20].

[20] Neutral position means that statements within the questionnaire do not give any form of indication in favour or against to any of the statements being made within the questionnaire itself.

The main survey was disseminated to the participants (appendix 6b) both through normal post including a self-addressed envelope return and through e-mail facility. Krejcie and Morgan (1970) state that for a given population of 322 organisations the sample size should be 176, or 54.7%. In our case 142 Maltese organisations took part in this survey, which means 44.4% of the population.

50% of the respondents work within the human resources departments/units. From the 142 responses received, 138 cases were retained following data screening, from which 73 were from senior management positions i.e. 51.4% and 67 were from management level within the organisation i.e. 47.2%. Two were unclassified. This means that 98.6 % of the respondents were classified as managerial or senior managerial positions. This sustains a sufficient overview of the issues covered in this survey and unnecessary in obtaining more than one respondent per organisation. This was also sustained by Conant et al., (1990), Abernethy & Guthrie (1994) and Truch (2004) in their research.

3.4 Discussion of the sample and the sampling process

Greengard (1998), Soliman & Spooner (2000), Salleh & Goh (2002) and Maier (2007) state that human resources departments are better positioned than other functional units to create a link between the employee knowledge and the strategy of the organisation. Miles and Snow (1978) suggest that ideally the application of their model is not at a corporate but at a functional level. It therefore seems

appropriate that the focus of the sample within this research fell upon the human resource function of the participating organisations.

The survey was aimed at Maltese public and private sector organisations at the human resources unit level, comprising of either a division or department within the organisation being studied or an entire organisation taken holistically. There is no mention in knowledge management literature that includes or excludes a specific sector of organisations to be researched. For the structured interviews that were held separately in order to gauge certain measures and constructs as part of this dissertation, the organisations sampled came from a broad range of sectors. In doing so, the intention was to construct a sample that could be used to make some tentative generalisations about knowledge management and strategy across different sectors. According to the Employment and Training Corporation (2007) organisational size is defined as follows:

Micro Enterprise between 1-9 employees (i.e. including self-employed)

Small Enterprise between 10-49 employees

Medium Enterprise between 50-249 employees

Large Enterprise between 250 and more

According to the Labour Market Information Unit of the Employment and Training Corporation, specific human resources units in micro and small enterprises are generally found lacking with the general manager, chief executive officer or director of such organisations assuming such a role. Specific human resources units

are found in generally all Maltese medium and large-sized organisations (ETC Labour Market Information Unit 2007). This is another reason why medium to large-sized organisations were used in the survey, to ease access to the organisation, and retrieve relevant organisational information, through a dedicated human resources function. This shows that across most types of organisations coherent results could be achieved as this approach is common to other research studies conducted in this area (Stankovsky 2004; Rauch et al., 2004).

3.5 Description and explanation of the survey instrument

The purpose of the questionnaire-based survey is to provide means whereby behavioural measurement of Maltese public and private medium to large-sized organisations could be surveyed. The objective of the questionnaire-based survey is to collect information to investigate the hypotheses drawn in the preceding chapter, which should yield into a proper investigation on the impact between strategic alignment and organisational performance. The reliability of the questionnaire-based survey was increased with the utility of validated instruments which measured strategic-type, organisational performance and environmental turbulence, utilised by other researchers. The literature search succeeded in identifying an instrument that can be used to measure knowledge orientation (Truch 2004). In this chapter, further detail was provided on the survey instrument that was used to gather data for this cross-sectional research study.

3.5.1 The design process of the questionnaire-based survey

The plan outlined below in figure 3.1 illustrates the piloting process involved in constructing and re-constructing the questionnaire. A draft was presented to the sample of ten selected Maltese medium to large-sized organisations in order to check its' applicability in the Maltese context as well as desirable validity attributes and properties as mentioned by Bearden et al., (1989), Kotabe (1990), and Melewar (2001).

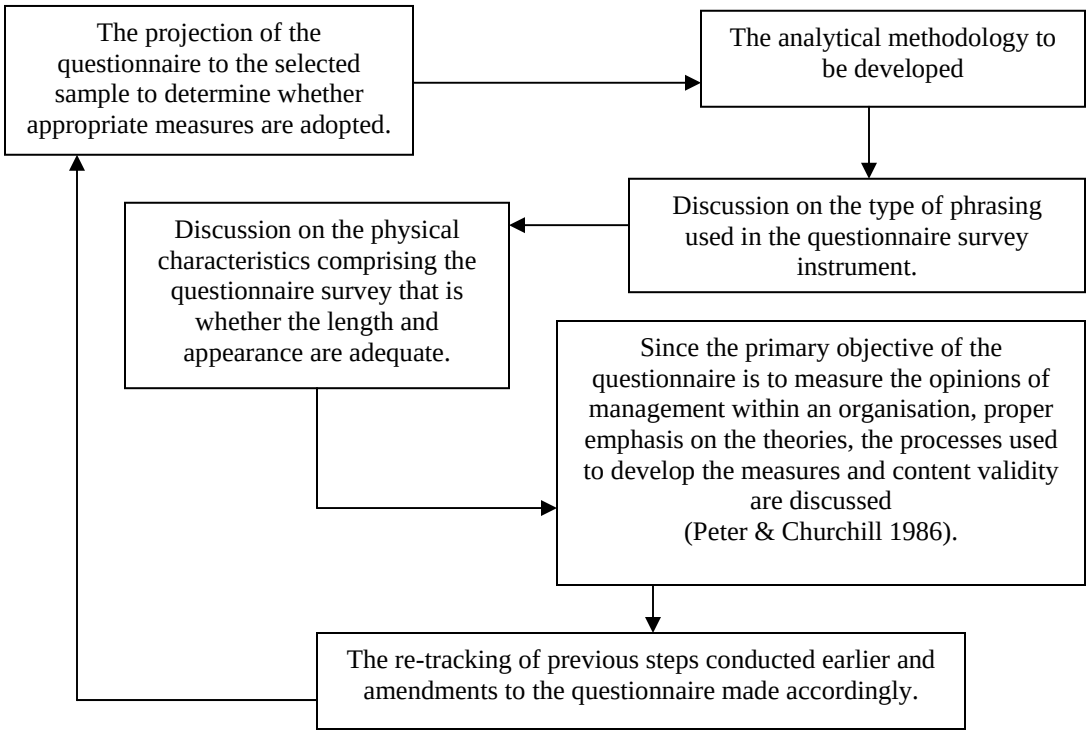


Figure 3.1: Checking the applicability of the questionnaire in the Maltese context

Appendix 6b shows the final questionnaire submitted to the Maltese public and private medium to large-sized organisations. The questionnaire is divided into five main sections namely:

- Section I – Organisational information
- Section II – Organisational environment
- Section III - Organisational strategic orientation
- Section IV – Organisational knowledge orientation
- Section V – Organisational performance

Section I – Organisational information

To facilitate categorisation of the respondents being surveyed, background information on the organisation is retrieved. This included:

a) The major activities of the organisation.

b) The main industry classification of the organisation.

c) The determination of whether the organisation is subsidiary of a parent company.

d) The number of full-time employees within the organisation.

e) The job-title of the person filling the questionnaire.

This was initially addressed to the Human Resources Manager of the organisation concerned as most companies having resources dedicated to knowledge management, often form part of human resources departments which may report directly to the head of the organisation (Stankovsky 2004). Besides the human resources function addresses the intellectual capital of an organisation as established by Kaplan and Norton (1992) in the Balanced Scorecard framework.

Section II – Organisational environment

The hypothesis tested was related as to whether in Maltese medium to large-sized prospector-type organisations, the susceptibility of environmental turbulence is by far greater than in defender-type organisations. In order to facilitate completion of the survey instrument, an ordinal scale was used (Ansoff & Sullivan 1993b) to measure environmental turbulence. No problems were reported with respondents when it came to filling these questionnaires. This had already been established with the ten selected Maltese organisations. The issue of environmental turbulence and the possibility that results could be biased due to the lack of proper turbulence identification on the adopted scale was investigated during the pilot survey stage, as this could directly affect the validity of the research instrument. The pre-test resulted that the unpredictability factor in answering this part reduced the possibility of bias, which eventually produces uniformity in interpretation.

Section III - Organisational strategic orientation

As outlined in section 2.5.1, the Miles and Snow's model was used as the basis for investigating strategic orientation within this study. The main reason for this is its reliability registered when used in other research studies (Abernethy & Guthrie 1994; Truch 2004). Two different approaches to Miles and Snow's model were analysed with the selected sample of Maltese medium to large-sized respondents in the pre-test stage, in order to determine which is the most suitable to adopt. These included:

1. The definitions of the four strategic-types identified by Hrebiniak & Snow (1980) (appendix 7).
2. An instrument comprising of eleven components (p. 64) that describe the four strategic-types (Conant et al., 1990).

The Conant et al., model (1990), was found to be more consistent to reflect the views of the pre-tested Maltese organisations, thus enabling appropriate categorisation. Organisations were classified along the four main strategic-types namely defenders, prospectors, analysers or reactors. As mentioned earlier in section 2.5.1 (p. 58), the prospector and defender-types were used as these have been defined clearly by Miles and Snow (1978). The analyser-type is a hybrid between the prospector and defender-types and therefore one cannot clearly say whether it is closer to the prospector-type or the defender-type, whereas the reactor-type lacks consistent characteristics and was identified by Miles and Snow as the residual-type.

The responses selected by a respondent led towards the proper categorisation of the organisation, based on the majority of replies given in a particular questionnaire. Whenever strategic-type ties evolved, the Miles and Snow's (1978) concept was adopted (Conant et al., 1990). Analysers possess both prospector and defender characteristics and therefore whenever ties developed between prospector, analyser and defender types the analyser-type was adopted. The reactor-type organisations behave in various ways, adopting a defender attitude when performing

environmental scanning; a prospector attitude when developing new markets and when maintaining control to gauge performance within an organisation adopts an analyser-type of organisation. Thus a reactor position was maintained whenever a tie involving the reactor response with other categorised responses was established. This approach led towards proper categorisation of Maltese medium to large-sized organisations. The hypotheses tested included the knowledge strategy and strategic fit links between prospector/defender and personalisation/codification strategies.

Section IV – Organisational knowledge orientation

Although the questionnaire developed by Truch (2004) was adopted in order to investigate organisational knowledge orientations, it was pre-tested to determine its' applicability in the Maltese scenario. Truch's model provides the main components comprising of strategic knowledge orientation namely strategy and implementation within the same model. During the pre-testing stage with selected Maltese organisations, the main points tackled included:

a) Whether the components selected address a knowledge management strategy.
b) The effects generated by the application of a knowledge management strategy adopted by the particular organisation.

As established in section 3.3.2 the objective of this exercise was to verify the content validity of the strategic knowledge orientation tool in the Maltese scenario. Appendix 6a shows Truch's questionnaire that was used to address knowledge orientation. The components that did not form part of the final questionnaire, as

these were considered secondary or incorporated in a broader context in the Maltese context were identified earlier in section 3.3.2.

The scales adopted for the main questionnaire were designed to eliminate any bias[21] that could be provided by the respondent so that the real scenario linked towards organisational performance could be addressed. As regards to organisations that follow personalisation and codification strategies (Hansen et al., 1999), these were measured on a separate basis. A seven-point Likert scale was adopted (Churchill 1979), ranging from strongly disagree to strongly agree, allowing statistical analysis to be developed coherently. The primary purpose of this questionnaire section was to address the hypotheses relating to differences in knowledge orientation between prospector and defender-type strategies, specifically:

- Strategic alignment, knowledge management practices and staff capabilities links in terms of policies and systems knowledge needs.
- Knowledge horizontal and vertical information flows and project team operations.
- Knowledge management coordination and operations that occur due to set procedures.
- The utility of information systems in providing performance measures.
- Organisational knowledge management internal and external focus.
- The type of staff hired.

[21] The scale has to be sufficiently free from response bias so that balance is maintained.

- Knowledge management sharing encouraged by appropriate reward mechanisms and organisation's databases.
- Training which relies on appropriate documentation and mentoring.
- Knowledge transfer due to job movement.
- The importance given to client, competitor and industry knowledge.
- Issues related to knowledge capture related to information accuracy, knowledge maintenance, the creation of knowledge, research and development and knowledge transfer.
- The storage of knowledge related to organisational staff and expertise networking.
- The retrieval of knowledge related to information access without involvement from the individual and from electronic databases.
- The sharing of knowledge related to lack of up-to-date knowledge, project reflection time, knowledge retrieval on a one-to-one basis, and the creation of appropriate networks.
- The reuse of knowledge and innovation development.
- The use of information technology in accessing knowledge.

Section V – Organisational Performance

Selecting the most appropriate performance measure is arguably the most crucial aspect for this research, as this is the dependent variable of the model. The measurement of organisational performance has become a critical issue for management research with performance considered as a multidimensional construct

(Venkatraman & Ramanujum 1986; Kelly & Swindell 2002; Paauwe & Boselie 2005; Andrews et al., 2006). The utility of financial measures such as return on assets and return on sales to measure performance, are considered too narrow an approach. There is also a lack of standardisation, compatibility and inappropriate focus on profits, besides inconsistent results quoted in strategic research linked with performance measurement (Bierly & Chakrabarti 1996; Peel & Bridge 1998; Andrews et al., 2006). The hypothesis tested was related as to whether in Maltese medium to large-sized prospector-type organisations performance between the four strategy-types as identified by Miles and Snow that is prospector, analyser, defender and reactor is the same or not.

3.6 Definition and operationalisation of performance

The concept of performance is complex and multi-dimensional (Dess & Robinson 1984), divisive, is least understood, and is somewhat imprecise, (Folan et al., 2007). A deficiency in literature still exists regarding the performance concept and the link between performance and HRM (Boselie et al. 2005). According to Dess and Robinson (1984), researchers consider performance of organisations when investigating organisational structure, strategy and planning. Performance is considered as a post-operative function, based upon pre-determined models that an organisation finds itself in. The concept of performance contains both dynamic and static elements namely random, that is performance that remains unformed, systematic that is where performance is evaluated and correctly formulised and over-bureaucratic/deformed with too much emphasis on static elements related to

performance (Folan et al., 2007). Performance has both static and dynamic elements which are usually held in balance; otherwise a sub-standard picture of performance is attained. It also seems to focus both on the immediate past and the present simultaneously. Folan et al., (2007) proposed a performance model made up of performance management, performance assessment and performance measurement which ultimately helps to streamline the performance system. Once the meaning and content of performance is determined, appropriate performance methodologies and tools are stipulated.

In their study Paauwe and Boselie (2005) concluded that in half of all the articles included in their financial performance analysis, profit is the most common measure followed by sales. Performance has also been defined as being made up of three components namely financial outcomes (such as sales volume, profits), organisational outcomes (such as productivity, efficiencies, quality) and HR-related outcomes (such as commitment, employee satisfaction, general attitudinal and behavioural impacts). Organisational performance includes recurring activities to establish organisational goals, monitoring progress toward the goals, and adjustments made to achieve those goals more effectively and efficiently. Dess and Robinson (1984) used ‘subjective’ measures and assessed the relationship between subjective and objective measures of return on assets and growth in sales and measures of return on assets, growth in sales and the overall performance measures. Return on investment (ROI) and growth in sales volume are specific measures that can be read from the organisation’s balance sheet (when applicable). ROI, which is

the ratio of money gained or lost in an investment relative to the amount of money invested, is a ‘commonly and widely accepted yardstick for measuring business success’ (Ansoff 1965: 42). The second measure of economic performance reflects ‘how well an organisation relates to their environment’ (Hofer and Schendel 1978: 4) by successfully expanding their ‘product-market scope’ (Ansoff 1965). Both Dess and Robinson (1984) and Pearce et al., (1987) suggest the following framework which was also found to be adequate during the pre-test stage in Maltese medium to large-sized organisations namely:

1. Overall/global performance achieved in the last year of what may be considered overall or global organisational performance.
2. Return of investments in these last three years.
3. Growth of sales volume in the last three years.

Dess and Robinson’s (1984) research used both ‘subjective’ and ‘self-reported’ objective measures for return on assets and growth in sales volume as well as any two measures which could be identified with a global organisational performance. Falshaw et al., (2006) mention that the ‘subjective’ approach has been used extensively in several research projects and has been based on the executives’ perception of performance. The multidimensionality of organisational performance coupled with a ‘subjective’ question of overall performance produced consistent answers with each top management team and variance between each organisation (Dess & Robinson 1984). Therefore Dess and Robinson’s (1984) and Pearce’s et al., (1987) suggestion of organisational/global performance was adopted as this addressed both the organisational and human resources related outcomes in the

overall performance measure by using the available and physical resources in an organisation, whereas financial outcomes were addressed through the return of investments and growth of sales volume measures. A five-point Likert scale was used to measure the performance of the organisation in relation to competitors which was left to the subjective judgement of respondents. This ranged from 'much worse' to 'much better'.

3.7 Discussion of data analysis techniques

The SPSS v12 statistical analysis software package was used to analyse the responses of the survey using multivariate techniques (Pallant 2001). Multivariate ANOVA (one-way) technique was used with the aim of comparing groups on a range of different characteristics. Statistical procedures were adhered to, to confirm compliance and eliminate outliers[22] in the process. In this research a scatter-plot and box-plots were used to observe whether outliers exist and due consideration was given for removing or recoding the offending value. Upon further inspection if it was established that outliers are not making any sort of effect on the remaining data, these were retained in the data set. Both statistical analysis and hypotheses testing are described in greater detail in the next chapter.

In the final stage of this research process, survey findings were compared, examined and interpreted with previous literature research topics to sustain validity

[22] Outliers are values which are higher or lower than other values in the data set and which can have an effect on the correlation coefficient.

of the research findings, analyse research outputs and address any knowledge gaps that might arise. The results are provided in a later chapter of this dissertation.

3.8 Ethical issues

The situation faced was varied and complex due to the necessity to make choices which are bound to generate dilemmas. Certain Maltese medium to large-sized organisations were reluctant in divulging information in relation to their strategic intent and knowledge management base. Where research involves the acquisition of data based on trust, it was axiomatic that the interests, rights and sensitivities of the organisations being studied were safeguarded. In this respect to questionnaire data, all respondents were guaranteed complete confidentiality. In this scenario, confidentiality was ensured through the current Maltese legislation regarding the Data Protection Act. This applied to the collection of data by all forms of media equipment, as well as data collected in face-to-face interviews.

A further consideration on the achievement of informed consent was achieved as a covering letter was attached to every questionnaire stating the scope and objectives of why this research was conducted. This was sent to all organisations involved in this survey prior to filling the questionnaire itself. The data collected was analysed in a manner that ensured complete confidentiality and absolute data protection. No information was divulged to third parties once data was collected and/or assimilated, without written permission from the person undertaking this research project. All information from the questionnaire was processed using

computer software on the researcher's personal PC which possessed a password to access to. Every manner to maintain, store, organise, analyse, or dispose of data was taken care of by the researcher of this project to minimise any form of loss, unauthorised access or transfer of information to any third parties. Despite every effort to preserve anonymity, respondents to the questionnaire were made clear that this might be compromised unintentionally.

The identification of medium to large-sized Maltese organisations was identified as stated earlier. The necessary permission to access this information and approach such organisations was sought. If during the research process an organisation was identified that had to be given mention, pseudonyms were used to ensure complete confidentiality. In this dissertation this issue never cropped up. All subjects were informed that they had the absolute right to refuse to participate in this survey. All subjects were also informed how the data was to be handled as well as any limitations to confidentiality communicated prior to the survey conducted.

Every effort was made to approach all organisations with an unbiased attitude and to gather data in the most accurate manner possible. In considering the sensitive nature that this research project might arise the University Of Leicester Research Code Of Conduct and the Data Protection Act as legislated by Maltese law were used as guidelines.

3.9 The limitations imposed by this research

One of the biggest advantages of a predominantly positivist approach is that the vision of what is to be investigated is clearly pinned down in the initial stages of the research. This provides a consistent and efficient way in which data could be collected (Easterby-Smith et al., 1991), besides enhancing the possibility that the research can be replicated by other researchers. The main disadvantage of a positivist approach is the value of contribution towards new knowledge. If in the course of events there is confirmation of what is already known or results lead towards triviality or in a stage of inconclusiveness, the positivist approach may not lead towards why such results have been achieved.

The development of survey questionnaires and utility of survey techniques serve towards the proper description of organisational features. The main disadvantages developed here are that no proper explanations of why such correlations exist can be successfully given and the possible external factors that could have possibly caused the observed correlation cannot be eliminated entirely. One of the main problems with questionnaires (and indeed interviews) is that they can only capture what organisations say they do, rather than what they actually do. They might seek to deceive the researcher for some reason, or their memory or perception, knowledge, or experience of the issue in question may be flawed in some way (Dijkstra et al., 2001).

The falsification concept was also discussed in this dissertation. According to Popper (1959) a concept is not scientific unless declared falsifiable. The practicality of collecting all the possible evidence that is relevant to the research topic is impossible. The negation of an apparent scientific proposition can be maintained and therefore needs to be sustained falsifiable. This provides an advantage in the sense that only one instance is required to falsify a theory, whereas a substantial amount of theory confirmations did not prove the theory being investigated. One should also note that questionnaires also carry general limitations such as the lack of accuracy that respondents provide that is being seen in a good light, the inability to probe the answers respondents give or to ask follow up questions, and the distance maintained so that 'bias' and contamination is kept to a minimum (Dijkstra et al., 2001).

3.10 Concluding remarks

In the first part of this research, a predominantly positivist approach was adopted, sustained by existing theories and the development of hypotheses that best describe the research model and its predictive power tested using a questionnaire survey which was based to some extent on existing instruments (e.g. Truch's questionnaire). In the second part further relationship analysis between components are analysed through a hypothetico-deductive formation of an analytic framework approach with the aim of creating a knowledge orientation model for Maltese medium to large-sized public and private sector organisations. Once the general aims for the proposed research has been set into a set of specific aims, further

development towards a set of specific hypotheses were proposed. The analysis is dealt with in the next chapter of this dissertation.

Chapter 4 – Analysis of data

4.1 Introduction

This chapter provides a detailed analysis on the survey-based questionnaire that was conducted amongst Maltese medium to large-sized organisations. The process involved the selection of appropriate analytical procedures using the SPSS v.12 software, for data screening and assumption testing using multivariate techniques. Following t-test techniques on key variables i.e. organisational global performance, strategy-type, environmental turbulence, rate of investment and sales in volume as well as seniority levels in Maltese participating organisations, these were classified using the industrial sector classification code and by discipline. Statistical analysis on environmental turbulence and organisational performance was analysed across strategy-types. This was followed with a correlation analysis and detailed descriptive statistics between personalisation and codification-type of strategies adopted by Maltese organisations.

A one-way between groups analysis of variance ANOVA was used to investigate the relationship between the strategic orientation variables and the four strategic-types as identified in the Miles and Snow model (1978). The Bonferroni post hoc test was used to minimise the chances of any null hypothesis being rejected when in fact they would be true. The hypotheses generated earlier were tested to verify any significant difference between the variables identified for:

- Knowledge strategy, strategic alignment, strategic fit[23] and performance (see 5.2.1, p. 255).

[23] The alignment of an organisation with its marketplace through the organisation's business and knowledge strategies means the sustaining of the organisation's strategic fit.

- Organisational structure (see 5.2.2, p. 259).
- The human resources field pertaining to recruitment, rewards, training and termination of employees' aspects (see 5.2.3, p. 261).
- Knowledge management pertaining to scanning, capturing, storage, retrieval, application, transfer and knowledge sharing (see 5.2.4, p. 264).
- The environmental turbulence registered in Maltese organisations (see 5.2.4.1, p. 271).

A factor analysis was performed on all observed variables with the objective of finishing with a smaller set of knowledge orientation factors that explain the pattern of correlations (see section 5.3, pp. 278-292), which were tested using the Cronbach alpha to observe the effect of reliability, the Kolmogorov-Smirnov test to assess normality of the distribution besides the Kruskal-Wallis test for significance. The K-means cluster analysis was performed in order to determine the number of clusters for Maltese medium to large-sized organisations. Following the identification of low and high-degree group performance organisations, through cross-tabulations, the correspondence analysis was used to identify any links between the strategy-type classification and strategic knowledge orientation variables. The predictive power of the model (p. 297) was also tested using multiple-discriminant analysis. The next chapter provides a detailed interpretation of the results in view of the literature review provided earlier.

4.2 Data screening resulting in strategic type classification

The organisational size studied during this research was a detrimental factor as it had to be decided whether micro (i.e. 1 to 9 employees) and small enterprises (i.e. 10 to 49 employees) are to be considered or not. Miles and Snow (1978) state that in order for their model to apply an organisation should be of adequate size that is greater than 25 employees, besides possessing a multi-dimensional structure in both horizontal and vertical components within the organisation. It was decided to study medium (i.e. 50 to 249 employees) and large organisations (i.e. 250 employees and over) not to conflict Miles and Snow's assertion. Focus was maintained on the human resources management level when collecting data, as such an approach enables more direct access to information regarding knowledge management and intellectual capital within the organisation (Stankovsky 2004; Kaplan & Norton 2004). The human resources function is generally absent from Maltese micro and small enterprises (ETC, Labour Market Information 2007). The number of Maltese organisations with fifty employees and over at the time this research was conducted was 322, from which a response rate of 44.4% was achieved following a survey-based questionnaire. The management levels within those organisations that responded were screened to determine whether any bias exists regarding respondent seniority levels (table 4.1).

Position	Job title	Number of cases	Percentage breakdown (%)
Senior management	• Chairperson • Chief Executive Officer • Company Secretary • Directors responsible for Ministry • Financial Controller • Human Resources Senior Manager • General Manager • Senior Manager • Head of Corporate Services • Head of school • Partners	**73**	**51.4**
Management	• Administration Manager • Human Resources Manager • Principal Officer • Project Manager • Quality Manager	**67**	**47.2**
Other	• Section Head-Training & Development • Secretary to Board of Special Commissioners	**2**	**1.4**
TOTAL		**142**	**100**

Source: Data derived from survey-based questionnaire

Table 4.1: Seniority-level analysis derived from the survey-based questionnaire

The key variables of the research model comprising of organisational performance, organisational strategy-type and environmental turbulence, were studied for the management positions identified in table 4.1, using the t-test technique. The independent-samples t-test was used to compare the mean scores of two different groups of subjects that is management and senior management. This involves the examination of the homogeneity of the variance between the two groups. A number of assumptions about the populations being compared have been made. The variance in the populations being compared was taken to be the same and was tested using Levene's test for *Equality of Variances*. The test is based on the F-statistic and p-value (Sig.). The objective of this test is to determine whether management and senior management differ significantly in terms of their mean scores for the two independent groups for:

(a) environmental turbulence,

(b) organisational performance levels,

(c) organisational strategic-type levels,

(d) organisational rate of investment,

(e) organisational sales volume.

Apart from calculating whether the difference between both groups occurred by chance, another test, the effect size (or Eta squared test) was used to provide an indication of the magnitude of the differences between both groups. Ranging from 0 to 1, the Eta squared test represents the proportion of variance in the dependent variable (seniority level) that is explained by the independent variable (environmental turbulence; organisational performance and strategy-type). Cohen's guidelines (1988) propose that 0.01 instigates a small effect, 0.06 instigates a moderate effect whereas 0.14 instigates a large effect. The variance as explained by management and senior management groups will be analysed for environmental turbulence, organisational performance, rate of investment, sales volume and strategy-type.

4.2.1 Environmental turbulence independent samples t-test

An independent-samples t-test was conducted to compare the environmental turbulence for management and senior management groups (appendix 8). In this case 'Sig.' is greater than 0.05 ($p>0.05$) and therefore Levene's test indicates that equal variances can be assumed. As regards to environmental turbulence compared with management seniority $F=0.180$ and Sig. (p)=0.672.

Since homogeneity of variances can be assumed, as Sig. value is larger than 0.05, this hypothesis is tested using the t-test row of results named 'Equal variances assumed'. The t-value is (t=-0.084) and the degrees of freedom (df) is 135. The Sig. (2-tailed) value, which is the actual probability of making a Type I error, (p value) is 0.933.

There was no significant difference in scores for the management group (M = 3.01, SD = 1.05) and the senior management group [M = 3.03, SD = 1.04; t (135) = -0.084, p = 0.933]. The procedure for calculating the eta squared value is shown below:

$$\text{Eta squared} = \frac{t^2}{t^2 + (N_1+N_2-2)} = \frac{-0.084^2}{-0.084^2 + (69+68-2)} = 5.23\text{X}10^{-5} = 0.00523\%$$

The magnitude in the differences of the means was small (eta squared = 0.0000523). It can be concluded that the bias to respondent management seniority does not constitute a significant factor for environmental turbulence.

4.2.2 Independent samples t-test on the other variables

An independent-samples t-test was conducted to compare the organisational performance, rate of investment, sales volume and strategy-type for management and senior management groups. In all cases the 'Sig.' is greater than 0.05 (p>0.05) and therefore Levene's test indicated that equal variances can be assumed. Appendix 8 shows detailed results of respective F values and Sig. (p) values. Table 4.2 is a summary of the analysis of key variables and management seniority using the t-test technique.

LEVEL/VARIABLE	Organisational Global Performance		Strategy-type		Environmental turbulence	
Senior Management	Mean	3.94	Mean	2.33	Mean	3.03
	SD	0.77	SD	1.05	SD	1.04
	t (df)	-0.115	t (df)	0.328	t (df)	-0.084
	Sig. (2-tailed)	0.909	Sig. (2-tailed)	0.743	Sig. (2-tailed)	0.933
Management	Mean	3.93	Mean	2.39	Mean	3.01
	SD	0.719	SD	0.997	SD	1.05
	t (df)	-0.115	t (df)	0.328	t (df)	-0.084
	Sig. (2-tailed)	0.909	Sig. (2-tailed)	0.743	Sig. (2-tailed)	0.933

LEVEL/VARIABLE	Rate of investment		Sales volume	
Senior Management	Mean	3.78	Mean	3.75
	SD	0.983	SD	0.816
	t (df)	1.074	t (df)	1.151
	Sig. (2-tailed)	0.285	Sig. (2-tailed)	0.252
Management	Mean	3.95	Mean	3.91
	SD	0.837	SD	0.759
	t (df)	1.074	t (df)	1.151
	Sig. (2-tailed)	0.285	Sig. (2-tailed)	0.252

Source: Analysis using SPSS software v.12

Table 4.2: Analysis of key variables and seniority using t-test technique

The magnitude in the differences of the means was small (eta squared value) for all the variables (table 4.3). It can be concluded that the bias to respondent management seniority does not constitute a significant factor for organisational performance, rate of investment, sales volume and strategy-type.

Variable	Eta squared
Organisational performance	0.0000987
Strategy type	0.000796
Rate of investment	0.009
Sales Volume	0.0102
Environmental turbulence	0.0000523

Table 4.3: Analysis of key variables and seniority using t-test technique

4.3 Statistics involving researched Maltese medium to large-sized organisations

Table 4.4 shows the sample classification based on Industrial Classification (ISIC Code), retrieved from the Employment and Training Corporation (Malta).

MANUFACTURING CLASSIFICATION	ISIC Code	Respondents by sector	Percentage
Food manufacturing industries, except beverage industries	200	8	**5.84**
Beverage industries	210	4	**2.92**
Manufacture of textiles	230	1	**0.73**
Manufacture of footwear and other apparel	240	1	**0.73**
Manufacture of furniture and fixtures	260	2	**1.46**
Manufacture of paper products	270	1	**0.73**
Printing, publishing and allied industries	280	2	**1.46**
Manufacture of leather and leather products except footwear	290	1	**0.73**
Manufacture of rubber products	300	1	**0.73**
Manufacture of chemical products	310	4	**2.92**
Manufacture of metal products, except machinery and transport equipment	350	1	**0.73**
Manufacture of electrical machinery, apparatus, appliances and supplies	370	3	**2.19**
Miscellaneous manufacturing industries	390	9	**6.57**
Construction	400	6	**4.38**
Electricity and Gas	510	1	**0.73**
SERVICES CLASSIFICATION	**ISIC Code**	**Respondents by sector**	**Percentage**
Wholesale and retail trade	610	9	**6.57**
Banks and other financial institution	620	5	**3.65**
Insurance	630	3	**2.19**
Real estate	640	1	**0.73**
Transport	710	15	**10.95**
Communication	730	6	**4.38**
Government services	810	21	**15.33**
Community and business services	820	9	**6.57**
Recreation services	830	11	**8.03**
Personal services	840	12	**8.76**
TOTAL		**137**	**100.00**

Source: Author's derived data from the survey-based questionnaire

Table 4.4: Survey respondents by Industrial Sector Classification-ISIC Code

Table 4.5 provides detailed information by sector using the ISIC Code and their respective strategic orientations[24].

Manufacturing Sector	ISIC CODE	Description	Prospector	Analyser	Defender	Reactor	Total
Food manufacturing industries	**200**	**Count**	1	3		4	**8**
		% within sector	12.5	37.5	0.0	50.0	**100.0**
		% within strategy-type	2.9	8.6	0.0	22.2	
Beverage industries	**210**	**Count**	2	1		1	**4**
		% within sector	50.0	25.0	0.0	25.0	**100.0**
		% within strategy-type	5.7	2.9	0.0	5.6	
Manufacture of textiles	**230**	**Count**		1			**1**
		% within sector	0.0	100.0	0.0	0.0	**100.0**
		% within strategy-type	0.0	2.9	0.0	0.0	
Manufacture of footwear and other apparel	**240**	**Count**			1		**1**
		% within sector	0.0	0.0	100.0	0.0	**100.0**
		% of total	0.0	0.0	2.0	0.0	**2.0**
Manufacture of furniture and fixtures	**260**	**Count**			1	1	**2**
		% within sector	0.0	0.0	50.0	50.0	**100.0**
		% within strategy-type	0.0	0.0	2.0	5.6	
Manufacture of paper products	**270**	**Count**			1		**1**
		% within sector	0.0	0.0	100.0	0.0	**100.0**
		% within strategy-type	0.0	0.0	2.0	0.0	
Printing publishing and allied industries	**280**	**Count**				2	**2**
		% within sector	0.0	0.0	0.0	100.0	**100.0**
		% within strategy-type	0.0	0.0	0.0	11.1	
Manufacture of leather and leather products except footwear	**290**	**Count**	1				**1**
		% within sector	100.0	0.0	0.0	0.0	**100.0**
		% within strategy-type	2.9	0.0	0.0	0.0	
Manufacture of rubber products	**300**	**Count**	1				**1**
		% within sector	100.0	0.0	0.0	0.0	**100.0**
		% within strategy-type	2.9	0.0	0.0	0.0	
Manufacture of chemical products	**310**	**Count**	2		1	1	**4**
		% within sector	50.0	0.0	25.0	25.0	**100.0**
		% within strategy-type	5.7	0.0	2.0	5.6	
Manufacture of metal products, except machinery and transport equipment	**350**	**Count**			1		**1**
		% within sector	0.0	0.0	100.0	0.0	**100.0**
		% within strategy-type	0.0	0.0	2.0	0.0	
Manufacture of electrical	**370**	**Count**	2	1			**3**

[24] The Miles and Snow's typology of strategic orientations is explored on pages 96-101.

machinery, apparatus , appliances and supplies		**% within sector**	66.7	33.3	0.0	0.0	**100.0**
		% within strategy-type	5.7	2.9	0.0	0.0	
Miscellaneous manufacturing industries	**390**	**Count**	2	4	3		**9**
		% within sector	22.2	44.4	33.3	0.0	**100.0**
		% within strategy-type	5.7	11.4	6.1	0.0	
Construction	**400**	**Count**		2	4		**6**
		% within sector	0.0	33.3	66.7	0.0	**100.0**
		% within strategy-type	0.0	5.7	8.2	0.0	
Electricity and gas	**510**	**Count**			1		**1**
		% within sector	0.0	0.0	100.0	0.0	**100.0**
		% within strategy-type	0.0	0.0	2.0	0.0	
Market Services	**ISIC CODE**	**Description**	**Prospector**	**Analyser**	**Defender**	**Reactor**	**Total**
Wholesale and retail trade	**610**	**Count**	2	3	3	1	**9**
		% within sector	22.2	33.3	33.3	11.1	**100.0**
		% within strategy-type	5.7	8.6	6.1	5.6	
Banks and other financial institutions	**620**	**Count**	3	1	1		**5**
		% within sector	60.0	20.0	20.0	0.0	**100.0**
		% within strategy-type	8.6	2.9	2.0	0.0	
Insurance	**630**	**Count**		2		1	**3**
		% within sector	0.0	66.7	0.0	33.3	**100.0**
		% within strategy-type	0.0	5.7	0.0	5.6	
Real Estate	**640**	**Count**		1			**1**
		% within sector	0.0	100.0	0.0	0.0	**100.0**
		% within strategy-type	0.0	2.9	0.0	0.0	
Transport	**710**	**Count**	3	3	8	1	**15**
		% within sector	20.0	20.0	53.3	6.7	**100.0**
		% within strategy-type	8.6	8.6	16.3	5.6	
Communication	**730**	**Count**	2	4			**6**
		% within sector	33.3	66.7	0.0	0.0	**100.0**
		% within strategy-type	5.7	11.4	0.0	0.0	
Government Services	**810**	**Count**		2	16	3	**21**
		% within sector	0.0	9.5	76.2	14.3	**100.0**
		% within strategy-type	0.0	5.7	32.7	16.7	
Community and Business Services	**820**	**Count**	3	3	2	1	**9**
		% within sector	33.3	33.3	22.2	11.1	**100.0**
		% within strategy-type	8.6	8.6	4.1	5.6	
Recreation Services	**830**	**Count**	5	2	2	2	**11**
		% within sector	45.5	18.2	18.2	18.2	**100.0**
		% within strategy-type	14.3	5.7	4.1	11.1	

Personal Services	**840**	**Count**	6	2	4		**12**
		% within sector	50.0	16.7	33.3	0.0	**100.0**
		% within strategy-type	17.1	5.7	8.2	0.0	
TOTAL		**Count**	**35**	**35**	**49**	**18**	**137**
		% of total	**25.5**	**25.5**	**35.8**	**13.1**	**100.0**

Source: Author's derived data from the survey-based questionnaire

Table 4.5: Detailed survey respondents by sector and using ISIC Code

Five of the submitted questionnaires were anonymous, as to which specific sector they belonged, and therefore could not be classified. The distribution of the manufacturing organisations studied in this dissertation included: food manufacturing (5.8%), beverage (2.9%), textiles (0.7%), footwear and other apparel (0.7%), furniture and fixtures (1.5%), paper products (0.7%), printing and publishing (1.5%), leather (0.7%), rubber (0.7%), chemicals (2.9%), metal (0.7%), electrical machinery and other appliances (2.2%), miscellaneous manufacturing (6.6%), construction (4.4%), and electricity and gas (0.7%).

The distribution of the market services organisations studied in this dissertation included: wholesale and retail trade (6.6%), banks and financial institutions (3.6%), insurance (2.2%), real estate (0.7%), transport (10.9%), communication (4.4%), government services (15.3%), community and business services (6.6%), recreation services (8%) and personal services (8.8%).

Table 4.6 shows respondent composition by sector.

Main activities of organisation	Tally	Percentage
Banking, insurance and finance services	13	**9.2**
Construction, planning and environment issues	7	**4.9**
Education and training	9	**6.3**
Food and beverage manufacture and distribution	15	**10.6**
General management/services	24	**16.9**
Government services and support line services to Ministries	21	**14.8**
Hospitality/Tourism services	16	**11.3**
Manufacturing/Production	25	**17.6**
Media and communications	7	**4.9**
Transport	5	**3.5**
TOTAL	**142**	**100.0**

Source: Author's derived data from the survey-based questionnaire

Table 4.6: Detailed survey respondents by sector

Table 4.7 shows the organisational management respondent classification.

Job Title	Tally	Percentage
Acting/Head of School-Rector	4	**2.8**
Assurance Partner/Partner	2	**1.4**
Chairman/Company Secretary	2	**1.4**
Director responsible for a Ministry	4	**2.8**
Director-Administration Manager	13	**9.2**
Finance and Administration Manager	6	**4.2**
Financial Controller/Director	9	**6.3**
Chief Executive Officer/General Manager/Managing Director	18	**12.7**
Group Human Resources/Head Corporate Services	7	**4.9**
Human Resources & Administration Manager	5	**3.5**
Human Resources & ICT Manager	2	**1.4**
Human Resources & Security Manager	1	**0.7**
Human Resources (Assistant Director/Director)	6	**4.2**
Human Resources Manager/Personnel Officers	49	**34.5**
Human Resources Senior Manager	2	**1.4**
Principal Officer	3	**2.1**
Production & Material Control/Project/Quality Manager	7	**4.9**
Secretary to the Board of Special Commissioners	1	**0.7**
Section Head Training and Development	1	**0.7**
Total	**142**	**100.0**

Source: Author's derived data from the survey-based questionnaire

Table 4.7: Detailed survey respondents by management discipline

The Miles and Snow model (1978) discussed in the literature review of this dissertation, helped to identify the strategic adaptive cycle and thereby facilitate categorisation of Maltese public and private organisations (table 4.8).

Strategic-type	Frequency	Percentage	Cumulative Percentage
Prospector	**35**	25.5	**25.5**
Analyser	**35**	25.5	**51.1**
Defender	**49**	35.8	**86.9**
Reactor	**18**	13.1	**100.0**
Total	**137**	**100.0**	

Source: Author's derived data from the survey-based questionnaire

Table 4.8: Detailed survey respondents by strategy-type

17 cases resulted in ties. Using the guidelines provided by Conant et al., (1990) which were explained in chapter 2 (p. 66), the responses were categorised along the four main types of Miles and Snow's model (table 4.9). These were inserted in table 4.8.

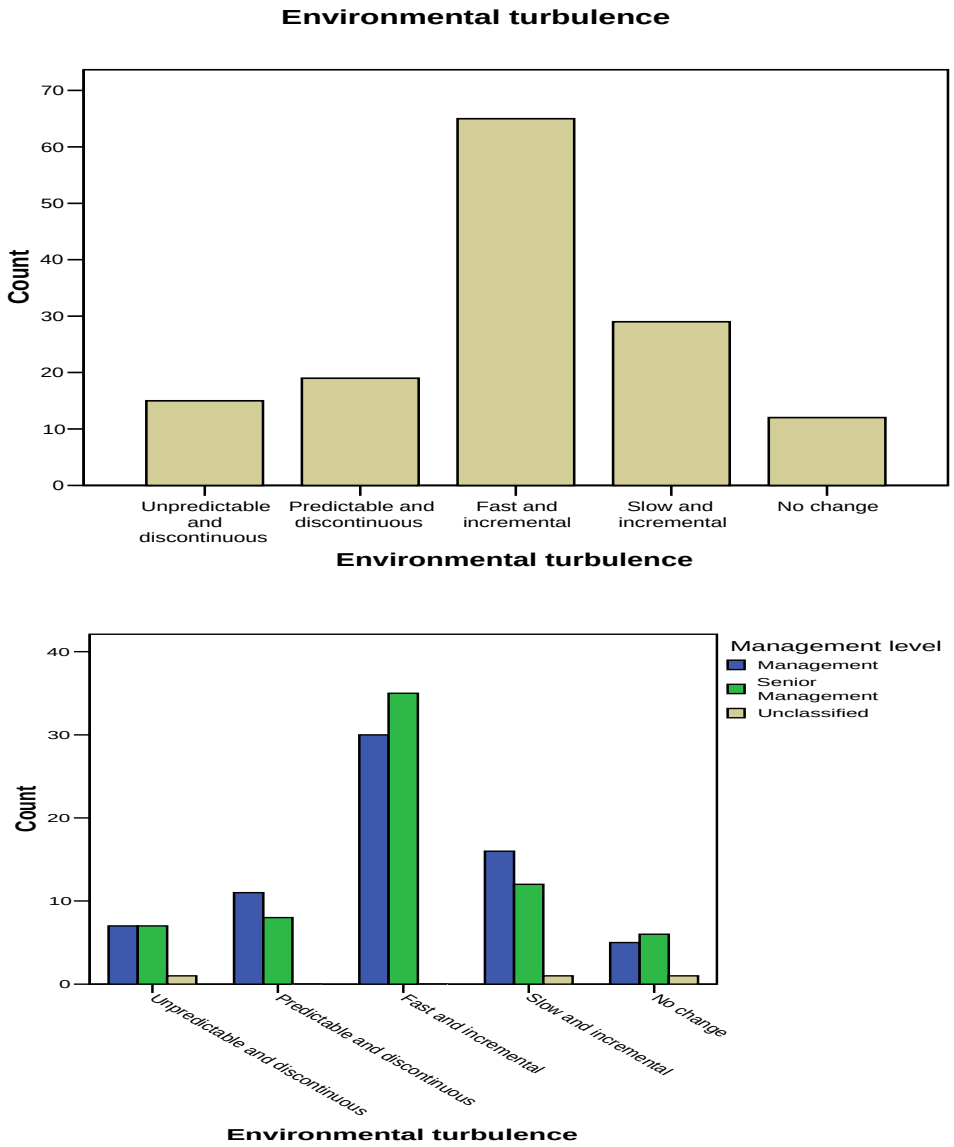
Strategic-type tie	No of cases	Resultant classification
Defender-Analyser	**2**	Analyser
Defender-Reactor	**5**	Reactor
Prospector-Analyser	**2**	Analyser
Prospector-Defender	**4**	Analyser
Prospector-Reactor	**1**	Reactor
Reactor-Analyser-Defender	**2**	Reactor
Prospector-Defender-Reactor	**1**	Reactor
TOTAL	**17**	

Source: Author's derived data from the survey-based questionnaire

Table 4.9: Ties developed by strategic type

4.4 Organisational environmental turbulence among Maltese public and private sector organisations

Figure 4.1 shows the distribution of environmental turbulence amongst Maltese medium to large-sized public and private sector organisations as identified by respondents.



Source: Author's derived data from the survey-based questionnaire

Figure 4.1: Environmental turbulence in Maltese public and private sector organisations clustered along seniority levels

Based on Ansoff et al's (1993b) model, the environmental turbulence in Maltese public and private sector organisations was classified along five main categories namely:

a) No change is taking place.

b) Slow and incremental.

c) Fast and incremental.

d) Predictable and discontinuous.

e) Unpredictable and discontinuous.

Table 4.10 shows the responses given, whereas figure 4.2 shows the distribution related to environmental turbulence. Two of the respondent organisations did not reply.

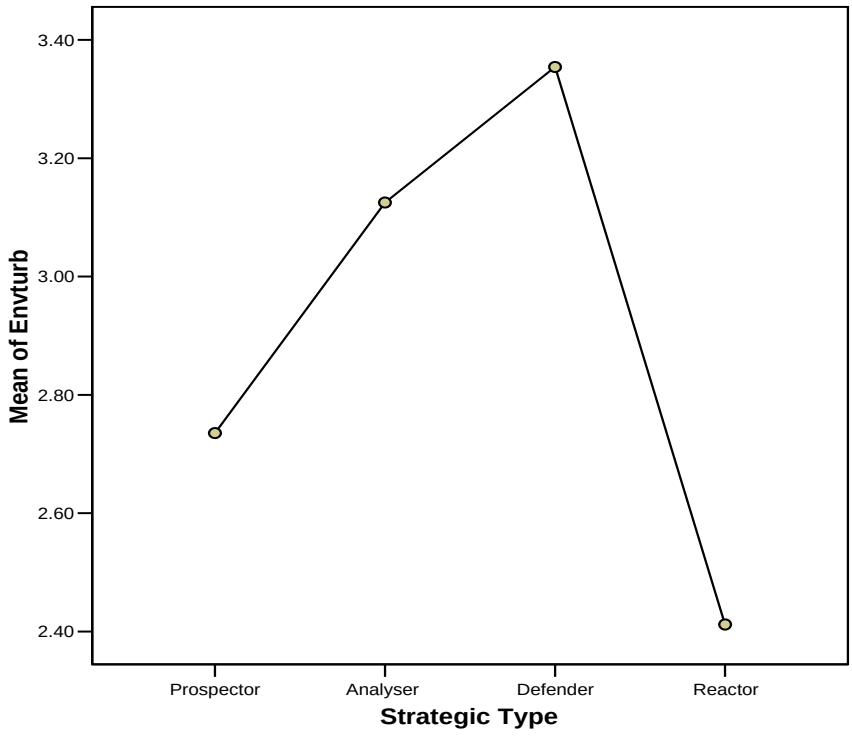
Type of organisational environment change experienced	Tally	Percentage
Change described as unpredictable and discontinuous	16	11.4
Change described as predictable and discontinuous	18	12.9
Change described as fast and incremental	65	46.4
Change described as slow and incremental	29	20.7
There is no change taking place	12	8.6
TOTAL	140	100.0

Source: Author's derived data from the survey-based questionnaire

Table 4.10: Detailed survey respondents by environmental turbulence types

ANOVA technique using a one-way analysis of variance, which is similar to the t-test, was used to investigate the relationship of mean scores between organisational strategy-type classifications and environmental turbulence (appendix 9). The overall significance value (Sig.) is less than 0.05 (Sig. value = 0.003), indicating a

statistically significant result somewhere between the groups, [F (3, 132) =4.96, p=0.003] in scores related to environmental turbulence across the four organisational strategy-types. Since a significant difference in the overall ANOVA table was registered, the post-hoc tests helps to decipher where the differences amongst the groups occur. The two groups prospector (M=2.74, SD=0.886) and defender (M=3.37, SD=1.01) with a Sig. value of 0.028 and defender (M=3.37, SD=1.01) and reactor (M=2.44, SD=1.29), with a Sig. value of 0.006, are significantly different from one another at the $p<0.05$ level. Figure 4.2 compares the mean scores for the different groups, which shows that the mean score of environmental turbulence is greatest for the defender-type organisation.



Source: Author's derived data from survey-based questionnaire

Figure 4.2: Mean of environmental turbulence against strategic-types

4.5 Organisational performance measurement between different strategic types

The mean of the three-item variable instrument[25] (Dess & Robinson 1984; Pearce et al., 1987), was used to gauge organisational performance. The possible dimensions of concepts were pretested, revised, retested and statistically analysed through the proper understanding of Cronbach's alpha[26] and factor analysis. Several researchers regard values of Cronbach below 0.6 and test-retest correlation coefficient below 0.7 as problematic (Landis & Koch 1977, Dunn 1989 and Bravo & Potvin 1991). Others maintain that the threshold above 0.7 as reliable (Pallant 2001). It is logical to state that high reliability is required when tests are used to make important decisions and when individuals are sorted into different categories based upon relatively small individual differences. The reliability indicator may be improved either through diminished error variation or through greater true variation (Elasy & Gaddy 1998). It may seem plausible that the creation of a good reliability indicator in an extremely homogenous group will be rather difficult, which may eventually yield a poor reliability coefficient. On the contrary in general, heterogenous groups increase variance (Elasy & Gaddy 1998).

The reliability measure through Cronbach's alpha test resulted in 0.621, which exceeds the recommended minimum value of 0.6 to 0.7 and thus confirms scale reliability (Hair et al., 1998). In the column marked *Corrected Item-Correlation* (appendix 10), there are no values less than 0.3, which would indicate that the item

[25] The Dess and Robinson (1984) three-item variable is explained on page 152-155.

[26] Reliability refers to internal consistency assessment of a set of statements (construct validity) assessed by what is referred to as Cronbach's alpha which helps to discriminate amongst statements (Pallant 2001). Cronbach's alpha is based on inter-item correlations between 0 (low) and 1 (high). The more items on test, the Cronbach's alpha will be expected to be higher.

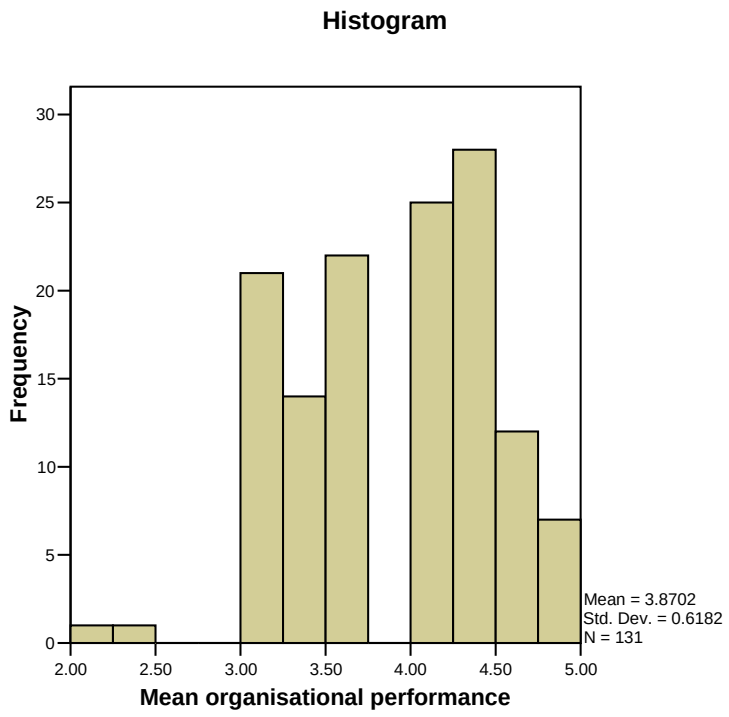
is measuring something different to the scale (Pallant 2001). Interpretation using SPSS v.12 descriptives provides information related to the distribution of scores on continuous variables (skewness and kurtosis). The symmetry of distribution is provided by the skewness value whereas the 'peakedness' of the distribution is provided by the kurtosis value. Table 4.11 shows kurtosis and skewness statistical tests carried out for the aggregated performance measure. The negative skewness value indicates that scores are clustered at the high end (to the right). The negative kurtosis value indicates that the distribution is rather flat.

N	131
Percent Valid (%)	92.3
Missing	11
Mean	3.87
Std. Deviation	0.618
Skewness	-0.244
Std. Error of Skewness	0.212
Kurtosis	-0.391
Std. Error of Kurtosis	0.42

Source: Author's derived data from the survey-based questionnaire

Table 4.11: Detailed statistical analysis on aggregated organisational performance measure

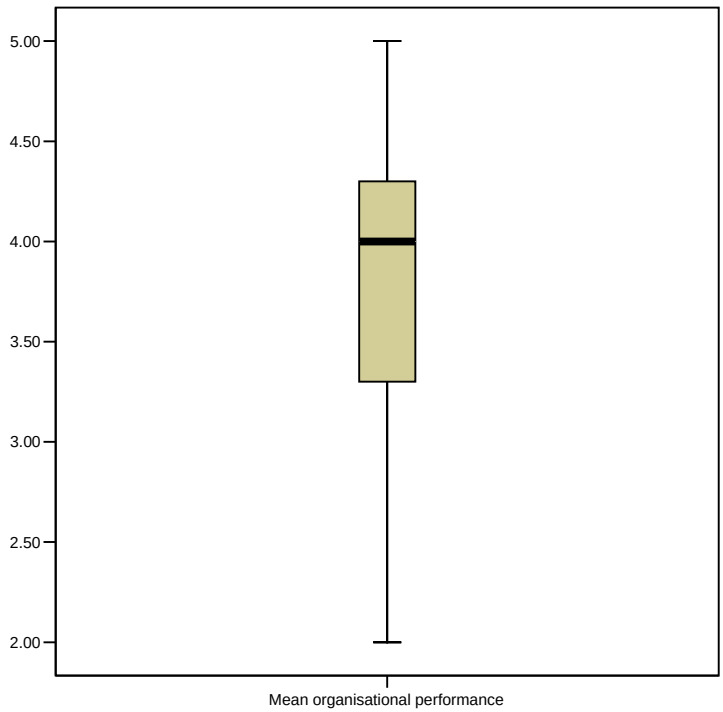
Figure 4.3 shows the aggregated performance histogram, with a mean of 3.87, a 5 per cent trimmed mean of 3.87 and standard deviation of 0.618. There is no difference between the mean and trimmed mean value.



Source: Author's derived data from the survey-based questionnaire

Figure 4.3: The aggregated performance measure histogram

The boxplot identifies any outliers. When one observes the tails of histogram distribution, it seems that data points sit on their own at one of the extreme ends, for aggregated organisational performance. There are no outliers in the performance data presented in this research (figure 4.4).



Source: Author's derived data from survey-based questionnaire

Figure 4.4: Outliers for aggregated performance measure

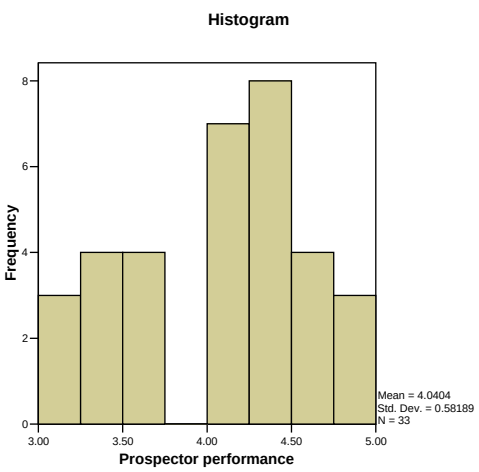
Table 4.12 shows the kurtosis and skewness statistical tests carried out for the aggregated performance measure with strategy-type. The Kolmogorov-Statistic test assesses the normality of the distribution of scores. A non-significant result (Sig. value of more than 0.05) indicates normality. In this case the Sig. value is 0.067 for prospector, 0.115 for analyser, 0.001 for defender and 0.146 for reactor strategic-types suggesting normality except for the defender strategic-type (appendix 11).

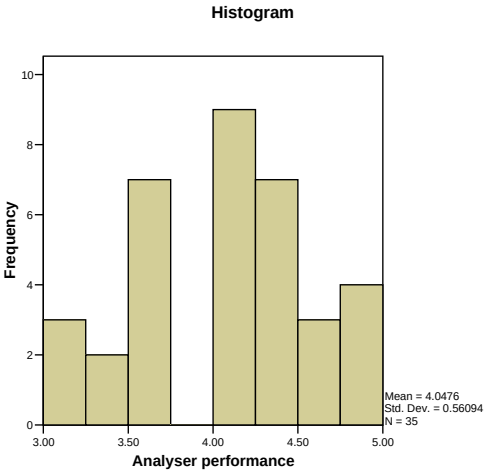
Strategic type	Prospector	Analyser	Defender	Reactor
N	33	35	38	18
Percent Valid (%)	66.0	70.0	100.0	36.0
Missing	17	15	0	32
Mean	4.0404	4.0476	3.7200	3.7037
Std. Deviation	0.5819	0.5609	0.5527	0.7912
Skewness	-0.197	0.042	-0.181	-0.326
Std. Error of Skewness	0.409	0.398	0.337	0.536
Kurtosis	-0.735	-0.427	-0.385	-0.702
Std. Error of Kurtosis	0.798	0.778	0.662	1.038

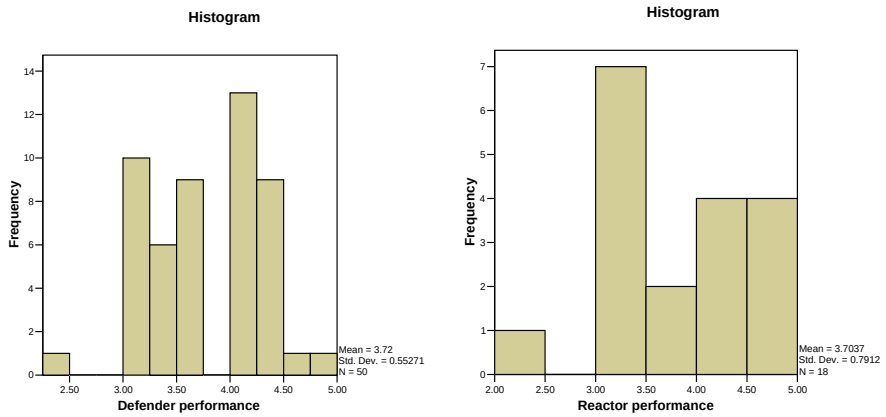
Source: Author's derived data from the survey-based questionnaire

Table 4.12: Detailed statistical analysis on organisational performance measure against strategic grouping variables

Figure 4.5 shows the distribution of the aggregated organisational performance measure against each strategic-type for Maltese organisations.







Source: Author's derived data from the survey-based questionnaire

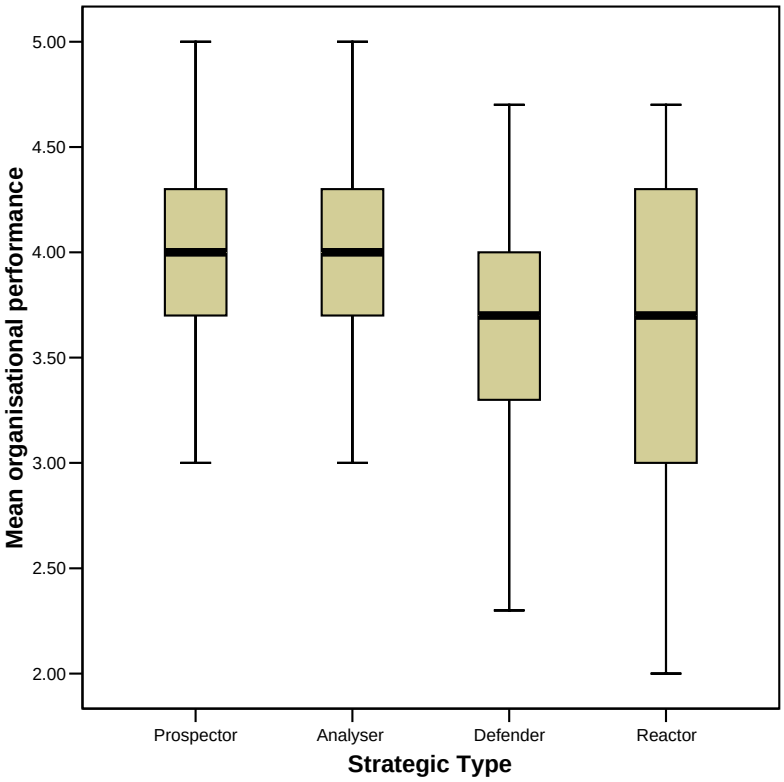
Figure 4.5: Organisational performance measure for Maltese public and private organisations according to strategic types

The mean for organisational performance for:

- prospector-type strategy is 4.04 and with a 5 percent trimmed mean the value remains at 4.05.
- analyser-type strategy is 4.05 and with a 5 percent trimmed mean the value is 4.05.
- defender-type strategy is 3.72 and with a 5 percent trimmed mean the value is 3.72.
- reactor-type strategy is 3.70 and with a 5 percent trimmed mean the value is 3.75 (appendix 11).

The difference is small when comparing the original mean with the new trimmed mean. This implies that the extreme cases are not influencing the mean value. The boxplot shows the distribution of scores for the two groups (figure 4.6). 50 percent

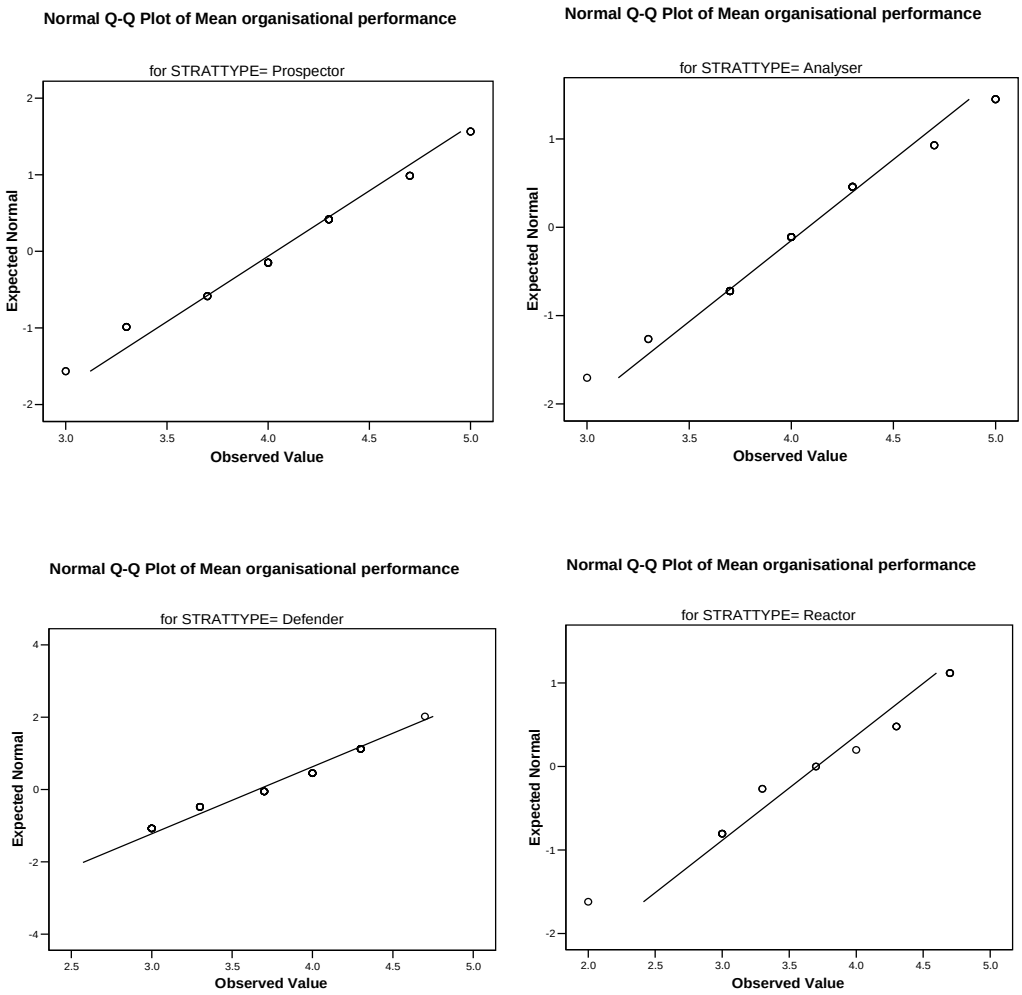
of the cases lie within the rectangle with protruding lines representing the largest and smallest values.



Source: Author's derived data from the survey-based questionnaire

Figure 4.6: Boxplot for organisational performance measure for Maltese public and private organisations according to strategic types

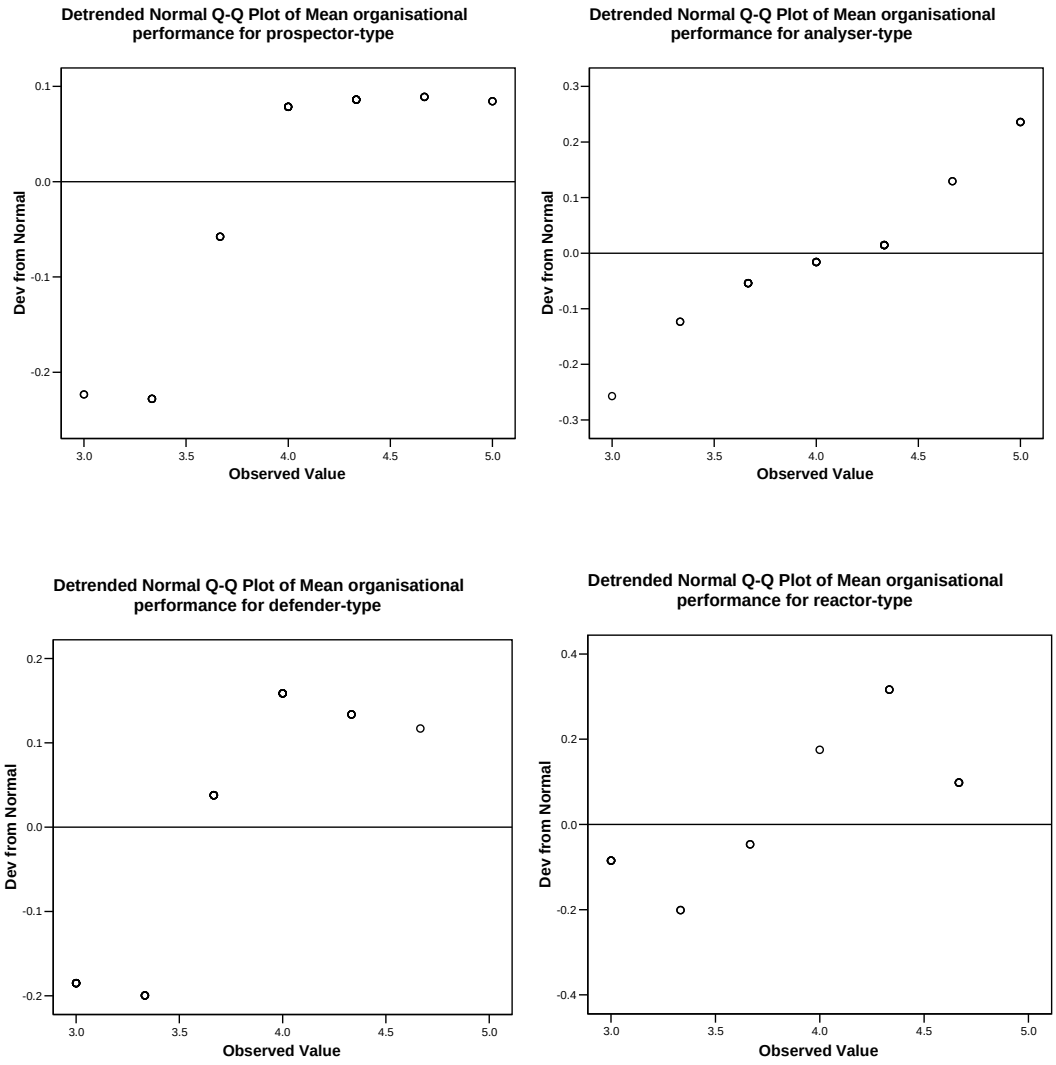
The four strategic group scores appear to be normally distributed. This is also supported by the normal probability Q-Q plots as a reasonably straight line suggests a normal distribution, when the observed and expected values are plotted (figure 4.7).



Source: Author's derived data from the survey-based questionnaire

Figure 4.7: Normal Q-Q Plots of organisational performance for the different strategic-types

The Detrended Normal Q-Q Plots show the actual deviation of the scores from the straight line. There is no clustering of points and most of the points are around the zero lines in both cases (figure 4.8).



Source: Author's derived data from the survey-based questionnaire

Figure 4.8: Detrended normal Q-Q Plots of organisational performance for the different strategic-types

An ANOVA one-way between group variance analysis was used to investigate the relationship between organisational strategy-types and aggregated organisational performance in Maltese medium to large-sized public and private sector organisations. The homogeneity of variance option provides the Levene's test for

homogeneity of variances. This tests whether the variance in scores is the same for the four strategic-type groups. The Sig. value is 0.086 which is greater than 0.05. This means that the homogeneity of variance assumption has not been violated.

The Sig. value in the ANOVA table for the strategic-types is 0.019 (appendix 12) which is less than 0.05 [F (3, 132) =3.427, p=0.019]. This means that there is a significant difference somewhere among the mean scores on the dependent variable between the strategic-type groups.

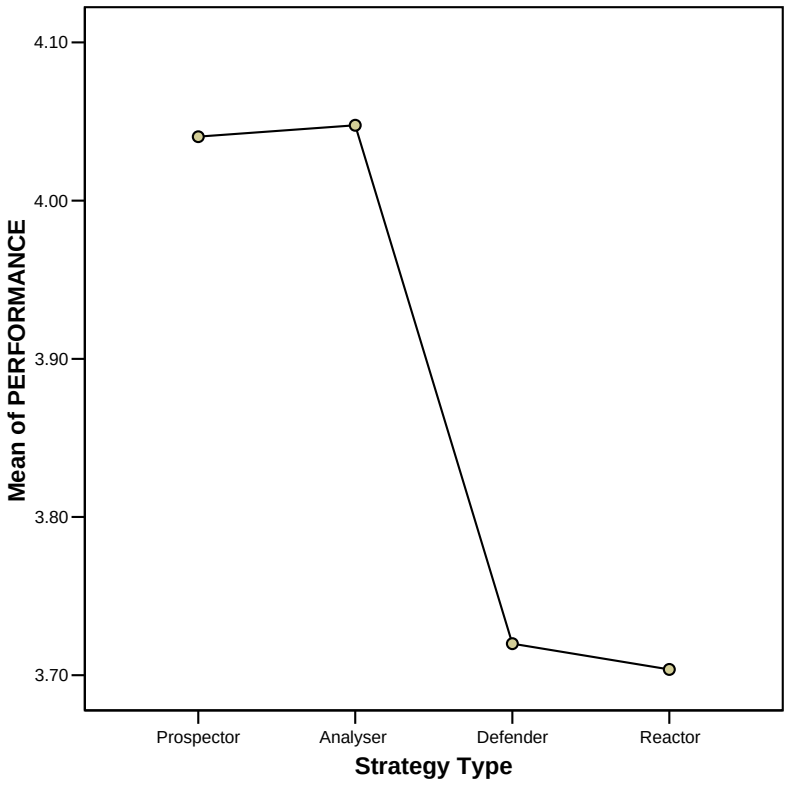
This was sustained by the paired Bonferroni post-hoc comparison which shows that the mean performance for prospectors is greater than the mean for defender-type, and the mean for analyser is greater than the mean of defender-type (appendix 12). Table 4.13 shows the results using one-way ANOVA technique of organisational performance across the organisational strategic-types. The mean for organisational performance is 3.8799 with a standard deviation of 0.6135. Figure 4.9 shows the means plot for these types of strategies.

Variable	Prospector	Analyser	Defender	Reactor	F-value	Bonferroni comparison (p<0.1; p<0.15)
Organisational Performance	4.0404	4.0476	3.7200	3.7037	3.427	P>D** A>D*
Standard Deviation	0.5819	0.5609	0.5527	0.7912		

*** p<0.1; ** p<0.15**

Source: Author's derived data from the survey-based questionnaire

Table 4.13: Aggregated organisational performance across strategy-types



Source: Author's derived data from the survey-based questionnaire

Figure 4.9: Means plot of organisational performance across strategic-types

The homogeneity of variance option provides the Levene's test for homogeneity of variances. This provides a test whether the variance in scores is the same for the three strategic groups of prospector, analyser and defender. The Sig. value is 0.894 which is greater than 0.05. This means that the homogeneity of variance assumption has not been violated. Applying the one-way ANOVA technique of organisational performance across the prospector, defender and analyser-types, produces a mean for organisational performance of 3.8982 with a standard deviation of 0.5839 (appendix 12).

The Sig. value in the ANOVA table for the strategic-types is 0.002, which is less than 0.05 [F (3, 132) =6.899, p=0.002]. This means that there is a significant difference somewhere among the mean scores on the dependent variable (performance) between these three strategic-type groups.

The t-test conducted for organisations following a reactor-type strategy resulted with a mean of 3.7037, standard deviation of 0.7912 and a standard mean error of 0.1865. The 95% confidence interval is 3.3102< ū <4.0972 (appendix 12).

Having outlined the findings concerning the relationship between strategic-type and performance, the next section presents the findings that address the relationship between knowledge management orientation and performance.

4.6 Personalisation and codification knowledge management strategies and performance

Appendix 4 shows the variables adopted to cater for the knowledge orientation instrument from which thirteen pertain to personalisation variables whereas the other eight pertain to codification variables (Hansen et al., 1999). The mean for codification variables is denoted by C_{01} which has a value of 4.1438, whereas the mean for personalisation variables is given by P_{01} which has a value of 4.3820. The difference between P_{01} and C_{01} denoted by D_{P-C} is a measure in balance between the two types of strategies. If D_{P-C} is positively oriented it means that the strategy is biased towards the personalisation type whilst if D_{P-C} is negatively oriented it means that the strategy is biased towards the codification type of strategy. The

mean value of $D_{P\text{-}C}$ is 0.2382, which means that there is a personalisation strategy bias.

For **prospector-type strategy**, the mean between personalisation and codification strategies is 0.3744, with a 95% confidence interval, the confidence interval is $0.1585 < \bar{u} < 0.5904$ (appendix 13).

For **defender-type strategy**, the mean between personalisation and codification strategies is 0.1859, with a 95% confidence interval, the confidence interval is $-0.1790 < \bar{u} < 0.3897$ (appendix 13).

The reliability of the codification scale was measured. Ideally, the Cronbach alpha coefficient of a scale should be above 0.7 (Pallant 2001). For the codification scale C_{01}, the Cronbach alpha value is 0.624, which is below 0.7. On considering removing the item with low item-total correlation, (i.e. COD18), the new Corrected Item-Total Correlation, is 0.685 (appendix 14), which is acceptable. This is common in short scales of less than ten items which usually register a Cronbach value in the region of 0.5. In such cases the corrected item total-correlation is used where an optimal range of 0.2 to 0.4 is recommended (Pallant 2001). For the personalisation scale P_{01} the Cronbach value 0.804, which is above 0.7, so the scale is considered reliable.

Further analysis between codification C_{01} and personalisation P_{01} strategies yield a positive moderate to strong correlation that exists between the two strategies, with a

Pearson coefficient (r) of 0.626 ($p<0.01$) (table 4.14), and a coefficient of determination (r^2) of 0.39 per cent shared variance, which explains how much of the variation in one variable can be explained by another. The Pearson coefficient can range from -1.00 to 1.00 and indicates the strength of the relationship between the means of the two variables (Cohen 1988). The chance of this correlation result being obtained by chance is less than 1 in 100, which is very unlikely.

Correlations

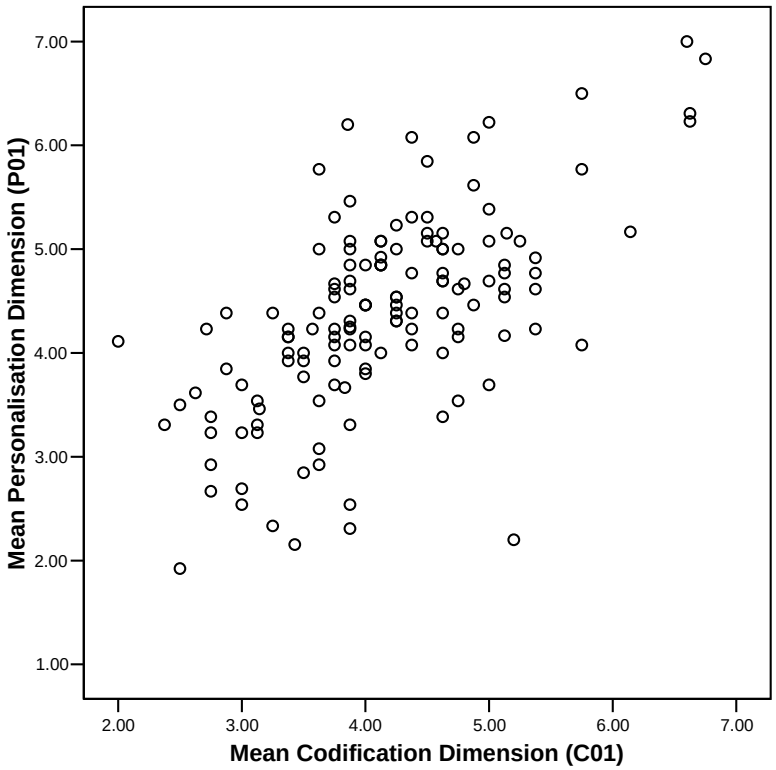
		MEANCOD C_{01}	MEANPERS P_{01}
C_{01}	Pearson Correlation	1	.626(**)
	Sig. (2-tailed)		.000
	N	140	140
P_{01}	Pearson Correlation	.626(**)	1
	Sig. (2-tailed)	.000	
	N	140	140

**** Correlation is significant at the 0.01 level (2-tailed[27]).**
Source: Author's derived data from the survey-based questionnaire

Table 4.14: Correlation for personalisation and codification strategies

The personalisation and codification scatterplot is shown in figure 4.10.

[27] 'The two-tailed test is performed if the results would be interesting in either direction' (Stockburger 2005).



Source: Author's derived data from the survey-based questionnaire

Figure 4.10: Scatterplot for personalisation versus codification strategy

In exploring a group of variables and their inter-relationships, appendix 15 shows significant correlations at the 0.05 level (2-tailed) and at the 0.01 level (2-tailed) between the codification and personalisation variables.

The t-test value for organisational performance with codification and personalisation strategies for the defender-type of strategy is 0.261 (df = 49) at a significance (2-tailed) of p=0.005 (mean is 3.72; standard deviation is 0.5527; standard error 0.0782 - appendix 12). The t-test value for organisational performance with codification and personalisation strategies for the prospector-type

of strategy is 0.101 (df = 34) at a significance (2-tailed) of p=0.005 (mean is 4.0404; standard deviation is 0.5819; standard error 0.1013-appendix 12).

The mean, standard deviation and standard error for organisational performance following the codification and personalisation-type of strategies is shown in table 4.15. In the defender-type and the prospector-type strategies the Sig. value is less than 0.05 (sig. 0.0005), which means that there is a significant difference in the mean scores on the dependent variable for each of the two groups.

Strategy -type CODIFICATION STRATEGY	Mean	Std. Error	Standard Deviation
Prospectors P_{01}	4.2849	0.1616	0.9423
Defenders C_{01}	3.8954	0.1162	0.8130

Strategy -type PERSONALISTION STRATEGY	Mean	Std. Error	Standard Deviation
Prospectors P_{01}	4.6618	0.1565	0.9127
Defenders C_{01}	4.0834	0.1161	0.8127

Source: Author's derived data from the statistical package

Table 4.15: Detailed descriptive statistics for knowledge management strategies

4.7 Strategic knowledge orientation

Data was screened to check for any existing outliers by comparing the mean and the trimmed mean as well as the boxplots for the variables identified as forming part of strategic knowledge orientation in Maltese medium to large-size public and private organisations. SPSS defines points as outliers if they extend more than 1.5 box-lengths from the edge of the box, with extremes of 3 box-lengths from the edge of the box indicated with an asterisk * (Pallant 2001). No variables with a difference between the mean and 5% trim were registered, and therefore there is no need to remove any outliers (table 4.16). Extreme points were registered for PERS30 (ID: 30), ORIENT26 (ID: 128); ORIENT35 (ID: 128) and ORIENT40 (ID: 103)

(appendix 16) but since the 5% trimmed mean value is similar to the mean these values were retained.

Knowledge Orientation variable	Mean	5% Trimmed Mean	Percentage difference
COD18	3.8696	3.8551	**-0.37**
COD24	5.4388	5.5592	**2.21**
COD28	3.1880	3.0977	**-2.83**
COD29	3.9855	3.9839	**-0.04**
COD32	4.7206	4.7222	**0.03**
COD36	3.3407	3.2819	**-1.76**
COD46	4.9030	5.0033	**2.05**
COD48	3.5414	3.5125	**-0.82**
PERS19	4.8841	4.9509	**1.37**
PERS20	4.1912	4.2059	**0.35**
PERS21	3.2609	3.1940	**-2.05**
PERS22	3.1704	3.0782	**-2.91**
PERS25	4.8905	4.9663	**1.55**
PERS30	5.3381	5.4552	**2.19**
PERS31	5.2190	5.2758	**1.09**
PERS37	4.1894	4.2104	**0.50**
PERS38	4.9489	5.0150	**1.34**
PERS39	3.8346	3.8162	**-0.48**
PERS49	4.0149	4.0166	**0.04**
PERS51	4.1756	4.2205	**1.08**
PERS52	4.7239	4.7819	**1.23**
ORIENT23	4.4964	4.5515	**1.23**
ORIENT26	5.3261	5.4420	**2.18**
ORIENT27	4.1014	4.1127	**0.28**
ORIENT33	5.437	5.5741	**2.52**
ORIENT34	4.6953	4.7639	**1.46**
ORIENT35	5.303	5.4259	**2.32**
ORIENT40	5.3796	5.4704	**1.69**
ORIENT41	4.8382	4.9003	**1.28**
ORIENT42	4.3603	4.4003	**0.92**
ORIENT43	3.6515	3.6128	**-1.06**
ORIENT44	3.8647	3.8580	**-0.17**
ORIENT45	3.8731	3.8814	**0.21**
ORIENT47	4.3158	4.3454	**0.69**
ORIENT50	4.6940	4.7711	**1.64**
ORIENT53	4.9485	5.0229	**1.50**
ORIENT54	4.7463	4.8234	**1.62**
ORIENT55	4.5037	4.5453	**0.92**
ORIENT56	4.5704	4.6173	**1.03**
ORIENT57	4.7164	4.7653	**1.04**
ORIENT58	4.6316	4.6629	**0.68**
ORIENT59	3.7863	3.7757	**-0.28**

Source: Author's derived data from the statistical package

Table 4.16: Comparison of mean and 5% trimmed values

Two of the questionnaires received omitted all section IV related to strategic knowledge orientation, stating that this was not applicable in their case. There were other organisations, especially respondents from government organisations, who omitted certain questions in this part of the survey, stating that the particular question was not applicable or relevant for their organisation (table 4.17). This does not affect the research being conducted as there is enough data for statistical tests to be carried out.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
COD18	138	96.5%	5	3.5%	143	100.0%
COD24	139	97.2%	4	2.8%	143	100.0%
COD28	133	93.0%	10	7.0%	143	100.0%
COD29	138	96.5%	5	3.5%	143	100.0%
COD32	136	95.1%	7	4.9%	143	100.0%
COD36	135	94.4%	8	5.6%	143	100.0%
COD46	134	93.7%	9	6.3%	143	100.0%
COD48	133	93.0%	10	7.0%	143	100.0%
PERS19	138	96.5%	5	3.5%	143	100.0%
PERS20	136	95.1%	7	4.9%	143	100.0%
PERS21	138	96.5%	5	3.5%	143	100.0%
PERS22	135	94.4%	8	5.6%	143	100.0%
PERS25	137	95.8%	6	4.2%	143	100.0%
PERS30	139	97.2%	4	2.8%	143	100.0%
PERS31	137	95.8%	6	4.2%	143	100.0%
PERS37	132	92.3%	11	7.7%	143	100.0%
PERS38	137	95.8%	6	4.2%	143	100.0%
PERS39	133	93.0%	10	7.0%	143	100.0%
PERS49	134	93.7%	9	6.3%	143	100.0%
PERS51	131	91.6%	12	8.4%	143	100.0%
PERS52	134	93.7%	9	6.3%	143	100.0%
ORIENT23	137	95.8%	6	4.2%	143	100.0%
ORIENT26	138	96.5%	5	3.5%	143	100.0%
ORIENT27	138	96.5%	5	3.5%	143	100.0%
ORIENT33	135	94.4%	8	5.6%	143	100.0%
ORIENT34	128	89.5%	15	10.5%	143	100.0%
ORIENT35	132	92.3%	11	7.7%	143	100.0%

ORIENT40	137	95.8%	6	4.2%	143	100.0%
ORIENT41	136	95.1%	7	4.9%	143	100.0%
ORIENT42	136	95.1%	7	4.9%	143	100.0%
ORIENT43	132	92.3%	11	7.7%	143	100.0%
ORIENT44	133	93.0%	10	7.0%	143	100.0%
ORIENT45	134	93.7%	9	6.3%	143	100.0%
ORIENT47	133	93.0%	10	7.0%	143	100.0%
ORIENT50	134	93.7%	9	6.3%	143	100.0%
ORIENT53	136	95.1%	7	4.9%	143	100.0%
ORIENT54	134	93.7%	9	6.3%	143	100.0%
ORIENT55	135	94.4%	8	5.6%	143	100.0%
ORIENT56	135	94.4%	8	5.6%	143	100.0%
ORIENT57	134	93.7%	9	6.3%	143	100.0%
ORIENT58	133	93.0%	10	7.0%	143	100.0%
ORIENT59	131	91.6%	12	8.4%	143	100.0%

Source: Author's derived data from the statistical package

Table 4.17: Case processing summary of knowledge orientation variables

Appendix 17 shows the means and standard deviations of knowledge orientation variables. The overall mean is 4.43 and those variables above this mean have been identified. The Kolmogorov-Smirnov test was used to test the normality effects, as well as the distribution of the variables adopted for strategic knowledge orientation. The normality of the distribution of scores is registered if the Kolmogorov-Smirnov statistic test (the Sig. value) is 0.05 or more. In our case, the 42 variables do not meet the Kolmogorov-Smirnov value of 0.05 or more (appendix 16). However upon further inspection both the Normal Q-Q plots, Detrended Normal Q-Q Plots and distribution histograms revealed that histograms appear to be reasonably normally distributed, which is supported by the normal probability plots labelled Normal Q-Q plots where a reasonable straight line is present in all cases, thus suggesting normal distribution. The Detrended Normal Q-Q plots show that there is no clustering of points, with most of them collecting around the zero line. Some minor deviations

were registered in the boxplots for COD24 (ID: 65 & 112), PERS30 (ID: 111 & 139), ORIENT26 (ID: 90 & 141), ORIENT33 (ID: 103), ORIENT35 (ID: 50 & 141), ORIENT40 (ID: 69 & 141), ORIENT47 (ID: 117 & 138) for low values of knowledge orientation and ORIENT 35 (ID: 88), ORIENT 40 (ID: 88) and ORIENT47 (ID: 128) for high values of knowledge orientation. These have been noted when it comes to parametric statistical testing.

One-way between-groups analysis of variance (ANOVA) was used to investigate the relationship of the strategic orientation variables and the four organisational strategic-types (table 4.18). The test of homogeneity of variances using the Levene's test revealed that COD24, PERS19, PERS39, PERS52, ORIENT40 and ORIENT54 violated the assumption of homogeneity of variance. The rest of the knowledge orientation variables had a Sig. value greater than 0.05.

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
COD18	.703	3	131	.552
PERS19	6.181	3	131	.001
PERS20	.786	3	129	.504
PERS21	.450	3	130	.718
PERS22	.447	3	127	.720
ORIENT23	.323	3	129	.809
COD24	2.993	3	131	.033
PERS25	.777	3	129	.509
ORIENT26	.597	3	130	.618
ORIENT27	.177	3	131	.912
COD28	.677	3	126	.568
COD29	.474	3	130	.701
PERS30	.965	3	131	.411
PERS31	1.005	3	129	.393
COD32	1.214	3	128	.307
ORIENT33	2.236	3	128	.087

ORIENT34	.649	3	124	.585
ORIENT35	1.375	3	126	.254
COD36	.041	3	127	.989
PERS37	.620	3	126	.603
PERS38	.838	3	130	.475
PERS39	3.155	3	128	.027
ORIENT40	3.074	3	130	.030
ORIENT41	.094	3	130	.963
ORIENT42	.729	3	130	.536
ORIENT43	2.377	3	127	.073
ORIENT44	.644	3	128	.588
ORIENT45	.542	3	127	.654
COD46	.392	3	127	.759
ORIENT47	.708	3	126	.549
COD48	1.121	3	127	.343
PERS49	1.010	3	129	.391
ORIENT50	1.212	3	128	.308
PERS51	.781	3	126	.507
PERS52	2.686	3	128	.049
ORIENT53	1.120	3	130	.343
ORIENT54	2.873	3	129	.039
ORIENT55	1.311	3	129	.274
ORIENT56	1.987	3	129	.119
ORIENT57	.272	3	128	.846
ORIENT58	.112	3	128	.953
ORIENT59	.818	3	127	.486

Source: Author's derived data from the statistical package

Table 4.18: Test of Homogeneity of Variances

The ANOVA table provides the Sig. value for the knowledge orientation factors. A significant statistical difference lies somewhere among the mean scores on the dependent variable if the value registered is less than or equal to 0.05 (appendix 18). The exact identification of the group in which this occurs is given in the post-hoc multiple comparisons table (appendix 18). The variables with a Sig. value less than or equal to 0.05 are COD24, COD46, PERS25, PERS38, PERS39, PERS52, ORIENT23, ORIENT 27, ORIENT33, ORIENT34, ORIENT35, ORIENT40, ORIENT41, ORIENT53, ORIENT55, ORIENT56 and ORIENT 59.

To control better any Type I errors, the Bonferroni post-hoc test was used, in order to minimize any null hypotheses being rejected when in fact they are true, besides being stricter as an approach in obtaining significant statistical results. The Bonferroni post-hoc test does not assume equal variances for the groups analysed, unlike the Tukey-test (Pallant 2001). Table 4.19 shows the variance of knowledge orientation with organisational strategic-type.

Variable code	**Knowledge Orientation Measure**	**Prospector**	**Analyser**	**Defender**	**Reactor**	**F-Value**	**Bonferroni multiple paired comparisons**
COD18	Our organisational training is based on manual-type of training	3.727	3.686	4.122	4.000	0.560	-
PERS19	Our organisational training is based on the transfer of knowledge through appropriate mentoring	5.091	5.314	4.571	4.611	2.294	A>D***
PERS20	Staff hired within our organisation are problem-solvers	4.324	4.235	4.021	4.111	0.307	-
PERS21	Knowledge sharing is enhanced directly by our organisational remuneration package system	3.636	3.471	2.918	3.278	1.476	-
PERS22	Networks are fostered by the creation of secondments with other organisations through links developed by our HR department	3.485	3.188	3.063	3.056	0.353	-
ORIENT23	Both knowledge needs of our organisation and HR policies and systems are aligned	5.000	4.886	4.064	4.111	2.913	P>D**
COD24	Our organisation utilises its own ICT technologies for documentation and storage of information	5.618	5.743	4.896	5.944	3.649	A>D** D<R*

Variable code	Knowledge Orientation Measure	Prospector	Analyser	Defender	Reactor	F-Value	Bonferroni multiple paired comparisons
PERS25	Knowledge within our organisation is exchanged and contact developed through its own ICT technologies	5.471	5.088	4.383	4.944	3.592	P>D*
ORIENT26	Our IT Department (or subcontracted IT Department) utilises the latest technologies in knowledge exchange	5.636	5.500	4.959	5.500	1.815	-
ORIENT27	Our organisation has a performance management system that is disseminated throughout the organisation with its information systems	4.824	4.676	3.347	3.889	5.970	P>D* A>D*
COD28	Knowledge is tapped from our organisation's database without prior consultation to the person who created it	3.419	3.235	3.122	3.000	0.215	-
COD29	Knowledge is tapped from our organisation's database using search facility	4.030	4.177	3.796	3.944	0.301	-
PERS30	A high percentage of our organisation's knowledge rests with staff within the organisation	5.182	5.543	5.388	5.278	0.431	-
PERS31	A high percentage of our organisation's knowledge is developed to staff-to staff contact within our organisation departments/divisions/units	5.258	5.486	5.082	5.111	0.833	-
COD32	The concept of knowledge re-use is used to a great extent once it is discovered for our organisation's products/services	4.906	4.735	4.500	5.000	0.988	-
ORIENT33	Client knowledge is continuously updated within our organisation and is considered of utmost importance	5.844	5.971	4.771	5.722	6.594	P>D* A>D* D<R**

Variable code	Knowledge Orientation Measure	Prospector	Analyser	Defender	Reactor	F-Value	Bonferroni multiple paired comparisons
ORIENT34	Competitor knowledge is continuously updated within our organisation and is considered of utmost importance	4.806	5.229	4.114	4.889	2.779	A>D*
ORIENT35	Industry knowledge is continuously updated within our organisation and is considered of utmost importance	5.531	5.765	4.745	5.529	3.548	A>D*
COD36	Knowledge database contribution within our organisation is enhanced through the organisation's remuneration structure	3.467	3.471	2.939	4.000	2.230	D<R**
PERS37	Our organisation's database knowledge on experts related to our field is continuously updated	4.267	4.471	3.959	4.059	0.674	-
PERS38	Innovative knowledge is increased through communication between people who possess the relevant knowledge in our organisation	5.375	5.314	4.592	4.500	3.426	P>D** A>D***
PERS39	Our organisation utilises exit interviews so that their knowledge and experience could be transmitted to other staff members	4.032	4.657	2.979	4.167	5.417	P>D*** A>D*
ORIENT40	Information accuracy is essential to our organisation even though it may take some time to capture	5.313	5.943	4.898	5.556	4.178	A>D*
ORIENT41	Our organisation's knowledge management is updated continuously	5.000	5.286	4.388	4.778	2.948	A>D*
ORIENT 42	Our organisation is well known for the creation and acquiring of new knowledge assets	4.594	4.714	4.000	4.056	2.009	-
ORIENT43	Our organisations creation of new knowledge assets are in line with the business operations of the organisation or by selling them to other organisations	4.194	3.800	3.447	2.889	2.282	P>R**

Variable code	Knowledge Orientation Measure	Prospector	Analyser	Defender	Reactor	F-Value	Bonferroni multiple paired comparisons
ORIENT44	The derivation of new knowledge which directly effects our line of business is rather difficult to tap at times, thus hindering to carry out our operations in the most effective manner	3.935	3.800	3.667	4.500	1.486	-
ORIENT45	Our organisation's knowledge management systems are geared on external issues	3.968	3.829	3.787	4.056	0.229	-
COD46	Documentation access is feasible throughout our organisation through its' information systems	5.156	5.531	4.429	4.667	4.124	A>D*
ORIENT47	Knowledge management takes place mostly horizontally in our organisation	4.419	4.636	4.229	3.889	1.187	-
COD48	The prime objective of our organisation's management is the capturing and reuse of our knowledge through the electronic medium	3.433	3.647	3.449	3.889	0.466	-
PERS49	Networks with experts functioning along the same business lines of our organisation is given attention by our organisation's management	4.563	4.057	3.667	3.833	2.050	P>D**
ORIENT50	Our organisation has standard operating procedures to work with and management discourages staff from work procedures deviations	4.969	4.714	4.660	4.111	0.859	-
PERS51	Our organisation's project teams operate along a horizontal level in the organisation	4.313	4.515	4.000	3.722	1.574	-

Variable code	Knowledge Orientation Measure	Prospector	Analyser	Defender	Reactor	F-Value	Bonferroni multiple paired comparisons
PERS52	The type of culture instilled within our organisation is to respond immediately to any knowledge requests from staff members within the organisation	5.188	4.941	4.458	4.056	2.946	P>R**
ORIENT53	Our organisation has its overall objectives and knowledge management practices aligned so that operations are performed effectively	5.219	5.371	4.694	4.278	3.367	P>R*** A>R*
ORIENT54	Our organisation has a centralised knowledge management structure and a top-down approach	4.645	4.457	4.816	5.167	0.957	-
ORIENT55	Knowledge information related to difficulties encountered, failures registered or possible mistakes that might arise are disseminated in a constructive manner without prejudice in our organisation	5.094	4.686	4.188	3.944	3.752	P>R* P>D*
ORIENT56	Knowledge creation regarding operations in our organisation are reflected upon and disseminated to other members of staff	4.938	4.912	4.245	4.056	3.790	P>D** A>D** P>R*** A>R***
ORIENT57	There is a vertical flow of knowledge management from subordinate level to management level and vice-versa	5.097	4.971	4.449	4.167	2.534	-
ORIENT58	The focus on knowledge management systems are on internal aspects of our organisation	4.710	4.571	4.667	4.500	0.127	-
ORIENT59	Our organisation devotes more time on research and development than our competitors	4.581	4.029	3.085	3.778	6.412	P>D* A>D*

***p<0.05; **p<0.1; ***p<0.15. Variable codes highlighted in bold and underlined were also tested using the Dunnet C test and were found significant at p<0.05, p<0.1, p<0.15.**
Source: Author's derived data from the statistical package

Table 4.19: Detailed descriptive statistics of knowledge strategic orientation with organisational strategic type variance

4.8 Testing the research hypotheses

The hypotheses proposed in chapter 2 are tested using the data retrieved from the survey that was conducted for Maltese medium to large-sized public and private organisations. Detailed interpretation will be provided in the next chapter. Each hypothesis presented hereafter will also entice a null hypothesis, which will not be written down formally but nonetheless tested. The use of the null hypothesis (H_0) principle will be used to verify any significant difference between the variables identified in this research that is including reactor and analyser-types besides the prospector and defender-types. The Bonferroni post-hoc test will also be used to confirm or reject the null or alternative hypotheses. For example:

H_0: Organisations adopting a prospector-type knowledge strategy are not linked to personalisation strategies and neither to codification strategies resulting in a mean value of zero.

H_1: Organisations adopting a prospector-type knowledge strategy are linked to personalisation strategies to a greater significance than codification strategies.

The variable mean for personalisation and codification strategies for the prospector-type strategy is equal to 0.3744 ($p<0.05$). The confidence interval is $0.1585 < \bar{u} < 0.5904$. As zero lies outside the interval and with the mean being non-zero, therefore this suggests that the null hypothesis is rejected with the alternative of H_1 being accepted. Table 4.20 shows how survey results will be classified during the research analysis.

Range	*Description*
1.0< ū <3.0	***Low***
3.0< ū <5.0	***Medium***
5.0< ū <7.0	***High***

Table 4.20: Description of survey results for the variables analysed

4.9 Knowledge strategy, strategic alignment, strategic fit and performance

As regards knowledge strategy, the following pair of hypotheses will be analysed. The difference between the personalisation and codification strategy scores will be tested for the prospector-type organisations. Table 4.21 shows the statistical results achieved for H_1 and H_2 hypotheses.

Hypotheses	Mean difference	95% confidence interval
H_1: Maltese medium to large-sized organisations adopting a prospector-type knowledge strategy are linked to personalisation knowledge strategies to a greater significance than codification-type knowledge strategies.	0.3744	0.1585< ū < 0.5904
H_2: Maltese medium to large-sized organisations adopting a defender-type knowledge strategy are linked to codification-type knowledge strategies to a greater significance than personalisation-type knowledge strategies.	0.1859	-0.1790< ū < 0.3897

Source: Author's derived data from statistical package. (See appendix 13 for results).

Table 4.21: Detailed descriptive statistics for knowledge strategy

The interval obtained for the H_1 hypothesis does not contain the zero value and the mean is positive, therefore the null hypothesis is rejected and the alternative of H_1 hypothesis is supported. For defender-type strategy, the confidence interval is -0.1790 < ū < 0.3897. The mean value is 0.1859. The data suggest, therefore, that organisations adopting a prospector-type knowledge strategy are indeed more

significantly linked to personalisation knowledge strategies than are codification-type knowledge strategies. The interval obtained for the H_2 hypothesis contains the zero-value, therefore this suggests that the null hypothesis is supported and the alternative of H_2 hypothesis is rejected.

As regards the strategic alignment component, that is the alignment between strategy-type and strategic knowledge orientation, the following three hypotheses will be analysed. Table 4.22 shows the statistical results achieved for the hypotheses H_3, H_4 and H_5.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_3: Maltese medium to large-sized defender-type organisations are significantly in a better position to align knowledge that they create with their main operations than prospector-type organisations. ORIENT43	4.194	3.447	2.282	p<0.1
H_4: The overall organisational objectives in Maltese medium to large-sized organisations are linked with knowledge management practices to the same degree in both defender-type and prospector-type organisations. ORIENT53	5.219	4.694	2.618	p<0.05 p<0.15
H_5: Maltese medium to large-sized prospector-type organisations show a greater awareness of systems knowledge needs of the organisation than defender-type organisations. ORIENT23	5.000	4.064	2.913	p<0.1

Source: Author's derived data from the statistical package

Table 4.22: Detailed descriptive statistics for strategic alignment

The result obtained for the F-value for the H_3 hypothesis is significant (P>R at p<0.1) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for a prospector-type is greater than a reactor-type of organisation

(application of Bonferroni test, $p<0.1$). This suggests that the H_3 alternative hypothesis should be accepted.

The result obtained for the F-value for the H_4 hypothesis is significant (A>R at $p<0.05$; P>R at $p<0.15$) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for a prospector-type is greater than a reactor-type of organisation (application of Bonferroni test, $p<0.15$) and the mean for an analyser-type is greater than a reactor-type of organisation (application of Bonferroni test, $p<0.05$). This suggests that the H_4 alternative hypothesis should be accepted.

The result obtained for the F-value for the H_5 hypothesis is significant (P>D at $p<0.1$) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for a prospector-type is greater than a defender-type of organisation (application of Bonferroni test, $p<0.1$). This suggests that the H_5 hypothesis should be accepted. As regards the strategic fit[28] component, the following two hypotheses were analysed. Table 4.23 shows the statistical results achieved for the hypotheses H_6 and H_7.

Hypotheses	t-test	p-value
H_6: Maltese medium to large sized prospector-type organisations adopting personalisation-type knowledge strategies out-perform those adopting codification-type strategies.	0.101	0.0005
H_7: Maltese medium to large sized defender-type organisations adopting codification-type knowledge strategies out-perform those adopting personalisation-type strategies.	0.261	0.0005

Source: Author's derived data from the statistical package

Table 4.23: Detailed descriptive statistics for strategic fit

[28] The alignment of an organisation with its marketplace means the sustaining of the organisation's strategic fit.

The t-test results conducted earlier (p. 189) show that for H_6 and H_7, the null hypotheses are not rejected. Therefore this suggests that the H_6 and H_7 alternative hypotheses should be rejected.

As regards the link towards performance of Maltese medium to large-sized organisations, the one-way ANOVA test on performance was conducted on the identified strategic-types (table 4.13), which resulted in an F-value of 3.427 at a significance level of $p<0.1$ and $p<0.15$. Table 4.24 shows the statistical results achieved for the hypotheses H_8 and H_9.

Hypotheses	Mean	95% confidence interval
H_8: Maltese medium to large sized defender-type, prospector-type and analyser-type organisations perform on an equal basis.	Prospector = 4.0404 Analyser = 4.0476 Defender = 3.7200	$3.8341< \bar{u} <4.2467$ $3.8549< \bar{u} <4.2403$ $3.5629< \bar{u} <3.8771$
H_9: Maltese medium to large sized reactor-type organisations perform poorly compared with Maltese medium to large sized defender, prospector and analyser-type organisations.	Reactor = 3.7037	$3.3102< \bar{u} <4.0972$

Source: Author's derived data from the statistical package. See Appendix 12 and table 4.13.

Table 4.24: Detailed descriptive statistics for performance

The null or H_8 hypothesis is rejected as the mean of prospector and analyser-type is greater than defender-type organisations at a significance level of $p<0.05$. The reactor mean has a value of 3.7037 with a 95 per cent confidence interval of $3.3102 < \bar{u} < 4.0972$. The mean performance of prospector, analyser and defender-type is 4.0404, 4.0476 and 3.7200 respectively, which falls within the confidence interval. Therefore the null hypothesis of equal means is not rejected. This suggests that the H_9 alternative hypothesis should be rejected. That is, reactor-type medium to large-sized organisations do not seem to perform any more poorly than other types of medium to large-sized organisations.

4.10 Maltese public and private organisational structure

As regards organisational structure, the following hypotheses will be analysed. Table 4.25 shows the statistical results achieved for the hypotheses H_{10}, H_{11} and H_{12}.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{10}: In Maltese medium to large-sized prospector-type organisations, knowledge information flows in a horizontal feedback short-loop[29] at all levels is much greater than in the defender-type of organisations. ORIENT 47	4.419	4.229	1.187	-
H_{11}: In Maltese medium to large-sized prospector-type organisations, project teams operate horizontally to a far greater degree than in defender-type of organisations. PERS 51	4.313	4.000	1.574	-
H_{12}: In Maltese medium to large-sized defender-type organisations, knowledge information flows in a vertical path from top to bottom hierarchical approach and from bottom to top are much more significant than in a prospector-type of organisation. ORIENT 57	5.097	4.449	2.534	-

Source: Author's derived data from the statistical package

Table 4.25: Detailed descriptive statistics for organisational structure

The results obtained for the F-value is 1.187 for the H_{10} hypothesis, the F-value is 1.574 for the H_{11} hypothesis and the F-value is 2.534 for the H_{12} hypothesis. These are not significant at $p<0.05$, $p<0.1$ or $p<0.15$ and therefore do not reject the null hypothesis of equal means. Therefore this suggests that the H_{10}, H_{11} and H_{12} alternative hypotheses should be rejected.

As regards organisational co-ordination, the following hypotheses will be analysed. Table 4.26 shows the statistical results achieved for the hypotheses H_{13}, and H_{14}.

[29] Prospector-type organisations permits a considerable amount of self-control to control their own performance indulge, investigate and report appropriately on product development and timely market analysis, which instigates short horizontal feedback loops (Miles & Snow 1978).

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{13}: In Maltese medium to large-sized defender-type organisation, knowledge management co-ordination takes place centrally from the top management level of the organisation to a greater extent, than the prospector-type of organisation. ORIENT 54	4.645	4.816	0.957	-
H_{14}: In Maltese medium to large-sized defender-type organisations, operations occur according to established sets of procedures to a greater extent than in the prospector-type of organisations. ORIENT 50	4.969	4.660	0.859	-

Source: Author's derived data from the statistical package

Table 4.26: Detailed descriptive statistics for organisational co-ordination

The results obtained for the F-values for the H_{13}, and H_{14} hypotheses are not significant ($p<0.05$; $p<0.1$ or $p<0.15$) and therefore do not reject the null hypothesis of equal means. This suggests that the H_{13} and H_{14} alternative hypotheses should be rejected.

As regards organisational performance measurement, the following hypothesis will be analysed. Table 4.27 shows the statistical results achieved for the hypothesis H_{15}.

Hypothesis	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{15}: In Maltese medium to large-sized defender-type organisations, information systems provide performance measures significantly greater than the prospector-type of organisations. ORIENT 27	4.824	3.347	5.970	$p<0.05$

Source: Author's derived data from the statistical package

Table 4.27: Detailed descriptive statistics for performance measurement

The result obtained for the F-value for the H_{15} hypothesis is significant (P>D; A>D at $p<0.05$) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for a prospector-type of organisation is greater than a defender-

type of organisation, and the mean for an analyser-type is greater than the defender-type (application of Bonferroni test, $p<0.05$). This suggests that the H_{15} alternative hypothesis should be accepted.

As regards whether Maltese organisations adopt organisational internal and external focus, the following hypotheses will be analysed. Table 4.28 shows the statistical results achieved for the hypotheses H_{16} and H_{17}.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{16}: In Maltese medium to large-sized prospector-type organisations, knowledge management systems are focussed externally to a significantly greater extent than are the defender-type of organisations. ORIENT 45	3.968	3.787	0.229	-
H_{17}: In Maltese medium to large-sized defender-type organisations, knowledge management systems are focussed internally to a significantly greater extent than the prospector-type of organisations. ORIENT 58	4.710	4.667	0.127	-

Source: Author's derived data from the statistical package

Table 4.28: Detailed descriptive statistics for organisational internal and external focus

The results obtained for the F-values for the H_{16} and H_{17} hypotheses are not significant ($p<0.05$; $p<0.1$ or $p<0.15$) and therefore the null hypotheses of equal means is not rejected. This suggests that the H_{16} and H_{17} alternative hypotheses should be rejected.

4.11 The human resources aspect in Maltese medium to large-sized public and private organisations

As regards the human resources aspect, the following hypothesis will be analysed. Table 4.29 shows the statistical results achieved for H_{18} hypothesis.

Hypothesis	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{18}: In Maltese medium to large-sized prospector-type organisations, recruited employees are significantly better problem solvers than those recruited by the defender-type of organisations. PERS 20	4.324	4.021	0.307	-

Source: Author's derived data from the statistical package

Table 4.29: Detailed descriptive statistics for the human resources aspect

The result obtained for the F-value for the H_{18} hypothesis is not significant at $p<0.05$; $p<0.1$ or $p<0.15$ and therefore does not reject the null hypothesis of equal means. This suggests that the H_{18} alternative hypothesis should be rejected.

As regards the rewards mechanism involved in Maltese medium to large-sized sector organisations, the following hypotheses will be analysed. Table 4.30 shows the statistical results achieved for H_{19} and H_{20} hypotheses.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{19}: In Maltese medium to large-sized prospector-type organisations, knowledge sharing is encouraged by reward mechanisms to a significantly greater extent than in defender-type of organisations. PERS 21	3.636	2.918	1.476	-
H_{20}: In Maltese medium to large-sized defender-type organisations, knowledge sharing is encouraged by the utility of the organisation's databases to a significantly greater extent than in prospector-type of organisations. COD36	3.467	2.939	2.230	$p<0.1$

Source: Author's derived data from the statistical package

Table 4.30: Detailed descriptive statistics for reward mechanisms

The result obtained for the F-value for the H_{19} hypothesis is not significant ($p<0.05$; $p<0.1$ or $p<0.15$) and therefore the null hypothesis of equal means is not rejected. This suggests that the H_{19} alternative hypothesis should be rejected.

The result obtained for the F-value for the H_{20} hypothesis is significant (R>D at $p<0.1$) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for a reactor-type of organisation is greater than a defender-type of organisation, (application of Bonferroni test, $p<0.1$). This suggests that the H_{20} alternative hypothesis should be accepted.

As regards the training aspect involved in Maltese medium to large-sized public and private sector organisations, the following hypotheses will be analysed. Table 4.31 shows the statistical results achieved for the H_{21} and H_{22} hypotheses.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{21}: In Maltese medium to large-sized defender-type organisations, training relies on documentation to a significantly greater extent than in prospector-type of organisations. COD 18	3.727	4.122	0.560	-
H_{22}: In Maltese medium to large-sized prospector-type organisations, training which relies on informal knowledge transfer occurs through appropriate mentoring to a significantly greater extent than in defender-type of organisations. PERS 19	5.091	4.571	2.294	$p<0.15$

Source: Author's derived data from the statistical package

Table 4.31: Detailed descriptive statistics for the training aspect in Maltese organisations

The results obtained for the F-value for the H_{21} hypothesis is not significant ($p<0.05$; $p<0.1$ or $p<0.15$) and therefore the null hypothesis of equal means is not rejected. This suggests that the H_{21} alternative hypothesis should be rejected.

The result obtained for the F-value for the H_{22} hypothesis is significant (A>D at $p<0.15$) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for an analyser-type of organisation is greater than a defender-type of organisation, (application of Bonferroni test, $p<0.15$). This suggests that the H_{22} alternative hypothesis should be accepted.

As regards the termination aspect involved in Maltese medium to large-sized public and private sector organisations, the following hypothesis will be analysed. Table 4.32 shows the statistical results achieved for the hypothesis H_{23}.

Hypothesis	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{23}: In Maltese medium to large-sized prospector-type organisations, knowledge transfer prior to job movement or termination is given greater importance than in defender-type of organisations. PERS 39	4.032	2.979	5.417	$p<0.05$ $p<0.15$

Source: Author's derived data from the statistical package

Table 4.32: Detailed descriptive statistics for the termination aspect in Maltese organisations

The result obtained for the F-value for the H_{23} hypothesis is significant (A>D at $p<0.05$; P>D at $p<0.15$) and therefore rejects the null hypothesis of equal means.

Table 4.19 shows that the mean for a prospector and analyser-type of organisation is greater than a defender-type of organisation (application of Bonferroni test, $p<0.05$; $p<0.15$). This suggests that the H_{23} alternative hypothesis should be accepted.

4.12 The management of knowledge in Maltese medium to large-sized organisations

As regards the management of knowledge in Maltese organisations, the following hypotheses will be analysed. Table 4.33 shows the statistical results achieved for H_{24}, H_{25} and H_{26} hypotheses.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{24}: In Maltese medium to large-sized defender-type organisations, client knowledge is significantly greater than in prospector-type of organisations. ORIENT 33	5.844	4.771	6.594	$p<0.05$ $p< 0.1$
H_{25}: In Maltese medium to large-sized prospector-type organisations, competitor knowledge is significantly greater than in defender-type of organisations. ORIENT 34	4.806	4.114	2.779	$p<0.05$
H_{26}: In Maltese medium to large-sized prospector-type organisations, industry knowledge is significantly greater than in defender-type of organisations. ORIENT 35	5.531	4.745	3.548	$p<0.05$

Source: Author's derived data from the statistical package

Table 4.33: Detailed descriptive statistics for the scanning of knowledge in Maltese organisations

The result obtained for the F-value for the H_{24}, H_{25} and H_{26} hypotheses are significant ($p<0.05$; $p<0.1$) and therefore reject the null hypothesis of equal means. Table 4.19 shows that the mean for a prospector and analyser-type of organisation is greater than a defender-type of organisation, and the mean of the reactor-type is greater than the defender-type for H_{24} hypothesis (application of Bonferroni test, $p<0.05$, $p<0.1$). This suggests that the H_{24} alternative hypothesis should be accepted.

The result obtained for the F-value for the H_{25} and H_{26} hypotheses are significant (A>D at $p<0.05$) and therefore reject the null hypothesis of equal means. Table 4.19 shows that the mean for an analyser-type of organisation is greater than a defender-type of organisation (application of Bonferroni test, $p<0.05$). This suggests that the H_{25} and H_{26} alternative hypotheses should be accepted.

As regards the capturing of knowledge in Maltese medium to large-sized public and private sector organisations, the following hypotheses will be analysed. Table 4.34 shows the statistical results achieved for H_{27} to H_{31} hypotheses.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{27}: In Maltese medium to large-sized defender-type organisations, information accuracy is significantly greater than in prospector-type of organisations. ORIENT 40	5.313	4.898	4.178	$p<0.05$
H_{28}: In Maltese medium to large-sized prospector-type organisations, continuously updated knowledge management is significantly greater than in defender-type of organisations. ORIENT 41	5.000	4.388	2.948	$p<0.05$
H_{29}: In Maltese medium to large-sized prospector-type organisations, the creation or acquisition of new knowledge is significantly greater than in defender-type of organisations. ORIENT 42	4.594	4.000	2.009	-
H_{30}: In Maltese medium to large-sized defender-type organisations, research and development is significantly greater than in prospector-type of organisations. ORIENT 59	4.581	3.085	6.412	$p<0.05$
H_{31}: In Maltese medium to large-sized defender-type organisations, knowledge transfer between staff and the electronic depositing of this information is significantly greater than in prospector-type of organisations. COD 48	3.433	3.449	0.466	-

Source: Author's derived data from the statistical package

Table 4.34: Detailed descriptive statistics for the capture of knowledge in Maltese organisations

The results obtained for the F-values for the H_{27}, H_{28} and H_{30} hypotheses are significant ($p<0.05$) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for the analyser-type of organisation is greater than a defender-type of organisation for H_{27} and H_{28} hypotheses, (application of Bonferroni test, $p<0.05$). This suggests that the H_{27} and H_{28} alternative hypotheses should be accepted. Table 4.19 shows that the mean for the prospector and analyser-type of organisation is greater than a defender-type of organisation for H_{30} hypothesis, (application of Bonferroni test, $p<0.05$). This suggests that the H_{30} alternative hypothesis should be accepted.

The results obtained for the F-values for the H_{29} and H_{31} hypotheses are not significant ($p<0.05$; $p<0.1$ or $p<0.15$) and therefore the null hypothesis of equal means is not rejected. This suggests that the H_{29} and H_{31} alternative hypotheses should be rejected.

As regards the storing of knowledge in Maltese medium to large-sized public and private sector organisations, the following hypotheses will be analysed. Table 4.35 shows the statistical results achieved for H_{32} to H_{34} hypotheses.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{32}: In Maltese medium to large-sized prospector-type organisations, tacit knowledge possessed by employees is significantly greater than in defender-type of organisations. PERS 30	5.182	5.388	0.431	-
H_{33}: In Maltese medium to large-sized prospector-type organisations, knowledge on available expertise is more readily available than in defender-type of organisations. PERS 37	4.267	3.959	0.674	-
H_{34}: In Maltese medium to large-sized prospector-type organisations, expertise networking is significantly more important than in defender-type of organisations. PERS 49	4.563	3.667	2.050	$p<0.1$

Source: Author's derived data from the statistical package

Table 4.35: Detailed descriptive statistics for the storage of knowledge in Maltese organisations

The result obtained for the F-value for the H_{34} hypothesis is significant (P>D at $p<0.1$) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for the prospector-type of organisation is greater than a defender-type of organisation for the H_{34} hypothesis (application of Bonferroni test; $p<0.01$). This suggests that the H_{34} hypothesis should be accepted.

The results obtained for the F-values for the H_{32} and H_{33} hypotheses are not significant ($p<0.05$; $p<0.1$ or $p<0.15$) and therefore the null hypothesis of equal means is not rejected. This suggests that the H_{32} and H_{33} alternative hypotheses should be rejected.

As regards the retrieval of knowledge in Maltese medium to large-sized public and private sector organisations, the following hypotheses will be analysed. Table 4.36 shows the statistical results achieved for H_{35} to H_{37} hypotheses.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{35}: In Maltese medium to large-sized defender-type organisations, knowledge information access through information systems is significantly greater than in prospector-type of organisations. COD 46	5.156	4.429	4.124	$p<0.05$
H_{36}: In Maltese medium to large-sized defender-type organisations, knowledge information can be accessed without having to refer to the person who created it, which is significantly greater than in prospector-type of organisations. COD 28	3.419	3.122	0.215	-
H_{37}: In Maltese medium to large-sized defender-type organisations, knowledge seeking and information retrieval from electronic databases in order to sustain job effectiveness is significantly more accessible than in prospector-type of organisations. COD 29	4.030	3.796	0.301	-

Source: Author's derived data from the statistical package

Table 4.36: Detailed descriptive statistics for the retrieval of knowledge in Maltese organisations

The result obtained for the F-value for the H_{35} hypothesis is significant (A>D at $p<0.05$) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for an analyser-type of organisation is greater than a defender-type of

organisation for H_{35} hypothesis (application of Bonferroni test, $p<0.05$). This suggests that the H_{35} alternative hypotheses should be accepted.

The results obtained for the F-values for the H_{36} and H_{37} hypotheses are not significant ($p<0.05$; $p<0.1$ or $p<0.15$) and therefore the null hypotheses of equal means are not rejected. This suggests that the H_{36} and H_{37} alternative hypotheses should be rejected.

As regards to appropriate knowledge seeking in Maltese organisations, the following hypotheses will be analysed. Table 4.37 shows the statistical results achieved for H_{38} and H_{39} hypotheses.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{38}: In Maltese medium to large-sized prospector-type organisations, there is more likely to be a lack of up-to-date work-related knowledge than in defender-type organisations. ORIENT 44	3.935	3.667	1.486	-
H_{39}: In Maltese medium to large-sized prospector-type organisations, knowledge retrieval on a one-to-one basis from employees is significantly greater than in defender-type of organisations. PERS 31	5.258	5.082	0.833	-
H_{40}: In Maltese medium to large-sized prospector-type organisations, project reflection time and employee sharing of experiences is significantly greater than in defender-type of organisations. ORIENT 56	4.938	4.245	3.790	$p<0.1$ $p<0.15$
H_{41}: In Maltese medium to large-sized prospector-type organisations, learning from past mistakes and knowledge sharing with others is significantly greater than in defender-type of organisations. ORIENT 55	5.094	4.188	3.752	$p<0.1$
H_{42}: In Maltese medium to large-sized prospector-type organisations, communication between staff for information requests is by far greater than in defender-type organisations. PERS 52	5.188	4.458	2.946	$p<0.1$
H_{43}: In Maltese medium to large-sized prospector-type organisations, the creation of networks that take place due to staff movements is by far greater than in defender-type organisations. PERS 22	3.485	3.063	0.353	-

Source: Author's derived data from the statistical package

Table 4.37: Detailed descriptive statistics for the transfer and sharing of knowledge in Maltese organisations

The results obtained for the F-values for the H_{40}, H_{41} and H_{42} hypotheses are significant ($p<0.1$, $p<0.15$) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for a prospector-type of organisation is greater than a defender and reactor-type and the mean for an analyser-type is greater than the reactor and defender-type for the H_{40} hypothesis, (application of Bonferroni test, $p<0.1$, $p<0.15$ respectively). This suggests that the H_{40} alternative hypothesis should be accepted.

Table 4.19 shows that the mean for a prospector-type of organisation is greater than a reactor-type and the defender-type for the H_{41} hypothesis, (application of Bonferroni test, $p<0.1$). This suggests that the H_{41} alternative hypothesis should be accepted.

Table 4.19 shows that the mean for a prospector-type of organisation is greater than a reactor-type for the H_{42} hypothesis, (application of Bonferroni test, $p<0.1$). This suggests that the H_{42} alternative hypothesis should be accepted.

The results obtained for the F-values for the $H_{38,}$ H_{39} and H_{43} hypotheses are not significant ($p<0.05$; $p<0.1$ or $p<0.15$) and therefore the null hypothesis of equal means is not rejected. This suggests that the $H_{38,}$ H_{39} and H_{43} alternative hypotheses should be rejected.

As regards the application of knowledge in Maltese medium to large-sized public and private sector organisations, the following hypotheses will be analysed. Table 4.38 shows the statistical results achieved for H_{44} and H_{45} hypotheses.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{44}: In Maltese medium to large-sized defender-type organisations, the reuse of knowledge in the organisation's products or services is significantly greater than in prospector-type organisations. COD 32	4.906	4.500	0.988	-
H_{45}: In Maltese medium to large-sized prospector-type organisations, employees with the appropriate knowledge instigate innovation significantly greater than in defender-type of organisations. PERS 38	5.375	4.592	3.426	p<0.1 p<0.15

Source: Author's derived data from the statistical package

Table 4.38: Detailed descriptive statistics for the application of knowledge in Maltese organisations

The result obtained for the F-value for the H_{44} hypothesis is not significant ($p<0.05$; $p<0.1$ or $p<0.15$) and therefore the null hypothesis of equal means is not rejected. This suggests that the H_{44} alternative hypothesis should be rejected.

The result obtained for the F-value for the H_{45} hypothesis is significant (P>D at $p<0.1$, A>D at $p<0.15$) and therefore rejects the null hypothesis of equal means. Table 4.19 shows that the mean for a prospector and analyser-type of organisation is greater than a defender-type, (application of Bonferroni test, $p<0.1$ and $p<0.15$). This suggests that the H_{45} alternative hypothesis should be accepted.

As regards the application of information technologies in Maltese medium to large-sized organisations, the following hypotheses will be analysed. Table 4.39 shows the statistical results achieved for H_{46} to H_{48} hypotheses.

Hypotheses	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{46}: In Maltese medium to large-sized defender-type organisations, information dissemination and use of information technology in accessing knowledge is significantly greater than in prospector-type organisations. COD 24	5.618	4.896	3.649	p<0.05 p<0.1
H_{47}: In Maltese medium to large-sized prospector-type organisations, employee contact and the utility of information technology is significantly greater than in defender-type organisations. PER 25	5.471	4.383	3.592	p<0.05
H_{48}: In Maltese medium to large-sized prospector-type organisations, the utility of cutting-edge information and information technology is significantly greater than in defender-type organisations. ORIENT 26	5.636	4.959	1.815	-

Source: Author's derived data from the statistical package

Table 4.39: Detailed descriptive statistics for the application of information technologies in Maltese organisations

The results obtained for the F-values for the H_{46} and H_{47} hypotheses are significant ($p<0.05$; $p<0.1$) and therefore reject the null hypothesis of equal means. Table 4.19 shows that the mean for an analyser and reactor-types of organisation is greater than a defender-type of organisation, for the H_{46} hypothesis and that the mean for prospector-type is greater than for defender-type for the H_{47} hypothesis. This suggests that the H_{46} alternative hypothesis and H_{47} hypothesis should be accepted.

The result obtained for the F-value for the H_{48} hypothesis is not significant ($p<0.05$; $p<0.1$ or $p<0.15$) and therefore the null hypothesis of equal means is not rejected. This suggests that the H_{48} alternative hypothesis should be rejected.

4.13 The environmental turbulence registered in Maltese medium to large-sized organisations

As regards the environmental turbulence in Maltese medium to large-sized public and private sector organisations, the following hypotheses will be analysed in relation to prospector and defender-type organisations. Table 4.40 shows the statistical results achieved for the H_{49} hypothesis by the application of one-way ANOVA technique (appendix 19).

Hypothesis	Mean prospector scores	Mean defender scores	F-value	Significance level
H_{49}: In Maltese medium to large-sized prospector-type organisations, the susceptibility to environmental turbulence is significantly greater than in defender-type organisations.	2.743	3.367	4.96	$p<0.05$

Source: Author's derived data from the statistical package

Table 4.40: Detailed descriptive statistics for environmental turbulence in Maltese organisations

The result obtained for the F-value for the H_{49} hypothesis is significant (D>P; D>R; $p<0.05$). The Bonferroni-test (mean difference) comparing prospector and defender-type organisations is -6.245 and comparing defender to reactor-type is 0.923 ($p<0.05$). Therefore the null hypothesis of equal means is rejected. This suggests that the H_{49} alternative hypothesis should be accepted. The findings suggest, therefore that defender-type organisations are indeed more susceptible to environmental turbulence than are prospector-type organisations.

4.14 Strategic knowledge orientation in Maltese organisations

The purpose of this section is to determine the significant knowledge orientation factors for Maltese medium to large-sized organisations through appropriate statistical techniques. An inspection of the Kaiser's criterion and the Catell's scree plot determined which significant components to retain from the knowledge orientation variables identified for further investigation, which was supplemented by using the Varimax rotation, to ease the interpretation of factors (appendix 20).

The principal component analysis (PCA) attempts to produce 'a smaller number of linear combinations of the original variables, in a way that captures (or accounts for) most of the variability in the patterns of correlations' (Pallant 2001: 151). Principal component analysis (PCA) was chosen over factor analysis[30] (FA) as the former is psychometrically sound, simpler and avoids '*factor analysis indeterminacy'*, besides providing an empirical summary of the data set (Stevens 1996; Tabachnick & Fidell 1996). Besides the 142 questionnaires received, led towards the adoption of PCA rather than FA as the latter suggests a sample of at least 150 (Tabachnick & Fidell 1996). The Bartlett's test of sphericity which supports factorability of the correlation matrix with the variables identified for strategic knowledge orientation (Bartlett 1954 in Pallant 2001) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were used (Kaiser 1970 in Pallant 1996). Bartlett's test of sphericity is to be significant at $p<0.05$ and the KMO value of 0.6 is the minimum value considered (Pallant 2001).

[30] The objective of a factor analysis is to explore and screen a large set of variables and presenting the data in an alternative manner with a smaller set of factors (Pallant 2001). This is achieved by grouping amongst the inter-correlations of the knowledge orientation factors.

Appendix 21 shows the significant correlation coefficients between a number of the knowledge orientation dimensions and overall performance by strategic-type. Three of the dimensions in appendix 21 are common to two of the strategic-types for Maltese organisations:

- Innovative knowledge is increased through communication between people (Analyser-Reactor).
- Knowledge management is updated continuously (Prospector-Analyser).
- More time on research and development than competitors (Defender-Reactor).

In deciding which factors are to be retained involves the Kaiser's criterion calculation and the Catell scree test. If the eigenvalue[31] derived from Kaiser's criterion is 1.0 or greater, this is retained for further investigation. In Catell's scree test, eigenvalues plots found to change towards a horizontal direction are retained. Once the factors were identified, these were 'rotated'. Both orthogonal (Varimax method) and oblique (Direct Oblimin) rotations were made so that the most clear of interpretations will be presented. Following these tests, a PCA was conducted on the knowledge orientation variables. The Component Matrix table (appendix 22) yielded a considerable number of correlation coefficients of 0.3 or greater. The KMO value is 0.807, which is above the recommended value of 0.6. The *Bartlett's Test of Sphericity* value is also found to be significant (p=0.000), and therefore PCA is appropriate (appendix 23). In the *Total Variance Explained* the first 12 components recorded were retained as eigenvalues are greater than 1, which tally to 70.74% of the variance (table 4.41).

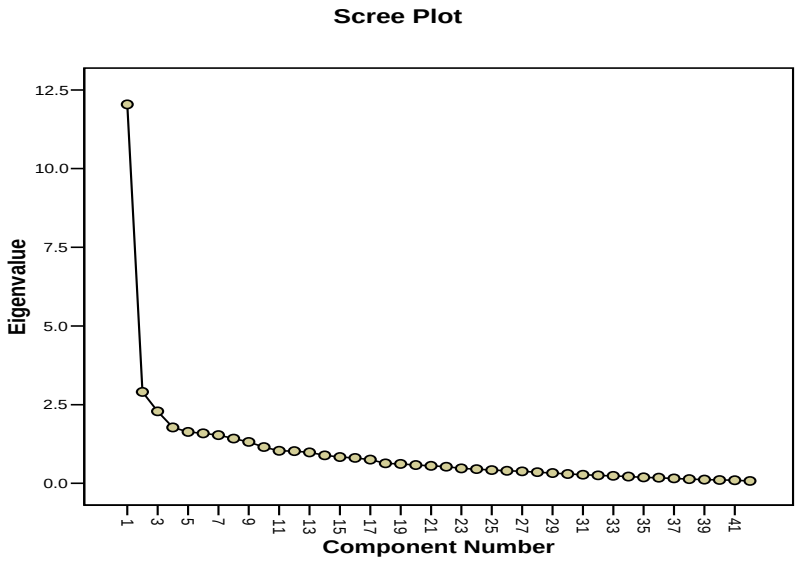
[31] This represents the amount of total variance explained by that factor (Pallant 2001).

Comp.	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.041	28.670	28.670	12.041	28.670	28.670
2	2.905	6.917	35.587	2.905	6.917	35.587
3	2.287	5.445	41.032	2.287	5.445	41.032
4	1.775	4.225	45.257	1.775	4.225	45.257
5	1.634	3.891	49.149	1.634	3.891	49.149
6	1.588	3.781	52.930	1.588	3.781	52.930
7	1.531	3.646	56.576	1.531	3.646	56.576
8	1.423	3.388	59.964	1.423	3.388	59.964
9	1.315	3.131	63.095	1.315	3.131	63.095
10	1.152	2.742	65.836	1.152	2.742	65.836
11	1.034	2.462	68.298	1.034	2.462	68.298
12	1.024	2.438	70.736	1.024	2.438	70.736
13	.982	2.339	73.075			
14	.888	2.114	75.189			
15	.833	1.984	77.173			
16	.807	1.920	79.093			
17	.754	1.796	80.889			
18	.632	1.505	82.393			
19	.617	1.469	83.862			
20	.579	1.379	85.241			
21	.556	1.324	86.565			
22	.527	1.255	87.820			
23	.474	1.129	88.949			
24	.451	1.073	90.022			
25	.420	1.001	91.022			
26	.396	.944	91.966			
27	.381	.906	92.872			
28	.353	.842	93.714			
29	.327	.779	94.493			
30	.296	.705	95.198			
31	.272	.648	95.847			
32	.251	.598	96.445			
33	.236	.561	97.007			
34	.215	.511	97.517			
35	.188	.448	97.966			
36	.176	.419	98.385			
37	.154	.367	98.752			
38	.133	.316	99.068			
39	.118	.281	99.349			
40	.104	.248	99.597			
41	.095	.227	99.824			
42	.074	.176	100.000			

Source: Author's derived data from the statistical package Extraction Method: Principal Component Analysis.

Table 4.41: Total Variances Explained Table for knowledge orientation variables

Figure 4.11 shows Catell's screeplot diagram, which shows a break-point in the ninth and tenth components.



Source: Author's derived data from the statistical package

Figure 4.11: Screeplot for knowledge orientation variables

Table 4.42 shows the *Component Matrix* with loadings on the 12 components with eigenvalues greater than 1.

Component Matrix(a)												
	Component											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
ORIENT41	0.8109											
ORIENT42	0.7560											
ORIENT53	0.7236											
ORIENT35	0.7097			-0.3463								
ORIENT23	0.7033				-0.3442							
ORIENT56	0.7028	-0.3949										
PERS38	0.6854											
PERS37	0.6793											
ORIENT55	0.6310	-0.3838										
PERS52	0.6284											
ORIENT33	0.6133											
ORIENT26	0.6076			-0.3516								
ORIENT57	0.6055	-0.3380								-0.3301		
COD36	0.5922	0.5312										
ORIENT27	0.5881											
PERS49	0.5849											

PERS21	0.5816	0.5018										
PERS25	0.5790		0.3206			-0.3822						
COD46	0.5717		0.3086									
PERS19	0.5546								-0.4047			
PERS39	0.5394										0.3162	-0.3565
PERS22	0.5342	0.3980			-0.3142							
PERS51	0.5280			0.3602								
ORIENT40	0.5276										0.3104	
ORIENT58	0.5113					0.4280		0.3198				
ORIENT34	0.5059		-0.3749	-0.3369								
COD48	0.4926	0.3767										
COD32	0.4920	-0.3033					0.3403				-0.3285	
ORIENT43	0.4531								0.3727			
ORIENT59	0.4526										-0.3538	-0.3224
ORIENT45	0.4395				0.3885							
PERS20	0.3695						0.3619				0.3246	
ORIENT50		-0.4024		0.3113	0.3593					0.3768		
COD29	0.3805		0.6903									
COD28		0.3266	0.6709									
ORIENT47	0.3893			0.3933								
ORIENT44					0.6956		0.3760					
COD24	0.4505					-0.5277						
PERS31		-0.4243					0.4694					
COD18								0.6289	0.3288			
ORIENT54						0.4172		0.4261				
PERS30		-0.3686	0.4590							0.6200		

Extraction Method: Principal Component Analysis a. 12 components extracted.

Source: Author's derived data from the statistical package

Table 4.42: Component Matrix for knowledge orientation variables

Most of the variables load on the first and second components. However there are other significant loadings such as components 3, 4 and 5. To aid in the interpretation of these components, the Varimax orthogonal rotation was used. Appendix 22 shows rotated matrices for five, six, and seven components respectively with their respective loadings. No solutions were retrieved for an eight component extraction. The five component solution provides 49.15% of the variance; the six component solution provides 52.93% of the variance, whereas the seven component solution provides 56.58% of the variance. Table 4.43 shows the

respective cumulative percentage distributions which is consistent with the previous analysis shown in table 4.42 and in appendix 22.

Total Variance Explained

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	6.833	16.270	16.270
2	5.522	13.149	29.418
3	3.573	8.508	37.927
4	3.043	7.244	45.171
5	1.671	3.978	49.149

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	5.967	14.208	14.208
2	4.888	11.637	25.845
3	3.930	9.358	35.203
4	3.383	8.054	43.257
5	2.321	5.526	48.782
6	1.742	4.148	52.930

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	5.637	13.420	13.420
2	4.247	10.112	23.533
3	4.218	10.042	33.575
4	3.286	7.823	41.397
5	2.372	5.648	47.045
6	2.288	5.448	52.493
7	1.715	4.083	56.576

Extraction Method: Principal Component Analysis.
Source: Author's derived data from the statistical package.

Table 4.43: *Total Variance Explained* following Varimax Rotation for components extraction

The results obtained were grouped and tested along five, six, and seven knowledge orientation factors that represent Maltese medium to large-sized public and private organisations. The Cronbach alpha test was performed on the identified orientation

factor components in order to observe the effect of reliability. The identified knowledge orientation variables are shown in table 4.44.

Knowledge Orientation Factor		Cronbach Reliability Factor
Knowledge Generation	**KOF1**	**0.885**
Internal Alignment	**KOF2**	**0.877**
Agility and Horizontal Knowledge Flow	**KOF3**	**0.759**
Information Systems/Information Technology	**KOF4**	**0.693**
External Intelligence	**KOF5**	**0.402**

Knowledge Orientation Factor		Cronbach Reliability Factor
Internal Alignment	**KOF1**	**0.868**
Personal Knowledge	**KOF2**	**0.840**
Knowledge Generation	**KOF3**	**0.836**
Agility and Horizontal Knowledge Flow	**KOF4**	**0.772**
Information Systems and Information Technology	**KOF5**	**0.689**
External Intelligence	**KOF6**	**0.402**

Knowledge Orientation Factor		Cronbach Reliability Factor
Internal Alignment	**KOF1**	**0.867**
Knowledge Generation	**KOF2**	**0.866**
Agility and Horizontal Knowledge Flow	**KOF3**	**0.801**
Formality and standardisation	**KOF4**	**0.792**
Personal Knowledge	**KOF5**	**0.578**
Information Systems and Information Technology	**KOF6**	**0.689**
External Intelligence	**KOF7**	**0.402**

Source: Author's derived data from the statistical package.

Table 4.44: Reliability analysis on identified knowledge orientation factors

Four of the knowledge orientation factors meet the recommended alpha value of 0.6 (Hair et al., 1992) for the five component extraction. Five of the knowledge orientation factors meet the recommended alpha value of 0.6 for six and seven component extractions. As regards Pavot's et al., (1991) recommended value of 0.7 (Pallant 2001), three of the knowledge orientation factors meet the recommended value for the five component extraction whereas four components are met for the six and seven component extraction. The seven component extraction was investigated further as this provided the greatest percentage in variance.

As regards to the knowledge orientation factor related to personal knowledge and external intelligence, the initial Cronbach alpha value was 0.578 and 0.402

respectively for the seven component extraction. This is common in short scales of less than ten items which usually register a Cronbach value in the region of 0.5. In such cases the corrected item total-correlation is used where an optimal range of 0.2 to 0.4 is recommended (Pallant 2001). The personal knowledge orientation component which comprised of three items registered an inter-item correlation of 0.396, which is recommendable. The external intelligence orientation component which comprised of two items registered an inter-item correlation of 0.252, which is also recommendable. These were retained in the proposed model. The model shown in table 4.45 will be discussed further in the following chapter.

Internal Alignment
Knowledge database contribution within an organisation is enhanced through the organisation's remuneration structure (COD36)
Knowledge sharing is enhanced directly by the organisational remuneration package system (PERS21)
Networks are fostered by the creation of secondments with other organisations through links developed by the HR department (PERS22)
The organisation is well known for the creation and acquiring of new knowledge assets (ORIENT42)
Both knowledge needs of an organisation and HR policies and systems are aligned (ORIENT23)
The organisation's database knowledge on experts related to our field is continuously updated (PERS37)
The organisation utilises exit interviews so that their knowledge and experience could be transmitted to other staff members (PERS39)
The organisation devotes more time on research and development than our competitors (ORIENT59)
Staff hired within an organisation are problem-solvers (PERS20)
Competitor knowledge is continuously updated within an organisation and is considered of utmost importance (ORIENT34)
Networks with experts functioning along the same business lines of an organisation is given attention by our organisation's management (PERS 49)

Knowledge generation
The IT Department (or subcontracted IT Department) utilises the latest technologies in knowledge exchange (ORIENT26)
Knowledge within an organisation is exchanged and contact developed through its own ICT technologies (PERS25)
Documentation access is feasible throughout the organisation through its' information systems (COD46)
The organisation utilises its own ICT technologies for documentation and storage of information (COD24)
The organisation's knowledge management is updated continuously (ORIENT41)

The prime objective of our organisation's management is the capturing and reuse of knowledge through the electronic medium (COD48)
Industry knowledge is continuously updated within the organisation and is considered of utmost importance (ORIENT35)
The organisation has a performance management system that is disseminated throughout the organisation with its information systems (ORIENT27)
Client knowledge is continuously updated within the organisation and is considered of utmost importance (ORIENT33)

Agility and horizontal knowledge flow
The type of culture instilled within an organisation is to respond immediately to any knowledge requests from staff members within the organisation (PERS52)
The organisation has its overall objectives and knowledge management practices aligned so that operations are performed effectively (ORIENT53)
The organisation has standard operating procedures to work with and management discourages staff from work procedures deviations (ORIENT50)
Knowledge management takes place mostly horizontally in an organisation (ORIENT47)
The organisation's project teams operate along a horizontal level in the organisation (PERS51)
Knowledge information related to difficulties encountered, failures registered or possible mistakes that might arise are disseminated in a constructive manner without prejudice in an organisation (ORIENT55)
The organisational training is based on the transfer of knowledge through appropriate mentoring (PERS19)
The organisation's creation of new knowledge assets are in line with the business operations of the organisation or by selling them to other organisations (ORIENT43)

Formality and standardisation
The focus on knowledge management systems are on internal aspects of an organisation (ORIENT58)
The organisation has a centralised knowledge management structure and a top-down approach (ORIENT54)
Knowledge creation regarding operations in an organisation are reflected upon and disseminated to other members of staff (ORIENT56)
There is a vertical flow of knowledge management from subordinate level to management level and vice-versa (ORIENT57)
Information accuracy is essential to an organisation even though it may take some time to capture (ORIENT40)
Innovative knowledge is increased through communication between people who possess the relevant knowledge in an organisation (PERS38)

Personal knowledge
A high percentage of an organisation's knowledge is developed to staff-to-staff contact within our organisation departments/divisions/units (PERS31)
The concept of knowledge re-use is used to a great extent once it is discovered for an organisation's products/services (COD32)
A high percentage of an organisation's knowledge rests with staff within the organisation (PERS30)

Information Systems and information technology
Knowledge is tapped from an organisation's database using search facility (COD29)
Knowledge is tapped from an organisation's database without prior consultation to the person who created it (COD28)

External Intelligence
The derivation of new knowledge which directly effects our line of business is rather difficult to tap at times, thus hindering to carry out operations in the most effective manner (ORIENT44)
The organisation's knowledge management systems are geared on external issues (ORIENT45)

Table 4.45: Knowledge orientation components for Maltese medium to large-sized organisations for the seven component extraction

Table 4.46 shows a descriptive statistics analysis on the seven knowledge orientation factors.

Descriptive Statistics

	N	Range	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
KOF1	140	5.31	3.9386	0.0989	1.1706	0.055	0.205	-0.442	0.407
KOF2	140	5.78	4.8667	0.0916	1.0842	-0.433	0.205	0.233	0.407
KOF3	139	5.50	4.4863	0.0850	1.0027	-0.376	0.206	0.545	0.408
KOF4	138	5.67	4.8400	0.0862	1.0132	-0.329	0.206	0.240	0.410
KOF5	140	4.67	5.1024	0.0839	0.9923	-0.385	0.205	-0.126	0.407
KOF6	138	6.00	3.6159	0.1427	1.6767	0.294	0.206	-0.776	0.410
KOF7	135	5.50	3.8667	0.0988	1.1480	0.126	0.209	-0.024	0.414
Valid N (listwise)	133								

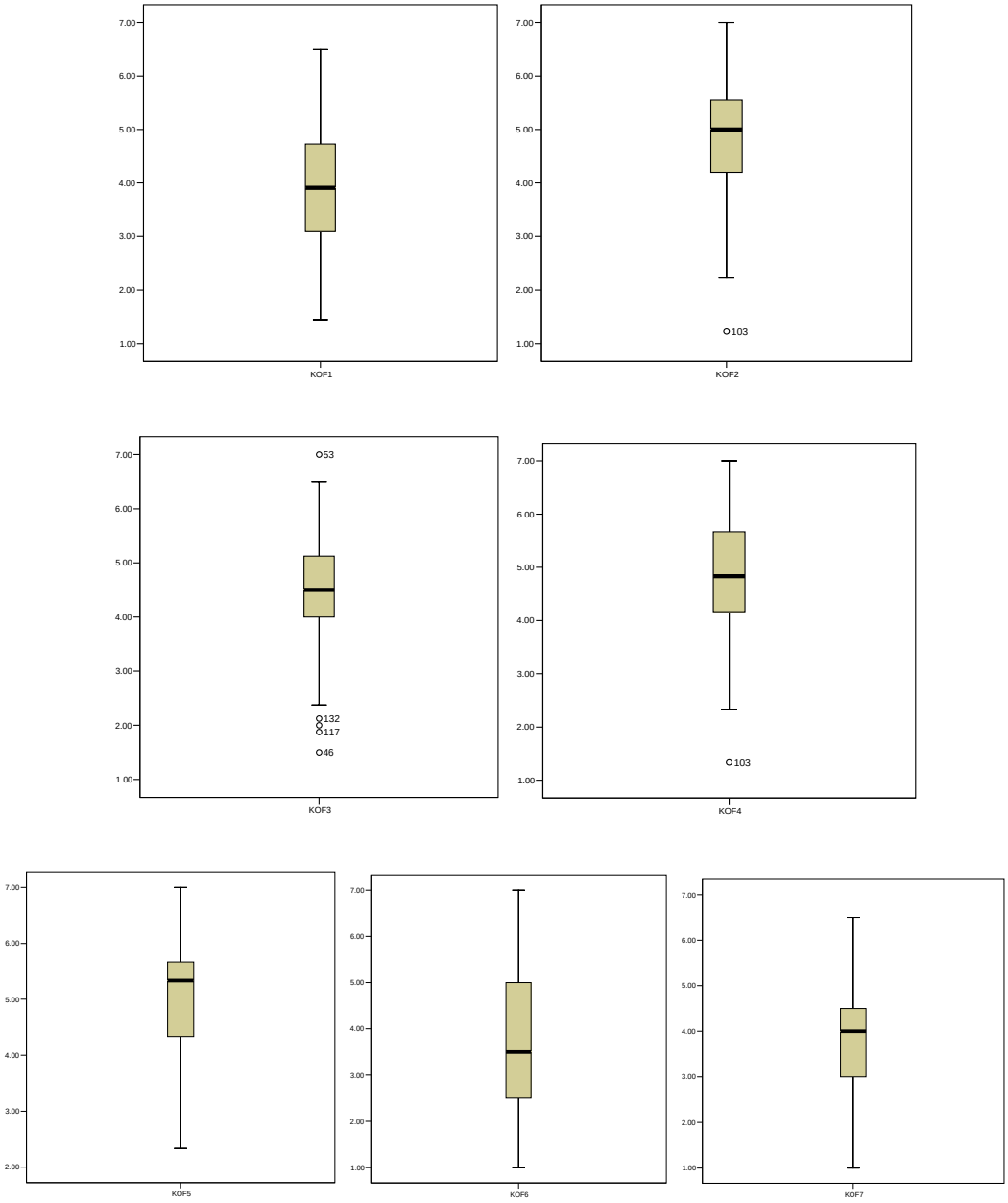
Source: Author's derived data from the statistical package

Table 4.46: Descriptive statistics for knowledge orientation factors

The range, mean and standard deviation is presented for the seven knowledge orientation variables, together with skewness and kurtosis analysis, which will be used in parametric statistical techniques. Since there is negative skewness, this indicates a clustering of scores at the high end. The issues pertaining to normality will be assessed further.

Boxplots analysis for the seven component extraction indicated one outlier for KOF2 (ID:103), four outliers for KOF3 (ID: 46; 117; 132; 53), and one outlier for

KOF4 (ID: 103) which resulted in genuine cases and no reason to be eliminated (figure 4.12).



Source: Author's derived data from statistical package

Figure 4.12: Box plots for the seven knowledge orientation factors

The difference in mean and trimmed mean for the knowledge orientation factors, shown in table 4.47 can be considered minimal which justifies the retention of these outliers in the data.

	Mean	Trimmed Mean	% difference
KOF1	3.9386	3.9302	**-0.21**
KOF2	4.8667	4.8934	**0.55**
KOF3	4.4863	4.5077	**0.48**
KOF4	4.8400	4.8568	**0.35**
KOF5	5.1024	5.1270	**0.48**
KOF6	3.6159	3.5733	**-1.18**
KOF7	3.8667	3.8601	**-0.17**

Source: Author's derived data from statistical package

Table 4.47: Mean and trimmed mean for the seven knowledge orientation factors

The Kolmogorov-Smirnov test was conducted on the seven knowledge orientation factors to assess the normality of the distribution (table 4.48).

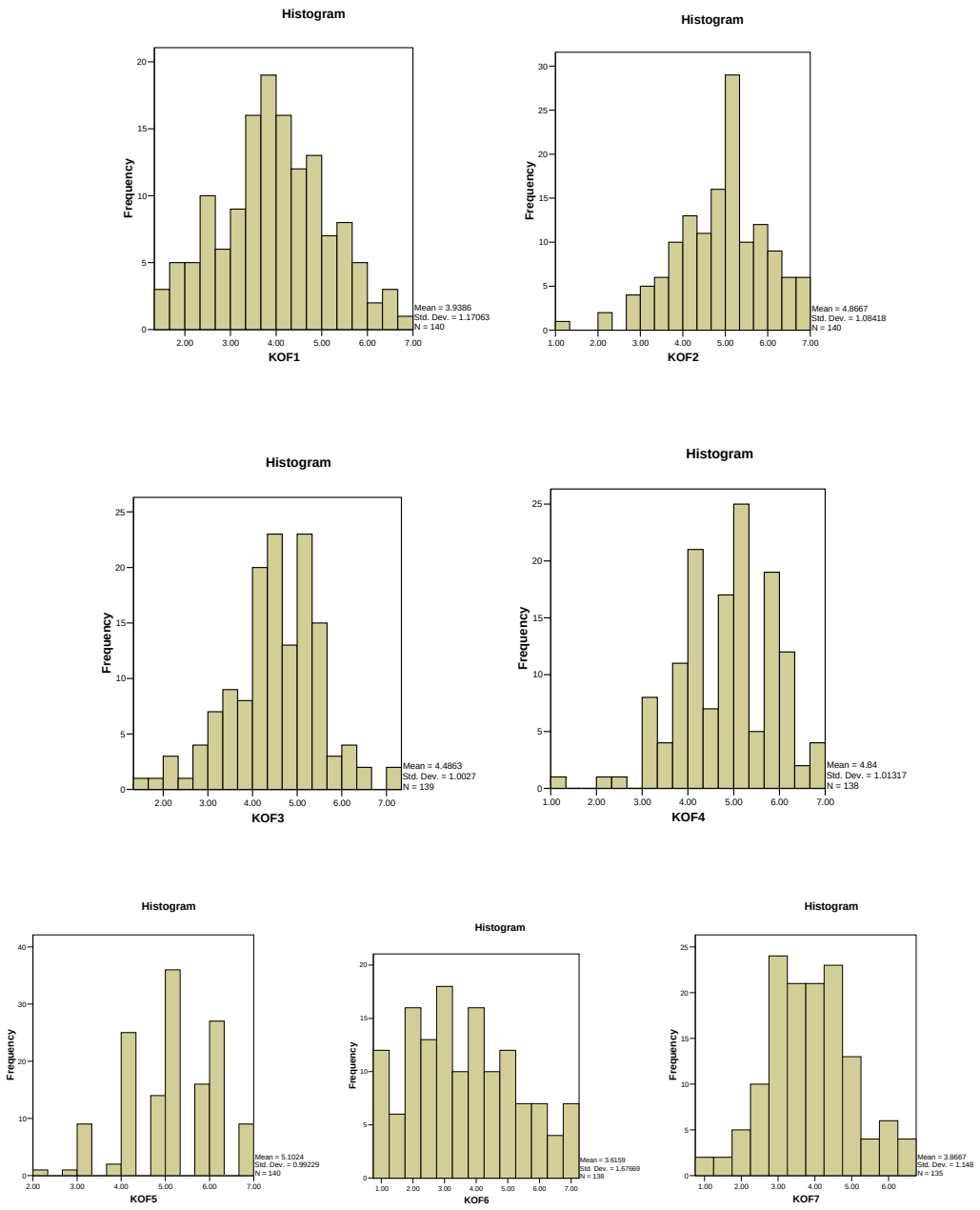
Tests of Normality

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
KOF1	.041	140	.200(*)	.990	140	.459
KOF2	.075	140	.052	.984	140	.108
KOF3	.074	139	.061	.982	139	.069
KOF4	.061	138	.200(*)	.987	138	.215
KOF5	.106	140	.001	.974	140	.008
KOF6	.114	138	.000	.958	138	.000
KOF7	.099	135	.002	.975	135	.014

* This is a lower bound of the true significance.
a Lilliefors Significance Correction
Source: Author's derived data from the statistical package

Table 4.48: Descriptive statistics for knowledge orientation factors

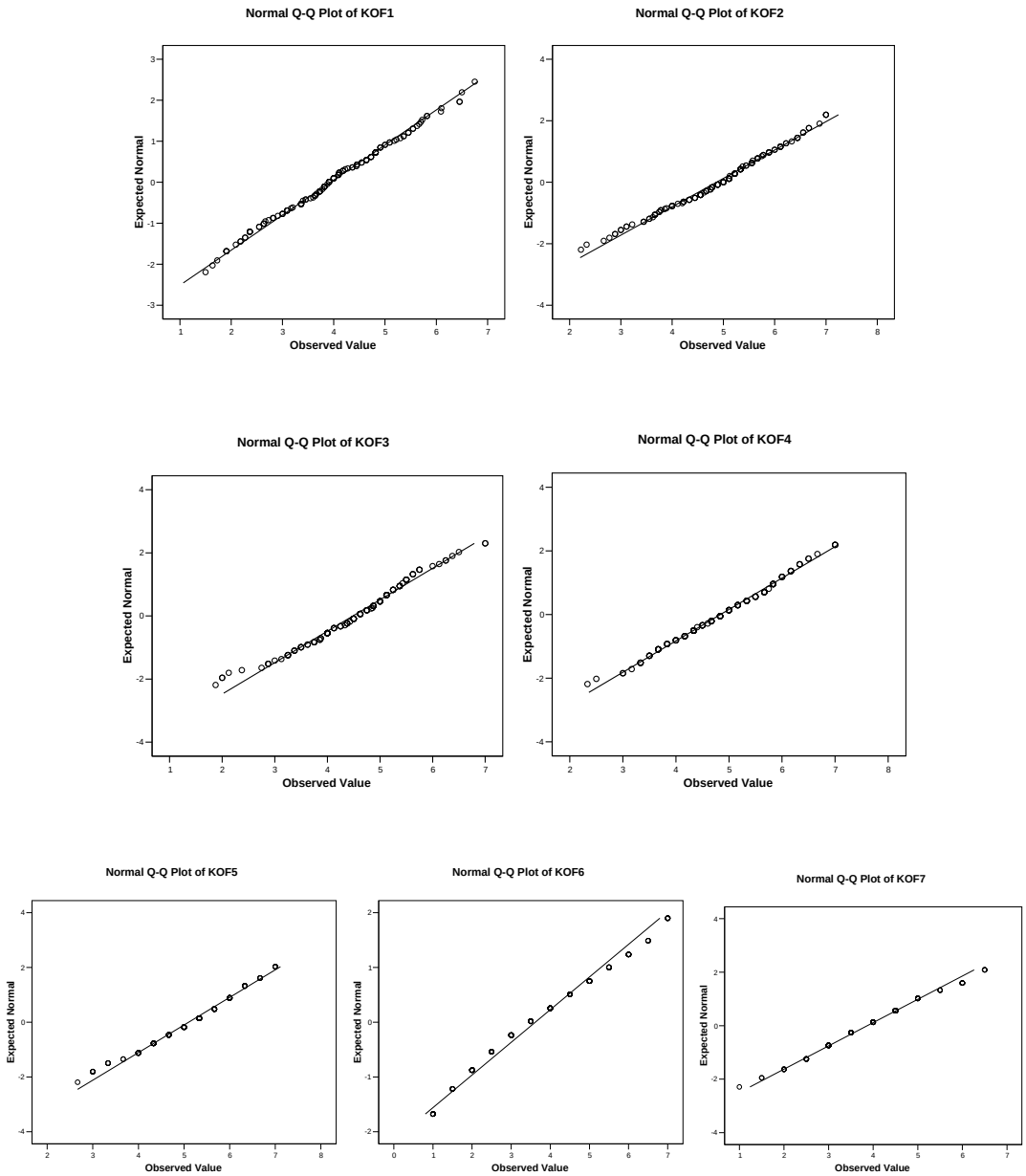
A non-significant result of more than 0.05 indicates normality. In our case KOF1, KOF2, KOF3 and KOF4 are above the 0.05 value and therefore suggest normality. The distribution of the histograms for the seven knowledge orientation factors appear reasonably normal (figure 4.13).



Source: Author's derived data from the statistical package

Figure 4.13: Histogram distribution for knowledge orientation factors

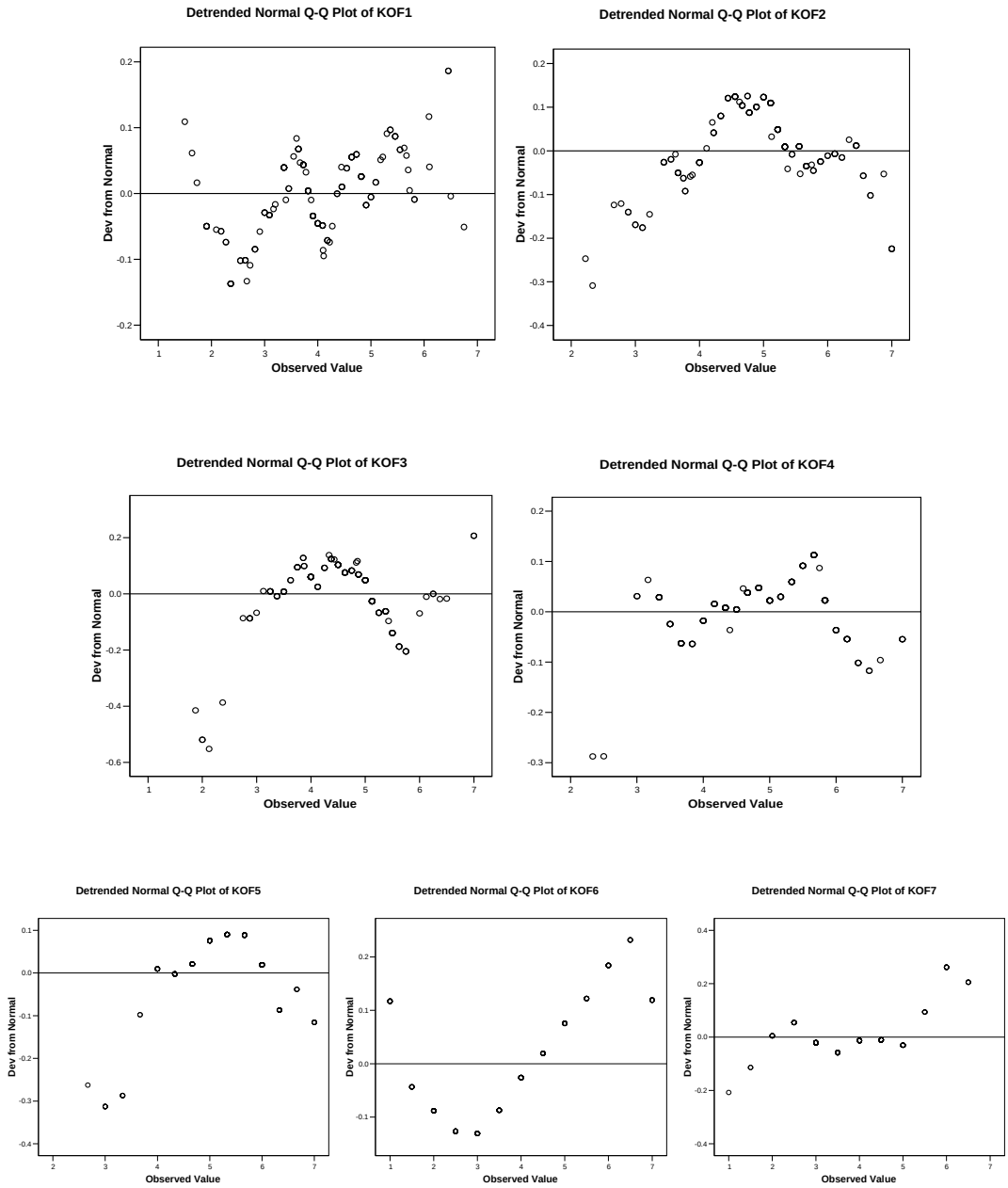
Inspection of the Normal Q-Q plots for the seven knowledge orientation factors are shown in figure 4.14 below. These plots show a reasonably straight line which suggests a normal distribution.



Source: Author's derived data from the statistical package

Figure 4.14: Normal Q-Q plots for knowledge orientation factors

Inspection of the Detrended Normal Q-Q Plots which plots the actual deviation of the scores from the straight line, show that no clustering of points exist for the seven knowledge orientation factors, with the majority collecting around the zero line (figure 4.15).



Source: Author's derived data from the statistical package

Figure 4.15: Detrended Normal Q-Q plots for knowledge orientation factors

The above analysis show that parametric tests can be performed on these knowledge orientation factors.

An ANOVA analysis between the seven knowledge orientation factors and the different strategic types was conducted (table 4.49).

Knowledge Orientation Components		Prospector	Analyser	Defender	Reactor	F-value	Bonferroni paired comparison
KOF1	Internal alignment	4.2619	4.2493	3.5235	3.9480	3.965*	P>D A>D
KOF2	Knowledge generation	5.2169	5.2250	4.3755	4.9861	6.714**	P>D A>D
KOF3	Agility and Horizontal Knowledge Flow	4.7605	4.7551	4.2878	3.9375	4.350*	P>R A>R
KOF4	Formality and standardisation	5.0344	5.0143	4.6102	4.6574	1.875	-
KOF5	Personal Knowledge	5.1471	5.2762	4.9796	5.1296	6.23	-
KOF6	Information systems and information technology	3.8030	3.7059	3.4592	3.5000	0.335	-
KOF7	External intelligence	3.9516	3.8143	3.6979	4.2778	1.248	-

*The mean difference is sig. at the 0.05 level
** The mean difference is sig. at the 0.01 level
Source: Author's derived data from the statistical package

Table 4.49: ANOVA analysis for knowledge orientation factors and strategy-type

The Kruskal-Wallis test for non-parametric variables (alternative to the one-way ANOVA between different groups) was also conducted (table 4.50).

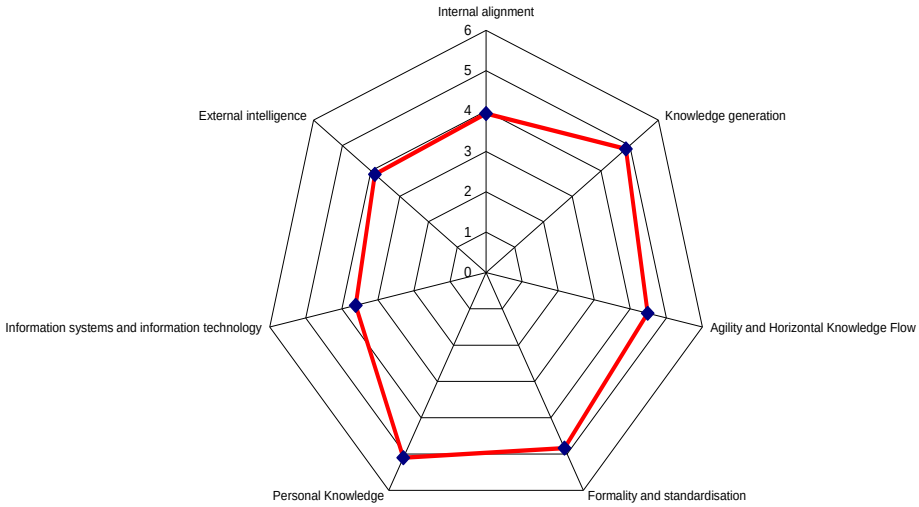
Test Statistics(a,b)

	KOF1	KOF2	KOF3	KOF4	KOF5	KOF6	KOF7
Chi-Square	10.863	16.680	13.511	4.125	1.460	0.593	3.031
df	3	3	3	3	3	3	3
Asymp. Sig.	.012	.001	.004	.248	.692	0.898	.387

a Kruskal Wallis Test
b Grouping Variable: Strategic Type
Source: Author's derived data from the statistical package

Table 4.50: Kruskal-Wallis test for knowledge orientation factors

If the significance level is less than 0.05, then a statistically significant difference along the particular knowledge orientation factor is registered. This has been achieved along three knowledge orientation factors namely KOF1, KOF2 and KOF3. Figure 4.16 shows the mean knowledge management profile for Maltese medium to large sized organisations.



Source: Author's derived data from the statistical package

Figure 4.16: Knowledge management profile for Maltese medium to large-sized organisations

4.15 Cluster Analysis on Knowledge Orientation Factors

The groupings of cases within the seven strategic knowledge orientation components were further tested using the K-means cluster analysis. 'One thorny problem with cluster analysis is the determination of the most appropriate number of clusters' (Miller & Roth 1994). Jambulingam et al., (2005) suggest that a balance between parsimony and accuracy is to be sought that best reflects the nature of the data. From an analysis performed from two to six cluster configurations, the four cluster group was adopted as this shows an even distribution of categorised cases (table 4.51).

Cluster	Cluster Group 2	Cluster Group 3	Cluster Group 4	Cluster Group 5	Cluster Group 6	Cluster Group 7
KOF1	82	28	34	32	32	25
KOF2	51	46	41	33	18	12
KOF3		49	25	9	4	30
KOF4			33	20	29	4
KOF5				39	22	33
KOF6					28	13
KOF7						16

Source: Author's derived data from the statistical package

Table 4.51: Number of cases in each cluster

Table 4.52 shows the strategic knowledge orientation clusters whereas table 4.53 shows the distance between these clusters.

Final Cluster Centers

	Cluster			
	1	2	3	4
KOF1	2.84	4.42	4.98	3.58
KOF2	3.73	5.24	6.02	4.60
KOF3	3.66	4.91	5.35	4.15
KOF4	3.91	5.29	5.55	4.53
KOF5	4.41	5.41	5.51	5.05
KOF6	2.25	2.57	5.12	5.14
KOF7	3.31	4.20	4.40	3.74

Source: Author's derived data from the statistical package

Table 4.52: Knowledge orientation final cluster centres

Distances between Final Cluster Centers

Cluster	1	2	3	4
1		3.183	5.099	3.294
2	3.183		2.780	3.029
3	5.099	2.780		2.666
4	3.294	3.029	2.666	

Source: Author's derived data from the statistical package

Table 4.53: Distances between final clusters centres

Further cluster analysis using ANOVA techniques shows the significant separation of the groups identified as forming part of the strategic knowledge orientation variables (table 4.54).

ANOVA

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
KOF1	27.292	3	.680	129	40.161	.000
KOF2	28.357	3	.504	129	56.235	.000
KOF3	17.678	3	.559	129	31.610	.000
KOF4	17.721	3	.586	129	30.248	.000
KOF5	8.117	3	.729	129	11.137	.000
KOF6	80.281	3	.897	129	89.524	.000
KOF7	7.506	3	1.124	129	6.678	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Source: Author's derived data from the statistical package

Table 4.54: Detailed descriptive statistics on strategic knowledge orientation across clusters

The spread across the four cluster-types is given in table 4.55, whereas figure 4.17 shows the profiles as identified in table 4.52.

Number of Cases in each Cluster

Cluster	1	34.000
	2	41.000
	3	25.000
	4	33.000
Valid		133.000
Missing		9.000

Source: Author's derived data from statistical package

Table 4.55: Detailed descriptive distribution statistics on cluster types as in the survey sample

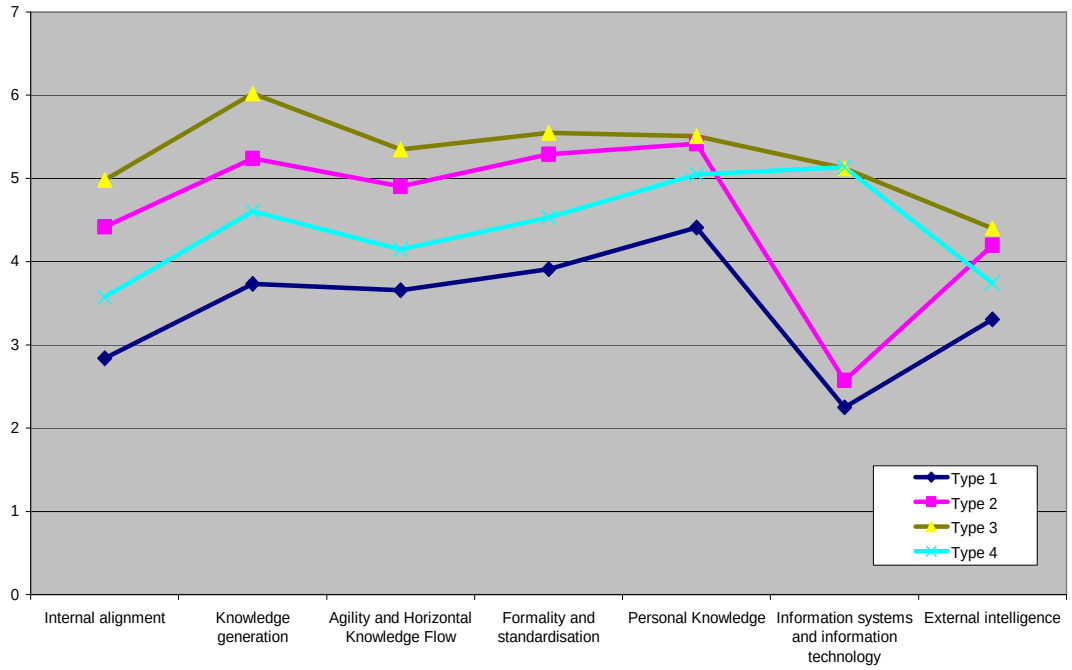


Figure 4.17: Profiles related to strategic knowledge orientation

The distribution between strategic knowledge orientation, strategic-type and performance was analysed using cross-tabulation techniques. The strategic types were split into two main categories that is below (low) and above (high) the sample median performance (table 4.56). One should note that this is quite a 'blunt' way of measuring differences in performance, and one that will not really capture the true

complexity of organisational performance. One could have also considered a 'medium performance' category.

However taking the value of above the sample median performance and classifying as a high performer organisation and the value below the sample median and classifying as low performer organisation was adopted**.** This will be discussed further in the next chapter.

Strategy-type * Group-type * Performance level Cross tabulation							
Performance Category			**Group Type**				**Total**
	Strategy-Type		**1**	**2**	**3**	**4**	
High performers	**Prospector**	Count	3	9	8	4	24
		Expected Count	5.3	8.2	5.5	5.0	24.0
		% within Strategic type	12.5	37.5	33.3	16.7	100.0
		% within Cluster type	15.0	29.0	38.1	21.1	26.4
		% of Total	3.3	9.9	8.8	4.4	26.4
	Analyser	Count	5	11	7	6	29
		Expected Count	6.4	9.9	6.7	6.1	29.0
		% within Strategic type	17.2	37.9	24.1	20.7	100.0
		% within Cluster type	25.0	35.5	33.3	31.6	31.9
		% of Total	5.5	12.1	7.7	6.6	31.9
	Defender	Count	10	8	2	8	28
		Expected Count	6.2	9.5	6.5	5.8	28.0
		% within Strategic type	35.7	28.6	7.1	28.6	100.0
		% within Cluster type	50.0	25.8	9.5	42.1	30.8
		% of Total	11.0	8.8	2.2	8.8	30.8
	Reactor	Count	2	3	4	1	10
		Expected Count	2.2	3.4	2.3	2.1	10.0
		% within Strategic type	20.0	30.0	40.0	10.0	100.0
		% within Cluster type	10.0	9.7	19.0	5.3	11.0
		% of Total	2.2	3.3	4.4	1.1	11.0
	Total	Count	20	31	21	19	91
		Expected Count	20.0	31.0	21.0	19.0	91.0
		% within Strategic type	22.0	34.1	23.1	20.9	100.0
		% within Cluster type	100.0	100.0	100.0	100.0	100.0
		% of Total	**22.0**	**34.1**	**23.1**	**20.9**	**100.0**

	Strategy-Type		1	2	3	4	Total
Low Performers	Prospector	Count	1	2	0	2	5
		Expected Count	1.7	1.2	0.3	1.8	5.0
		% within Strategic type	20.0	40.0	0.0	40.0	100.0
		% within Cluster type	9.1	25.0	0.0	16.7	15.2
		% of Total	3.0	6.1	0.0	6.1	15.2
	Analyser	Count	1	0	2	1	4
		Expected Count	1.3	1.0	0.2	1.5	4.0
		% within Strategic type	25.0	0.0	50.0	25.0	100.0
		% within Cluster type	9.1	0.0	100.0	8.3	12.1
		% of Total	3.0	0.0	6.1	3.0	12.1
	Defender	Count	5	6	0	5	16
		Expected Count	5.3	3.9	1.0	5.8	16.0
		% within Strategic type	31.3	37.5	0.0	31.3	100.0
		% within Cluster type	45.5	75.0	0.0	41.7	48.5
		% of Total	15.2	18.2	0.0	15.2	48.5
	Reactor	Count	4	0	0	4	8
		Expected Count	2.7	1.9	0.5	2.9	8.0
		% within Strategic type	50.0	0.0	0.0	50.0	100.0
		% within Cluster type	36.4	0.0	0.0	33.3	24.2
		% of Total	12.1	0.0	0.0	12.1	24.2
	Total	Count	11	8	2	12	33
		Expected Count	11.0	8.0	2.0	12.0	33.0
		% within Strategic type	33.3	24.2	6.1	36.4	100.0
		% within Cluster type	100.0	100.0	100.0	100.0	100.0
		% of Total	33.3	24.2	6.1	36.4	100.0

Source: Author's derived data from the statistical package

Table 4.56: Detailed descriptive distribution statistics on strategic knowledge orientation and strategic types

4.15.1 Maltese medium to large-sized high performing organisations

Correspondence analysis was conducted to describe the relationship between the strategic-type for high performing group and the knowledge orientation type. The distances between category points in a plot reflect the categorical relationships, with plots of similar categories shown close to each other, thus describing the relationship between the variables. The value of chi-square which explores the

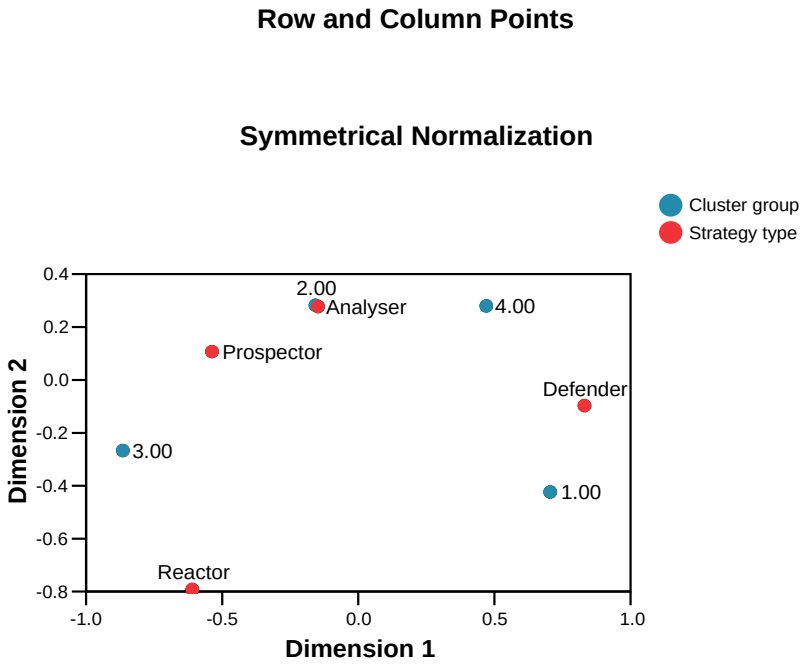
relationship between two categorical variables is 16.96. To be significant the Sig. value needs to be 0.05, or smaller. The value in this case for high performing Maltese medium to large-sized organisations is 0.002, confirming that the result is significant (table 4.57). This is also confirmed in table 4.55 when actual counts are compared with expected counts. Figure 4.18 shows the symmetrical normalization plot on strategic knowledge orientation and strategic-types for Maltese medium to large-sized high performing organisations.

Test Statistics

	Cluster High performing
Chi-Square(a)	16.957
df	4
Asymp. Sig.	.002

a 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 18.8.
Source: Author's derived data from the statistical package

Table 4.57: Chi-square tests for Maltese medium to large-sized high performing organisations



Source: Author's derived data from the statistical package

Figure 4.18: Symmetrical normalization on strategic knowledge orientation and strategic types for Maltese medium to large sized high performing organisations

Table 4.58 shows the association of Maltese high performing organisational strategic-types following correspondence analysis.

Group Type 1	Defender
Group Type 2	Analyser
Group Type 3	Prospector-Reactor
Group Type 4	Analyser-Defender

Source: Author's derived data from statistical package

Table 4.58: Association by group of high performing organisational strategic types

4.16 Investigating correlation between strategic knowledge orientation and organisational performance

The strength of association between strategic knowledge orientation factors and organisational performance for the different strategic-types for Maltese medium to large-sized organisations was investigated using correlation analysis by using the Pearson correlation coefficient. Results show the significant relationships between components (table 4.59).

Knowledge Orientation Factors		Prospector	Analyser	Defender	Reactor
KOF1	Internal Alignment	-0.024	0.384*	0.181	0.625**
KOF2	Knowledge generation	0.149	0.162	0.013	0.426
KOF3	Agility and horizontal knowledge flow	0.070	0.331	0.354*	0.538*
KOF4	Formality and standardisation	0.269	-0.027	0.093	0.517*
KOF5	Personal knowledge	-0.059	0.012	-0.206	0.381
KOF6	Information Systems and Information Technology	-0.127	-0.121	-0.063	-0.135
KOF7	External Intelligence	0.293	-0.039	0.230	0.327

*** Correlation is significant at the 0.05 level (2-tailed)** **** Correlation is significant at the 0.01 level (2-tailed)**
Source: Author's derived data from the statistical package

Table 4.59: Correlation analysis on strategic knowledge orientation factors with performance and strategic-types

4.17 The research model proposed for determining strategic knowledge orientation

In order to test the predictive power of the model, multiple discriminant analysis (MDA) is used, since the single dependent variable is dichotomous and therefore non-metric. MDA helps in the comprehension of the differences between groups and in the identification of proper classification through the independent variables.

The independent variables include the seven strategic knowledge orientation components, strategic-type and environmental turbulence. The dichotomous dependent variable is the organisational performance. The organisational strategic-types regarding reactor, defender, analyser and prospector are represented by the variable *Strategy Type*. Table 4.60 represent the structure matrix following the multiple discriminant analysis.

Structure Matrix

	Function		
	1	**2**	**3**
KOF3	.757(*)	-.133	-.180
KOF1	.751(*)	.441	.093
STRATEGY TYPE	-.483(*)	-.014	-.066
KOF2	.483	.500(*)	-.157
KOF7	.135	.479(*)	-.367
KOF4	.347	.433(*)	-.149
TURBULENCE	-.022	-.277(*)	.133
KOF6	.011	.261	.735(*)
KOF5	.179	.180	.313(*)

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions Variables ordered by absolute size of correlation within function.
* Largest absolute correlation between each variable and any discriminant function
Source: Author's derived data from the statistical package

Table 4.60: Discriminant Analysis-Structure Matrix

A significant result was achieved as chi-square value of 56.518 (df=27) and Wilks lambda test result of 0.610 confirms. Since the significance level (Sig. 0.001) is less than 0.05, then one can conclude that there is a difference among the groups. Table 4.61 shows that 68% cases belonging to a correct classification.

Classification Results(a)

		Performance Category	Predicted Group Membership		Total
			High	Low	
Original	Count	High	45	23	68
		Low	16	38	54
		Ungrouped cases	2	4	6
	%	High	66.2	33.8	100.0
		Low	29.6	70.4	100.0
		Ungrouped cases	33.3	66.7	100.0

a 68.0% of original grouped cases correctly classified.
Source: Author's derived data from the statistical package

Table 4.61: Discriminant Analysis-Classification Results

Table 4.62 shows the prior possibilities for a two-group discriminant analysis with a 50-50 split in the dependent variable. Since two groups for organisational performance namely high and low have been used, there is a 50% chance of a correct guess (Garson 2007).

Prior Probabilities for Groups			
Performance Category	Prior	Cases Used in Analysis	
		Unweighted	Weighted
High	0.5	68	68
Low	0.5	54	54
Total	1	122	122

Source: Author's derived data from the statistical package

Table 4.62: Discriminant Analysis-Prior possibilities for groups

Using the larger group and dividing it by the total, yields a result of 55.74%. The predictive power of the research model regarding strategic knowledge orientation can be gauged by the reduction of the random error proportion in the predictive power of the model. The calculated random-error proportion of 44.26% is the value

of randomly incorrectly grouped cases. The calculated model error proportion is 0.1226 (44.26 - [100-68]). Therefore the rate of error reduction reduces by 12.26%. The rate of error reduction was also investigated for the five component extraction which resulted in a reduction of 8.96% and the six component extraction which resulted in a reduction of 11.46%. Therefore the seven component extraction has been adopted.

4.18 Concluding remarks

SPSS v.12 software was used in order to derive a series of descriptive statistics that could enable confirmation of variations within the strategic knowledge orientation variables identified. This was analysed using one-way ANOVA technique. The number of hypotheses generated in an earlier part of this dissertation, were tested by means of the survey-based questionnaire. Ten hypotheses and eleven alternative hypotheses were supported with the rest being rejected. These will be further interpreted in the next chapter in view of the models and theories generated earlier in the literature review of this dissertation.

Seven components pertaining to strategic knowledge orientation were identified through factor analysis, which were reduced further to a four group knowledge orientation structure following cluster analyses. Following the identification of low and high-average group performances, through cross-tabulation and correspondence analysis yielded links between strategic-type classifications and strategic knowledge orientation. The multiple discriminant analysis technique was used to

test the predictive power of the research model. Results show that the rate of error reduction reduces by 12.26%, which produced a significant result. The statistical results derived, coupled with models and theories from the literature review will help towards further interpretation in the next chapter.

Chapter 5 – Discussion

5.1 Introduction

The results presented in the previous chapter, brings forward a number of issues for discussion, in view of the theories and models discussed earlier in the literature review of this dissertation. The discussion that follows relates to the central research question of how organisational strategy and knowledge management are related to each other and to performance in the Maltese context. Both the Miles & Snow (1978) typology of strategic-types and Hansen's et al., (1999) model of knowledge management orientation were analysed in a quantitative manner in Maltese medium to large-sized organisations in order to generate hypotheses. This represents a novel approach, because only Truch's (2004) quantitative study has combined the two models in order to investigate strategic knowledge orientation. Certain issues from Truch's questionnaire were eliminated as they were considered as secondary or were incorporated in a broader hypothesis (see p. 135). The focus on Maltese medium to large-sized organisations also represents an original approach. A number of hypotheses were generated from these models, and analysis of the survey data resulted in the rejection of some of these hypotheses, which confirms that these models might have to be revisited in relation to the organisational strategic-types in the knowledge management context. A discussion on this issue will be further dealt with in a later part of this chapter.

A broadly positivist approach on knowledge orientation was adopted by using a survey instrument derived from Truch (2004) to test the research model. This was

strengthened by an interpretivist approach by conducting further investigation between the survey results obtained and issues identified in the review of the relevant literature. The principal investigation is focused on what type of knowledge management strategies do Maltese medium to large-sized organisations adopt in relation to the business strategies developed and environmental turbulence encountered and of course, how these relate to performance.

Therefore this research investigation on strategic knowledge orientation was developed into components related to knowledge management strategy and its implementation in Maltese organisations. Analyses were performed on the hypotheses generated in an earlier part of this dissertation, that link organisational performance, strategic approach and organisational knowledge orientation factors taking in context both Hansen's et al., (1999) and Miles and Snow (1978) models. This chapter includes analysis on the different organisational strategic-types and strategic knowledge orientation comprising of knowledge strategy, strategic alignment, strategic fit and performance, organisational structure, the human resources aspect, the knowledge value chain, as well as information systems/technology utilised and environmental turbulence encountered. A discussion on each of the identified seven strategic knowledge orientation factors together with a proposed development of a knowledge orientation matrix for Maltese organisations follows. In the last part of this chapter a discussion on the organisational performance link with strategic-type and knowledge orientation components is pursued through the presentation of a new model of strategic

knowledge management alignment, which identifies a four-category typology of alignment types. Finally a comparison with the Miles and Snow (1978; 2003), Hansen's et al., (1999) and Truch (2004) models follows.

5.2 Analysis on the organisational strategic-type and strategic knowledge orientation in Maltese organisations

50% of the knowledge orientation components were found to be significant for Maltese medium to large-sized organisations following different strategic-types (see table 4.19 pp. 196-200). The issue pertaining to organisational performance and strategic alignment in Maltese medium to large-sized organisations was investigated further in relation to the seven knowledge orientation factors identified earlier (p. 229) from the list of knowledge orientation components derived from the survey-based questionnaire.

From the four strategic-types identified in the Miles and Snow model, the defender and the prospector-types were considered, due to their clear definitions and bi-polar nature. A similar approach was also adopted by Abernethy & Guthrie (1994) and Truch (2001). The reactor-type generally do not fit any of the prospector, analyser or defender-types and is considered as an outsider, since response patterns are hard to achieve and generally take action under threat and forced situations. The analyser-type lies between the defender and prospector-type organisations.

During the formulation and testing of hypotheses, proposed in an earlier part of this dissertation, ten were accepted whereas the remainder were rejected. The rejected hypotheses were further sustained through alternative hypotheses and a further eleven were accepted (pp. 196-200). These were investigated further. The discussion that follows covers the organisational strategy and structure adopted, the human resources aspect, the knowledge value-chain, the utility of information technologies and the business environment encountered in Maltese medium to large-sized organisations.

5.2.1 Knowledge strategy, strategic alignment, strategic fit and performance

The survey-based questionnaire measured the four main strategic criteria namely:

a) Knowledge strategy in terms of personalisation (tacit) and codification (explicit) knowledge types;
b) Strategic alignment in terms of knowledge management practices, policies and systems, knowledge needs, and knowledge alignment based on the organisation's operations;
c) Strategic fit in terms of personalisation and codification strategy-types, and
d) Organisational performance relationships.

The above mentioned components were used to group respondents into their respective codification and personalisation-types. In terms of personalisation strategy, the mean score for prospectors was higher than that of defenders. In terms of codification strategy, the mean score for prospectors was also higher than that of

defenders (table 4.15). For organisations classified as prospectors more emphasis is given on personalisation strategy than for defender-type of organisations, although codification is used as a supporting mechanism. It was also established that prospector and defender-types perform better for organisations that adopt personalisation rather than codification strategies in Maltese medium to large-sized organisations.

A positive correlation was registered for organisations adopting both personalisation and codification-types (table 4.14, p. 188). This does not sustain Hansen's et al., argument (1999) that organisations explicitly use *either* the personalisation *or* codification-type of strategy. Although Hansen's et al., model explicitly states that between personalisation and codification strategies, a negative correlation exists, the findings for the survey conducted in Maltese organisations did not sustain this argument as a positive correlation was achieved (table 4.14, p. 188). This is similar to Truch's findings (2001). This raises some doubts over the validity of Hansen's et al., typology.

As regards to strategic alignment (p. 203), research findings yield that Maltese organisations that fall under prospector and analyser-types, have their organisational objectives more closely connected to knowledge management practices than the reactor-type of organisation (ORIENT53). The prospector-type of organisation sustain their focus on staff capabilities in terms of policies and systems knowledge to a greater degree than the defender-type (ORIENT23), and the

prospector-type organisation are by far in a better position for operational knowledge alignment to occur than the reactor-type of organisation (ORIENT43). This is similar to what prospector-type organisations usually experience, which usually exploit business market opportunities to the fullest due to their natural flexibility. This finding is also similar to Wiig's (1997) (p. 87) model related to knowledge-centered strategies based on knowledge-business and personal knowledge. The adoption of both personalisation and codification strategies marks prospector-type organisations as quick to evolve in rapidly changing scenarios, by deploying expert teams in addressing both information system and organisational business objectives equally (Luftmann & Brier 1999).

Although according to the Miles and Snow's model, reactor-type organisations perform poorly compared with the defender, analyser and prospector-types, this result was not sustained for Maltese medium to large-sized organisations, as it was found that the mean performance of the defender, analyser and prospector-types falls within the confidence interval of the reactor-type. Therefore Maltese medium to large-sized reactor-type organisations, perform at a similar level to the defender, analyser and prospector-type organisations (table 4.24, p. 205). Hence, the Miles and Snow's (1978), McKee et al's (1989) and Croteau et al's (1999) assertions that the reactor-type organisation will be slow to respond to business opportunities, have no specified identified strategy, and considered as ineffective performers if neither of the "pure" strategies between prospector, analyser and defender are chosen, seems not to apply in the Maltese context. Chandler's (1962) assertion that reactor-

type organisations move towards diversification with less certainty and enthusiasm also seems to be not applicable in the Maltese context. This seems to lead us to question the purported differences between reactor-type and the other types and questions the validity of the Miles and Snow typology.

25.5% of the respondents were from organisations classified as analyser-type (p. 171). Miles and Snow (2003) sustain, that the analyser-type organisation is fragmented and inconclusive and needs further research. This research supports such a view as results for Maltese medium to large-sized analyser-type organisations show that results are inconclusive. The findings do not advance our understanding of whether the analyser-type is closer to the prospector or defender-type (pp. 202-205). There is, however some support for Miles and Snow's (2003) identification of the emergence of a new organisation type which operates in a forced dual strategy, especially in high technology industries. It seems that Maltese prospector and analyser-type organisations have developed an effective monitoring system (ORIENT 27) (p. 207), so that the overall organisational objectives are linked with knowledge management practices, to the extent that innovations are quickly adopted. This reminds us of Senge's (1990) model[32] of the learning organisation in building systematic practices for managing self-transformation through continuous innovation as an organised process. This organisational behaviour is also similar to what Miles and Snow (2003) had proposed for public agencies and seems to address flexible and efficient organisations with a broad

[32] Senge's (1990) model refers to the learning organisation which continuously adapts to new circumstances and learns to reinvent itself.

range of human capabilities, suggesting continuous improvement for every activity and development of new applications from its own successes (Drucker 1993).

Therefore the findings of the survey suggest that in relation to knowledge management orientations, both personalisation *and* codification strategies are used which goes against Hansen's et al., model. In terms of business strategy, the findings confirm that prospector-type organisations are those which exploit business market opportunities as sustained by Wiig (1997). Reactor-type organisations perform at a similar level to the other types which questions the validity of the Miles and Snow's typology. Analyser-type organisations still need further research as it is still unclear whether this type is closer to the prospector or defender-type. In the next section, further doubts are raised in relation to organisational structure of Maltese organisations as regards to knowledge flow, co-ordination, performance measurement and internal/external knowledge management focus.

5.2.2 Organisational structure in Maltese medium to large-sized organisations

As regards the organisational structure in Maltese organisations, the survey-based questionnaire was set to investigate:

a) the horizontal or vertical knowledge information flow within the organisational structure and the utility of project teams.
b) the co-ordination and adherence aspects pertaining to the use of standard operating procedures and the management of knowledge information and co-ordination.

c) information systems which provide appropriate performance measurement, and

d) the internal and external knowledge management focus.

No significant results were registered for the criteria identified above (pp. 206-208), which means that existing theoretical models might have to be re-visited, except that for prospector and analyser-type organisations that make use of information systems to a greater degree than defender-type organisations for providing adequate performance management systems, since the mean for a prospector and analyser-type organisations was greater than the defender-type (ORIENT 27) (p.207). This is consistent with Muralidharan (1997) as better performance management control and better use of deviation from planned performance enables corrective action to take place in organisations.

The other results related to horizontal/vertical knowledge information flow within the organisational structure and the utility of project teams (ORIENT 47; PERS 51; ORIENT 57, p. 206), knowledge management co-ordination and operations that occur due to set procedures (ORIENT 54; ORIENT 50, p. 207), and knowledge management aspects of internal/ external focus (ORIENT 45; ORIENT 58, p. 208) are not consistent with the Miles and Snow model, which was identified earlier in the literature review of this dissertation. This suggests that the top-down management model (ORIENT 54, p. 207), which according to Nonaka and Takeuchi (1995) has its roots in Weber, Taylor and Simon, is not evident amongst Maltese organisations. Nonaka & Takeuchi (1995) claim that, top-down management approach become the operational concepts for middle managers. No

evidence was found that such hypotheses are better sustained in prospector-type compared to defender-type organisations (pp. 206-208). This seems to suggest that information is not passed up the pyramid to top management, who would then use this information to create plans and which is passed down the hierarchy whereby these plans can be implemented. It may seem to suggest that role of middle managers in Maltese organisations is lacking which strengthens Nonaka and Takeuchi's (1995) argument that middle managers do not seem to have a place within a bottom-up approach. It may also suggest that top-down organisations are not pyramid shaped as suggested by Nonaka and Takeuchi (1995) but more an inverted-pyramid shape by making the whole organisation accountable to the employee, as employees and whoever forms intellectual capital within an organisation are recognised as the most valuable resource (Nayar 2008). The question is who is creating knowledge in such organisations and whether it is bottom-up that deals with tacit knowledge or top-down that deals with explicit knowledge as Nonaka and Takeuchi (1995) suggest.

5.2.3 The human resources aspect in Maltese medium to large-sized organisations

The four key components investigated in this survey related to the human resources aspect amongst Maltese medium to large-sized organisations included:

a) the type of individuals recruited,

b) the adoption of rewards mechanism to enhance knowledge sharing,

c) style of staff training adopted using documentation versus appropriate mentoring processes, and

d) staff exit interviews procedures in order to instigate appropriate knowledge transfer.

The findings indicate a significant result for the reactor-type organisation, which encourage knowledge sharing by the utility of the organisations' database through an appropriate reward system as the mean of the reactor-type was greater than the defender-type (COD 36) (table 4.30, p. 209). It was also established that the exit interview process that helps to instigate knowledge transfer, is significantly greater for the prospector and analyser-types than the defender-type for Maltese medium to large-sized organisations (PERS 39) (table 4.32, p. 211). This shows that knowledge sharing and knowledge transfer aspects are given their importance and are common practice in Maltese medium to large-sized organisations. It seems that importance is given to the kind of knowledge people possess in prospector and analyser-type organisations. It also seems that reactor-type organisations base their success on retrieving knowledge from people through reward structures.

No significant result was achieved for Maltese organisations related to knowledge transfer training that relies on documentation (COD 18, p. 210). This is consistent with the result achieved earlier for Maltese organisations whose operations occur due to set procedures as no significant result was achieved in that case as well (ORIENT 50, p. 207). A significant result was achieved for organisation based

training based on appropriate mentoring as analyser-type is greater than defender-type (PERS 19, p. 210).

The strategic alignment discussed earlier (ORIENT 23, p. 203), identified that staff capabilities in terms of policies and systems knowledge needs is greater in prospector than defender-type organisations. This was found to be consistent with two of Wiig's (1997) knowledge management strategic-types namely personal and knowledge-business strategies (table 2.14, p.103). Personal knowledge strategy-type depends on the personal responsibility of the individual within an organisation to cherish knowledge related investments and their effective use regarding innovations created and competitive knowledge application. Knowledge-business strategy accounts for the provision and creation of the best possible knowledge through proper capture, renewal, dissemination and use in the organisation's operations.

Therefore mentoring appears to be synonymous with analyser-type, knowledge transfer appears to be synonymous with with prospector and analyser-type organisations, knowledge sharing with reactor-type and strategic alignment with prospector-type organisations. This seems to suggest that the Miles and Snow (1978) typology might have to be re-visited as regards to the Maltese context, whereby it was established that prospector is not significantly greater than the defender-type in terms of the recruitment of problem-solvers and knowledge-

sharing. The next section deals with the knowledge-chain that covers both tacit and explicit knowledge in Maltese organisations.

5.2.4 The knowledge-value chain in Maltese medium to large-sized organisations

The tacit and explicit knowledge management information processes in Maltese organisations, were analysed in terms of the:

a) scanning, capturing and storage of competitor, client and industry knowledge, and
b) retrieval, knowledge transfer and sharing, knowledge re-use, innovation, staff-to-staff contact, information dissemination, the use of IT and the utility of cutting-edge information in terms of the application of knowledge information.

The survey-based questionnaire probed the scanning issue along three main aspects namely in terms of the client, competitor and industry knowledge that the particular Maltese organisation is in (ORIENT 33, ORIENT 34, ORIENT 35, p. 212). The mean for Maltese prospector, analyser and reactor-type is significantly higher than defender-type organisation as regards to client knowledge. As for the client knowledge focus (ORIENT 33), this is not exactly in line with the model proposed by Miles and Snow as besides the mean of prospector being greater than defender-type, the mean of the analyser and reactor-types are also greater than the defender-type. The same can be said for the importance given to competitor knowledge (ORIENT 34) and industry knowledge (ORIENT 35) in Maltese organisations, as

the mean analyser-type is significantly greater than the defender-type (table 4.33, p. 212). In the Miles and Snow's model the prospector-type scored significantly higher than the defender-type both as regards to client and industry scanning. In the Maltese scenario this is not the case and the findings seem to suggest that the analyser and reactor-type organisations are better equipped than defender-type organisations as regards to client and industry knowledge, which most probably ties in with the previous result achieved in the last section whereby client and industry knowledge is being retrieved by the type of recruitment of staff being made.

However as regards to competitor knowledge scanning (ORIENT 34), the mean for the analyser-type is greater than the prospector-type as might be expected being that analyser-type organisations are regarded as fast followers. This agrees with Conant et al., (1990) and Lee and Yang's (2000) models. In today's fierce marketplace environment, especially with the full membership status of the Maltese Islands in the European Union, it seems plausible that client, competitor and industry knowledge have become important tools especially for Maltese organisations who seek business growth through opportunities. The findings of the survey seem to suggest that Maltese analyser-type organisations have assumed this role and are more fully aware of clearly tapping competitor and industry knowledge to a greater extent that the prospector-type organisations. This is different from what Miles and Snow (1978) had proposed.

The survey-based questionnaire probed on the capturing and storage issues adopted by Maltese medium to large-sized organisations (p. 214). For the capture of knowledge the main components investigated were issues related to information accuracy (ORIENT 40), human resources who specifically deposit knowledge within an organisation and the knowledge transfer between staff (COD 48), continuous development and maintaining of up-to-date knowledge (ORIENT 41), knowledge assets creation or acquisition (ORIENT 42), and the importance related to research and development (ORIENT 59). It was established that the retrieval of information accuracy (ORIENT 40) and continuous knowledge maintenance (ORIENT 41) are more statistically significant in analyser-type organisations than in defender-type (table 4.34). More time is focused on research and development than competitors producing a significant result for prospector and analyser-types than defender-type organisations (ORIENT 59). No significant results were sustained for the creation or acquiring of knowledge assets (ORIENT 42), and the role of the skilled staff to transfer and deposit knowledge electronically (COD 48).

Maltese organisations have the capability of using their valuable intangible assets appropriately such as information accuracy (ORIENT 40), research and development (ORIENT 59), and continuous knowledge maintenance (ORIENT 41). This sustains Brown & Duguid (1991), Drucker (1994), Nonaka (1994), Nonaka & Takeuchi (1995), Zack (1999b), Bontis et al., (1999) and Lev's (2000) claims.

Rifkin (1996) argued that in order for organisations to remain competitive, knowledge within organisations must be created, located, captured and shared to address problems and opportunities. This is evident in Maltese organisations in aspects related to information accuracy, continuous knowledge maintenance and appropriate research and development. This seems to suggest that organisational knowledge creation is continuous and that dynamic interaction between tacit and explicit knowledge exists, shaped through the different modes of knowledge conversion i.e. socialisation through knowledge sharing, externalisation through dialogue, combination through networking and internalisation through learning by doing (Nonaka & Takeuchi 1995). It also consistent with Nonaka's (1991) and Nonaka's et al., (2000) claim that Western cultures have a tendency to view the organisation as a machine for 'information processing' based on formal and systematic hard data, as Maltese organisations have a difficulty in the capture of both dynamic knowledge assets as well as the electronic depositing of such information.

For the storage of knowledge in Maltese organisations, the main components investigated were issues related to the development of tacit knowledge amongst Maltese employees (PERS 30) and the availability of a consultancy base[33] (PERS 37) and the required support expertise networks (PERS 49). Tovstiga and Korot (1998) estimated that more than 70% of knowledge within an organisation is tacit, whereas Hansen et al., (1999) estimated this to be not more than 20%. The research findings in Maltese medium to large-sized organisations do not justify Tovstiga and

[33] This includes networks with experts functioning along the same business lines of the organisation.

Korot's estimate, and seems to be inclined more with Hansen's (1999) estimate**.** In fact no evidence was sustained that in Maltese organisations, tacit knowledge resides in individuals (PERS 30) (p. 215). However one should also note that the survey conducted to collect data cannot adequately capture tacit and informal types of knowledge and skills as Felstead et al., (2005) mention that 'learning as acquisition' and 'learning as participation' justify the importance of social relationships and job design that eventually enhance the individual performance and learning at work.

The significant result achieved for expertise networks and staff with similar skills suggests this availability in prospector-type rather than the defender-type (PERS 49, p. 215). This indicates that the organisations surveyed make it a point to devise network expertise support with similar job-related interests along their line of operations, thus sustaining the effect of creating further knowledge-based storage mechanisms. The effective and efficient use of knowledge accumulation through appropriate networks was a feature also noted by Nonaka & Takeuchi (1995).

The survey-based questionnaire also probed the knowledge retrieval aspect in Maltese organisations (p. 216). The main components investigated were related to knowledge access rights (COD 46), proper referencing within organisations (COD 28), and knowledge seeking and information retrieval from electronic databases in order to sustain job effectiveness (COD 29). The significant result achieved suggests that knowledge information access is faster in Maltese analyser-type than

defender-type organisation (COD 46) (p. 216). According to Hansen et al. (1999) and Lee and Yang (2000) the retrieval of information becomes easier and faster once information is codified and appropriate information systems are maintained within an organisation, besides without having to contact the individual who created the information. Thus one would have expected a significant result for the defender-type over the other strategy-types as information would be easier to access, as according to Hansen et al., (1999) and Lee & Yang (2000), knowledge is codified using the 'people-to documents' approach in these organisations.

No significant results were achieved for the retrieval of information that could take place without the actual reference to the person who created it (COD 28) and for knowledge retrieval from electronic databases, in order for work to be carried out effectively (COD 29) (table 4.36, p. 216).

For the transfer and sharing of knowledge (p. 217), investigation was related to the lack of up-to-date knowledge in order for work to be carried out effectively (ORIENT 44), knowledge retrieval between staff (PERS 31), project reflection time and staff sharing of experiences (ORIENT 56), learning from mistakes and using constructive criticism from employees (ORIENT 55), communication between staff for information requests (PERS 52), and the creation of networks that take place due to staff movements (PERS 22). All of these components relate to the building of an expertise networking system.

In Maltese medium to large-sized organisations, project reflection time and staff sharing of experiences (ORIENT 56) shows a significant result for the prospector and analyser-type over the defender and reactor-type organisations. It was also established that learning from past mistakes, sharing of knowledge and the generation of constructive criticism (ORIENT 55) produced a significant result for prospector-type organisations over the defender and the reactor-type organisations.

The communication of staff for information requests (PERS 52) also produced a significant result for prospector over the reactor-type organisations. No significant results were produced for the lack of up-to-date knowledge in order for work to be carried out effectively (ORIENT 44), for the importance of tacit knowledge retrieval on a one-to-one basis (PERS 31) and the creation of networks that take place due to staff movements (PERS 22) for prospector-type over defender-type organisations (table 4.37, p. 217).

To a certain degree this agrees with the model proposed by Miles and Snow for prospector-type organisations, which provides a great deal of focus on the building of an expertise networking system, with less importance being sustained for the defender-type organisations and with Szulanski's (1996) research which relates to information that is difficult to transfer. In fact cost and efficiency-driven parameters are synonymous with defender-type organisations whose main objective is the minimisation of knowledge sharing investments (Miles and Snow 1978).

In conclusion, as regards to scanning, capturing and storage of competitor, client and industry knowledge, the Miles and Snow model will have to be revisited. It

seems that Maltese prospector, analyser and reactor-type organisations are client knowledge oriented. It was also established that as regards competitor and industry knowledge Maltese analyser organisations are competitor and industry knowledge oriented. Analyser-type organisations are more oriented towards competitor knowledge scanning and capturing in aspects related to information accuracy, continuous knowledge maintenance and research and development. Knowledge conversion from personal (tacit) knowledge to a formal systematic knowledge (explicit), which can eventually be shared at all levels within the organisation and eventually crystallized at higher ontological levels as suggested by Nonaka and Takeuchi (1995), seems to exist in Maltese organisations. It also seems that Hansen's et al., model needs to be revisited as regards defender-type focusing on codified knowledge as it seems that the Maltese prospector and analyser-type organisation are stronger in this respect. Later in this chapter, it will be seen how, in recognising such limitations in existing models, we can begin to construct a new model for analysing the relationship between knowledge management and strategy. The next section deals with the importance of information systems/information technology and the business environment in Maltese medium to large-sized organisations.

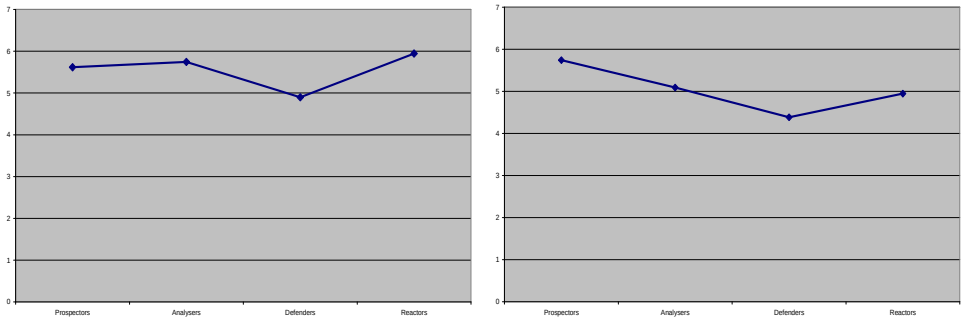
5.2.4.1 Information Systems/Information Technology and the Maltese business environment

For the application of knowledge in Maltese organisations (pp. 219-220), investigations were related to the reuse of knowledge (COD 32), knowledge which

instigates innovation (PERS 38), information dissemination and the use of IT in accessing knowledge (COD 24), staff-to-staff contact and the utility of information technology (PERS 25) as well as the utility of cutting-edge information and communication technology (ORIENT 26). A significant result was achieved for Maltese organisations with personalisation-type knowledge strategies which possess knowledge related working environment to instigate innovation (PERS 38) as the mean for prospector and analyser-types was greater than defender-type organisations (table 4.38, p. 219). This suggests that knowledge creation fuels innovation taking place epistemologically through the four modes of knowledge conversion[34] and ontologically where knowledge is passed from an individual towards a group/organistional level, suggesting the interaction of two knowledge spirals over time (Nonaka and Takeuchi 1995). However this goes against Hansen's et al., (1999) proposal, as Maltese organisations seem to use both personalisation and codification strategies to the same extent (see p. 189 and p. 308).

Significant results were also achieved for information dissemination and use of IT in accessing knowledge (COD 24) for analyser and reactor-type over defender-type organisations as well as for staff-to-staff contact and the utility of information technology (PERS 25) for prospector over defender-type organisations (table 4.39, p. 220) (figure 5.1). This agrees with Coombs and Bierly's (2006) assertion that the utility of information technologies helps in the sharing of knowledge and the creation of synergies with the aim of increasing knowledge.

[34] Knowledge created interacts in a 'spiral of knowledge' conversion through the SECI process, which can be identified along four main paths namely socialisation (existential-face to face interaction), externalisation/articulation (reflective-peer to peer), combination (systematic-collaborative) and internalisation (collective-on the site).



(a) (b)

Source: Author's derived date from survey-based questionnaire

Figure 5.1 (a) ICT for accessing documents and (b) ICT to contact people

No significant results were achieved for the reuse of knowledge in the organisation's products or services (COD 32, p. 219), and the utility of cutting-edge information and communication technology (ORIENT 26, p. 220) for Maltese medium to large-sized organisations.

As regards the Maltese environmental business scenario, 11.4% reported their organisational environment as unpredictable and discontinuous, 12.9% as predictable and discontinuous, 46.4% as fast and incremental, 20.7% as slow and incremental and 8.6% with no change taking place (table 4.10, p. 173). It was also established that environmental turbulence amongst Maltese defender-type organisations was greater than prospector and reactor-type organisations which fundamentally goes against with the proposed model by Miles and Snow (1978) (table 4.40, p. 221).

These findings seem to sustain Ansoff and Sullivan's (1993b) assertion that different success formulae exist for different environmental turbulence levels. Miles and Snow (1978) state that defender-type organisations perceive a great deal of stability in their organisational environment through a series of decisions that focus on diminishing the organisation's vulnerability to environmental change and uncertainty. Contrary to Miles and Snow's assertion, it seems that Maltese defender-type organisations are creating more change and uncertainty and respond more aggressively (which is directly proportional to the amount of environmental turbulence encountered as suggested by Ansoff (1965)), in the marketplace to which other competitors are forced to react. This may suggest that Maltese defender-type organisations are more externally oriented than the other strategy-types. Thus as Polanyi (1966) suggests, it may seem that in the Maltese context, defender–type organisations seem to facilitate new modes of interaction which may give rise to new knowledge than the other strategy-types.

5.2.5 General remarks on knowledge orientation elements in Maltese medium to large-sized organisations

From the knowledge orientation dimensions investigated, it was established that 50% of these dimensions vary significantly amongst Maltese organisations, which indicates that a relationship between strategic orientation knowledge management and business strategic-types in Maltese organisations exists (pp. 196-200). As regards the divergence between Maltese prospector, analyser and defender-type of

organisations, it was also established that the most aligned with their organisation's knowledge management strategy are the prospector and analyser-types.

In the literature review of this dissertation, mention was made for the constant drive exerted by prospector-type organisations in aligning the organisation's strategic fit of business objectives and their knowledge management systems (Ansoff & Sullivan 1993a; Brouthers & Roozen 1999). This is not in conformity with what was reported by Maltese prospector-type organisations as regards to organisational strategic fit and performance measurement (pp. 204-5) and which does not confirm Miles and Snow's model (1978). It was also established that Maltese medium to large-sized defender-type report greater levels of environmental turbulence than prospector-type (p. 221) which also goes against the Miles and Snow's model. Exit interviews are utilised better in Maltese prospector and analyser-types organisations than in defender-type of organisations.

Defender-type organisations perceive the highest degree of environmental turbulence among Maltese medium to large-sized organisations, which is not in line with the Miles and Snow model. Scott-Morton (1991), Ansoff and Sullivan (1993b) and Brouthers and Roozen (1999) had proposed that environmental turbulence puts pressure on organisations to adapt to change. They claim that the prospector-type is usually under greatest pressure in order to meet environmental changes. However, it is also arguable that in reality all organisations are under external pressure in order to attain strategic fit between organisational knowledge systems and business

objectives. It is their perception of those pressures, and how such organisational types cope with such pressures that varies.

No significant results were registered for Maltese prospector-type organisations being more prone in the adaptation of the latest technology, whereas in accessing documents and data the Maltese analyser-type organisation is more prone (p. 220). The use of information technologies to contact individuals and exchange knowledge is significantly greater in Maltese prospector-type organisations. It seems that a dual focus on both personalisation and codification approaches are optimal for performance as explained later (p. 308), which Hansen et al., (1999) might view as problematic.

The intermediate position of analyser-type between the defender and prospector-type organisations, continues to confirm the Miles and Snow model for the statistically significant strategic knowledge orientation variables analysed in terms of their relative degree of related competencies: prospector > analyser > defender. However there were exceptions registered for the analyser-type and reactor-type which produced significant results which were greater than the prospector-type. The exceptions were in the following:

- Knowledge database contribution through remuneration structure (p. 209).
- Training based on the transfer of knowledge through appropriate mentoring (p. 210).
- Competitor and industry knowledge updating (p. 212).

- The importance of information accuracy (p. 214).
- The updating of organisational knowledge on a continuous basis (p. 214).
- Documentation access through organisation's information system (p. 216).
- Use of ICT technologies for documentation and information storage (p. 220).

It also seems that reactor-type organisations (which lack consistent characteristics and were identified by Miles and Snow (1978) as the residual-type), is not always applicable for Maltese reactor organisations, as significant results were achieved for the utilisation of ICT technologies for documentation and storage of information, client knowledge updating, and knowledge database contribution enhanced through the organisation's remuneration structure. This goes against the Miles and Snow's (1978) typology, who identified reactor-type organisations are slow to react in taking-up business opportunities. It seems that this instigates employees to store and update organisational knowledge as an incentive exists towards this goal. From the eighteen organisations tagged as reactor-type (p. 171) of which 27.8% were based in the food/beverage manufacture industry and 16.7% from government services, it seems that external relations of these organisations tends to be more technical in nature such as distribution of statutory reports or product/service samples, which may prove successful with low external relations orientation, as stakeholders/shareholders are few and undemanding (Black & Härtel 2001).

5.3 The identification of strategic knowledge orientation factors to strategic type

A factor analysis whose main purpose is to reduce a large set of variables into a smaller set of factors, was performed on the 42 identified knowledge orientation variables in Maltese medium to large-sized organisations which identified seven major components following Varimax rotation (pp. 224-9).

5.3.1 Internal Alignment (KOF 1)

Knowledge management organisational maturity is measured through the internal alignment knowledge orientation factor achieved through business strategy and knowledge management alignment (Scott-Morton 1991). Miles and Snow's proposal of the analyser-type of organisation which is positioned between the prospector and the defender-types was found to be consistent with most of the survey-based results, except in two cases. This was for the continuous updating of competitor knowledge where the result for analyser-type was more significant than the defender-type organisation and for knowledge database contribution within an organisation aided through an appropriate reward structure where the reactor-type had a mean significant score greater than the defender-type organisation.

Maltese prospector and/or analyser-type organisations obtained significant results than defender-type organisations as regards to:

- the alignment of both knowledge needs of an organisation and human resources policies and systems (p. 203),

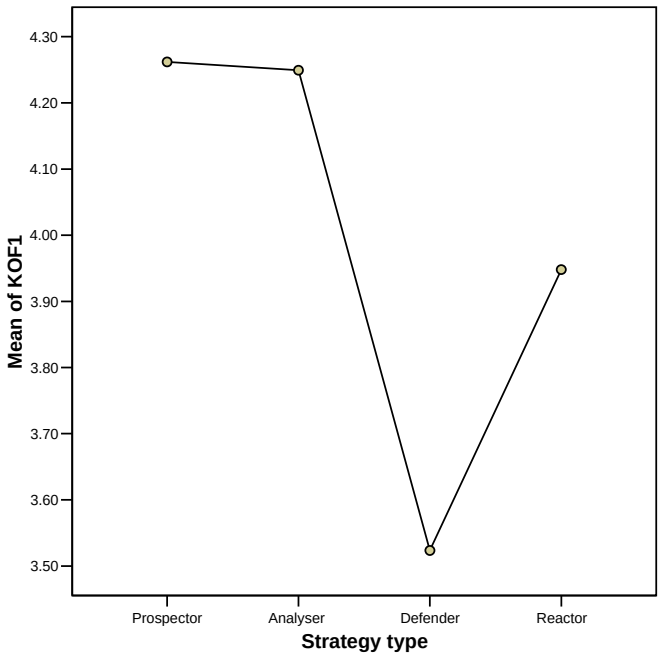
- the utilisation of exit interviews so that organisational knowledge and experience is transmitted to organisational staff members (p. 210-1),
- the provision of more time on research and development (p. 214) and
- the attention given by an organisation's management as regards to network with experts functioning along the same business lines of the organisation (p. 215).

This is in line with Zack's (1999a) typology, which suggests that internal alignment is achieved once a cost-benefit analysis justifies both the tacit and explicit strategic intent that the organisation intends to pursue together with the ability to manage in order to achieve performance targets, and remain competitive. Strategic intent can be more tacit, informal and subtle, but still have an impact on the organisation's strategic action (Marlow 2000).

This is in agreement with prospector and analyser-type organisations and also with the reactor-type as suggested earlier with the better utilisation of ICT technologies for knowledge storage and updating. However this may cause conflict for a defender-type of organisation as it has to justify its position, due to the explicitly cost-conscious outlook which is usually adopted (Galbraith 1973).

Figure 5.2 shows the organisational internal alignment orientation variance plotted against organisational strategic-type for Maltese medium to large-sized organisations. For this knowledge orientation factor, the mean score for prospector

is greater than analyser-type and defender-type. However the mean score for defender-type is less than the reactor-type.



Source: Author's derived data from the survey-based questionnaire

Figure 5.2: Internal alignment versus strategic type in Maltese organisations

The findings of this survey therefore indicate that the analyser-type is closer to the prospector-type organisation for this knowledge orientation factor, with the latter being better internally aligned by addressing knowledge organisational needs, knowledge capture through staff, research and development and appropriate networking.

5.3.2 Knowledge generation (KOF 2)

The findings suggest that the knowledge generation orientation factor measured the extent to which the organisation's information technology function utilises the latest

technologies in knowledge exchange, the extent through which knowledge within an organisation is exchanged, the contact developed through its own ICT technologies, and the accessibility of organisational documentation. Knowledge generation also measured the continuous updating of knowledge management, the capturing and reuse of knowledge through the organisation's electronic medium, the updating of client and industry knowledge as well as the provision of an adequate performance management system.

The knowledge generation orientation factor varies considerably across the different strategic-types. The prospector-type was significantly stronger than the defender-type for:

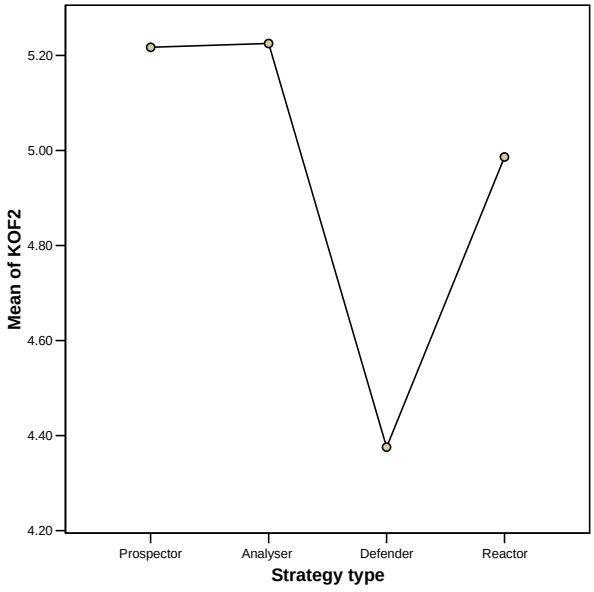
- an appropriate performance management system which is in place (p. 207), and
- the updating of client knowledge (p. 212),
- the exchange of knowledge and contact developed through the organisation's own ICT technologies (p. 220).

This is in line with Zack (1999a) as regards to knowledge integration and exploitation. On the other hand analyser-type organisations were significantly stronger than the defender-type for:

- the accessibility of documentation through the organisation's information system (p. 216),
- the use of the organisation's own ICT technologies for documentation and storage of information (p. 220), and

- the continuous updating of the organisation's knowledge management and industry knowledge (p. 215).

Figure 5.3 shows the knowledge generation variance plotted against strategy-type.



Source: Author's derived date from the survey-based questionnaire

Figure 5.3: Knowledge generation orientation versus strategic type in Maltese organisations

For this knowledge orientation factor, the mean score for analyser-type is greater than prospector-type and defender-type organisations. However the mean score for defender-type is less than the reactor-type. It seems that for this knowledge orientation factor the analyser-type is closer to the prospector-type. It also highlights the significant importance given by Maltese reactor-type organisations on the utility of ICT technologies in order to exchange knowledge and which seems to help in the codification of client knowledge. This challenges Miles and Snow's

(1978) claim, as the utility of ICT technologies to exchange knowledge seems to diminish the assertion coined with the reactor-types which generally have been considered as residual types and to lack consistent characteristics.

5.3.3 Agility and Horizontal Knowledge Flow (KOF 3)

The agility and horizontal knowledge orientation factor addresses the extent to which the organisation responds immediately to organisational knowledge requests[35], the overall organisational objectives and knowledge management practices alignment for effective operational performance, the utility of standard operating procedures and the effect of horizontal knowledge management flow. It also addresses the utility of project teams, the ability of disseminating constructive criticism, training and development through appropriate mentoring and the creation of new knowledge assets in line with business operations.

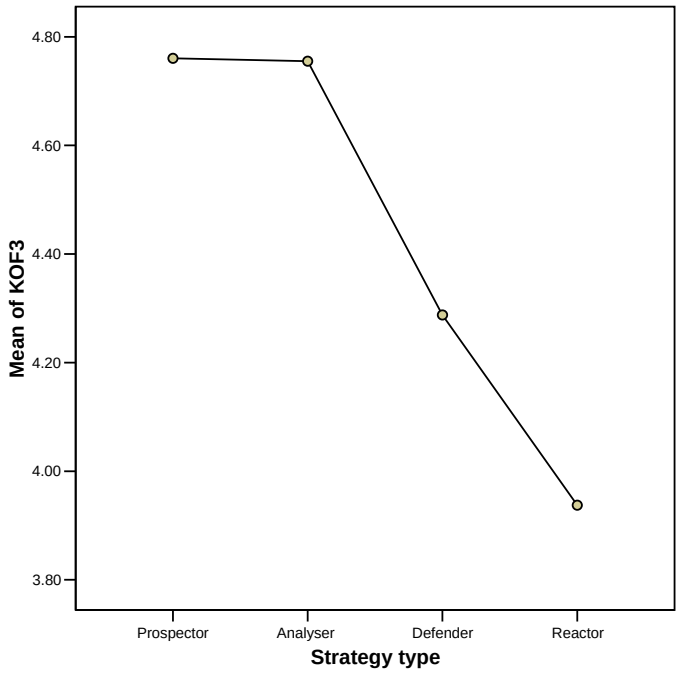
There is a significant variation in terms of agility/horizontal knowledge flow between the different organisational types (figure 5.4), with prospector-type organisations significantly higher than the defender-type for the dissemination of constructive criticism when failures are identified. This is in line with the Miles et al., (2000) view, that collaboration is perceived to be important component in future knowledge-based organisations, as more focus will be maintained on communication within an organisation for team-based improvements. Significant results were also registered for the creation of new knowledge assets in line with

[35] In order to encode and retrieve knowledge from a knowledge repository such as a database, organisational knowledge requests are made by employees to subject matter experts on an ad hoc basis. It is claimed that the response from the expert is rich in content, personalised to the particular person addressing it and contextualized to the particular problem being addressed.

business operations (p. 203), the alignment of overall objectives and knowledge management practices so that operations are performed effectively (p. 203) and prospector over reactor-type for the immediate response of knowledge requests from staff members (p. 217).

Other significant results were registered for the analyser-type as the mean was greater than the reactor-type as regards to overall objectives and knowledge management practices alignment so that operations are carried out effectively (p. 203). The mean for analyser-type was also greater than defender-type as regards to organisational training based on appropriate mentoring (p. 210-1).

The results achieved for horizontal knowledge flow were not consistent with the Miles and Snow typology whereby it is claimed that short-looped horizontal information systems are adopted by prospector-type organisations whereas long-looped vertical information systems are adopted by defender-type organisations. Thus competitive advantage cannot be maintained as continuous feedback leads towards organisational performance maximisation as argued by Miles and Snow (2003).



Source: Author's derived date from the survey-based questionnaire

Figure 5.4: Agility and horizontal knowledge flow versus strategic type in Maltese organisations

For this knowledge orientation factor, the mean score for prospector-type is greater than analyser, defender and reactor-type organisations (figure 5.4). It seems that the analyser-type is closer to the prospector-type. According to Miles et al., (2000), organisational agility rests on the rapid re-alignment of internal processes and systems to accommodate environmental changes. The ability to do this with speed requires the capacity to not only change, but to maintain performance targets and customer satisfaction in the process through competitive advantage. As regards to horizontal knowledge flow, feedback which can be taken as a means of organisational development through processes and people, is not taken advantage of which challenges Roebuck's (1996) view.

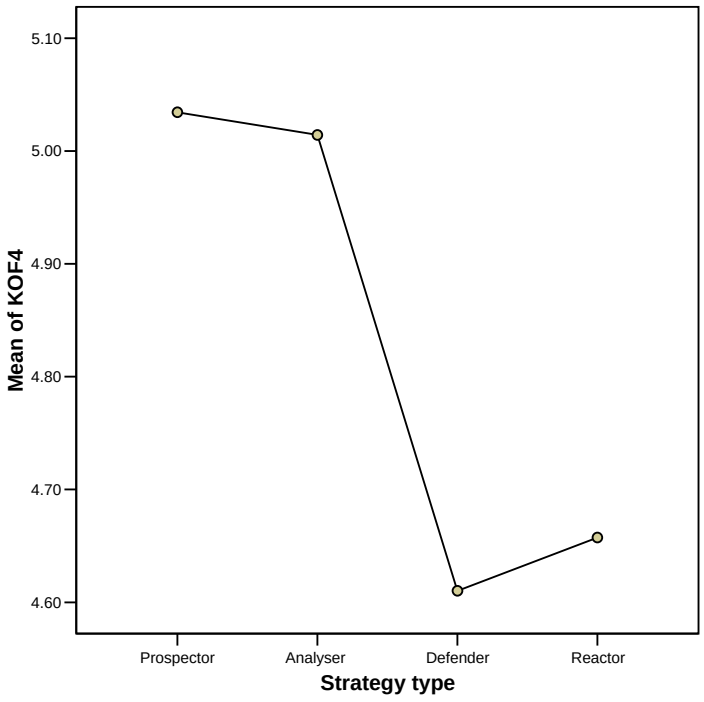
In summary, one can conclude that when one considers the agility and horizontal knowledge flow orientation factor, it seems that collaboration and communication are considered important aspects in Maltese prospector and analyser medium to large-sized organisations for effective team-based improvements. This is achieved through immediate response through knowledge requests, alignment of overall objectives and knowledge management practices.

5.3.4 Formality and standardisation (KOF 4)

The formality and standardisation knowledge orientation factor included:

- the utility of a vertical flow of knowledge management from subordinate to management level (p. 206),
- whether a centralised knowledge management structure exists with a top-down approach (p. 207),
- the internal aspects of an organisation, such as managing funds, offering superior services, planning and allocating skills, and knowledge of customers and competitors (p. 209),
- the importance of information accuracy (p. 214),
- the dissemination of knowledge to organisational members (p. 217), and
- the appropriate organisational communication in order to enhance innovation (p. 219).

Figure 5.5 shows the variance plot of formality and standardisation for Maltese medium to large-sized organisations against strategic-types.



Source: Author's derived date from the survey-based questionnaire

Figure 5.5: Formality and standardisation versus strategic type in Maltese organisations

For this knowledge orientation factor, the mean score for prospector-type is greater than analyser and defender-type organisations. However the mean score for defender-type is less than the reactor-type. Maltese prospector and analyser-type organisations are significantly stronger than the defender and reactor-types, for knowledge creation regarding organisational operations which are disseminated to other staff members. Prospector and analyser-type are significantly greater than the defender-type for the use of communication in order to increase innovative knowledge (p. 219). Also analyser-type organisations are significantly stronger than defender-type organisations as regards to the capture related to information

accuracy (p. 214). This is not in line with the Miles and Snow's typology where defender-type organisations generally seek efficiency through standardisation and formality. However this is consistent with Graham and Pizzo (1996) as they state that a balance between tacit knowledge creativity and informal flexibility is necessary to turn creativity towards business advantages. Since low-moderate formality/standardisation was registered, this may be linked with high tacit knowledge (Holtham 1996). It seems that Maltese organisations do rely to some extent upon an internal store of tacit knowledge, although the amount cannot be accurately quantified. The importance of more standardisation and formality and less diversity was registered by Menguc and Auh (2005) when trying to implement ideas as routine. Menguc and Auh believe that the use of standard processes should affect organisational performance which is also sustained in the Maltese context.

In summary, we can perhaps conclude that when the formality and standardisation knowledge orientation factor is considered, it seems that communication in order to create innovative knowledge is considered an important aspect in Maltese prospector and analyser-type medium to large-sized organisations. Maltese analyser-types organisations also consider information accuracy as an important aspect which may instigate creativity.

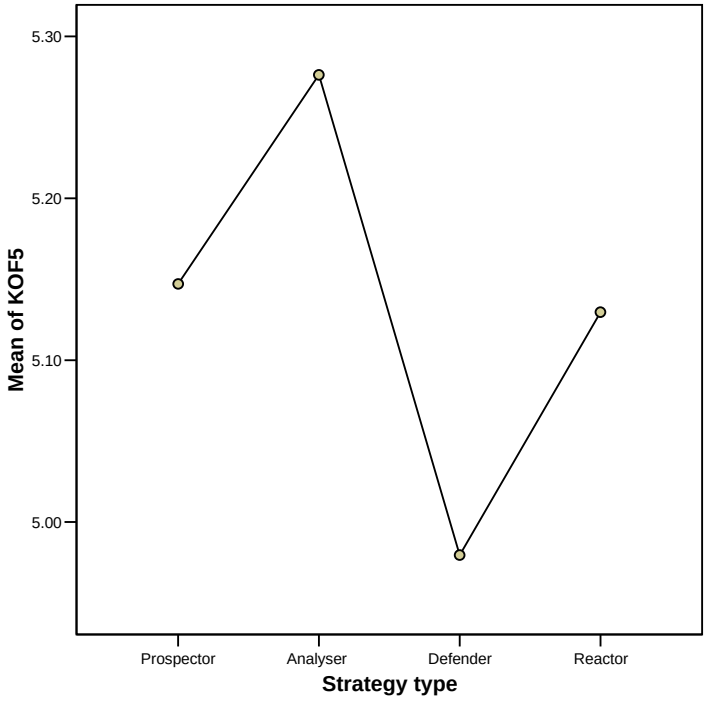
5.3.5 Personal knowledge (KOF 5)

The personal knowledge orientation factor measures include:

- the amount of knowledge which rests with organisational staff (p. 215).

- the degree through which the organisation's knowledge is developed between staff (p. 217), and
- the re-use of knowledge (p. 219)

Figure 5.6 shows the variance plot of personal knowledge against strategic-type for Maltese organisations. The mean variance of the analyser-type is higher than the prospector, and the defender-type organisation. However the mean score for the reactor-type is greater than the defender-type. The importance of ICT technologies in reactor-type organisations is again highlighted.



Source: Author's derived date from the survey-based questionnaire

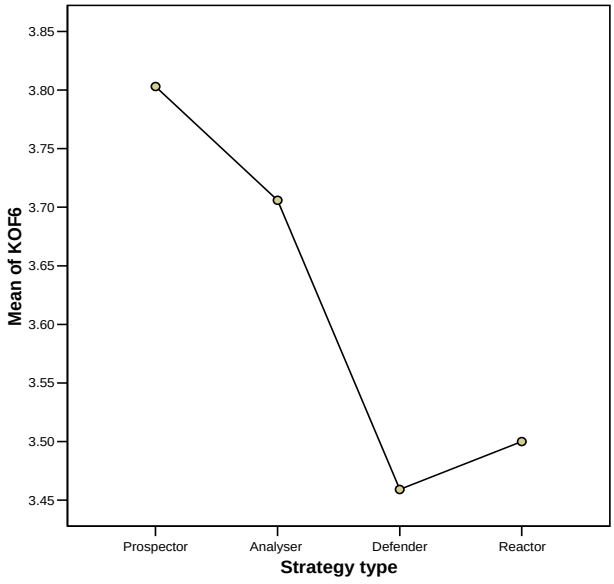
Figure 5.6: Personal knowledge versus strategic type in Maltese organisations

No significant values were registered for this knowledge orientation factor between prospector and defender-types. It does not seem that a high proportion of knowledge in Maltese organisations is tacit and therefore linked with the individual

concerned. This reminds us of Hansen's (1999) estimate that around 20% of knowledge is assumed to be tacit, although one cannot accurately quantify the amount of tacit and explicit knowledge that resides within an organisation.

5.3.6 Information systems and information technology (KOF 6)

The information systems and information technology orientation factor measures the knowledge tapped from an organisation's database using search facility (p. 216) and the knowledge tapped from an organisation's database without prior consultation to the person who created it (p. 216). No significant values were registered for this knowledge orientation factor.



Source: Author's derived date from the survey-based questionnaire

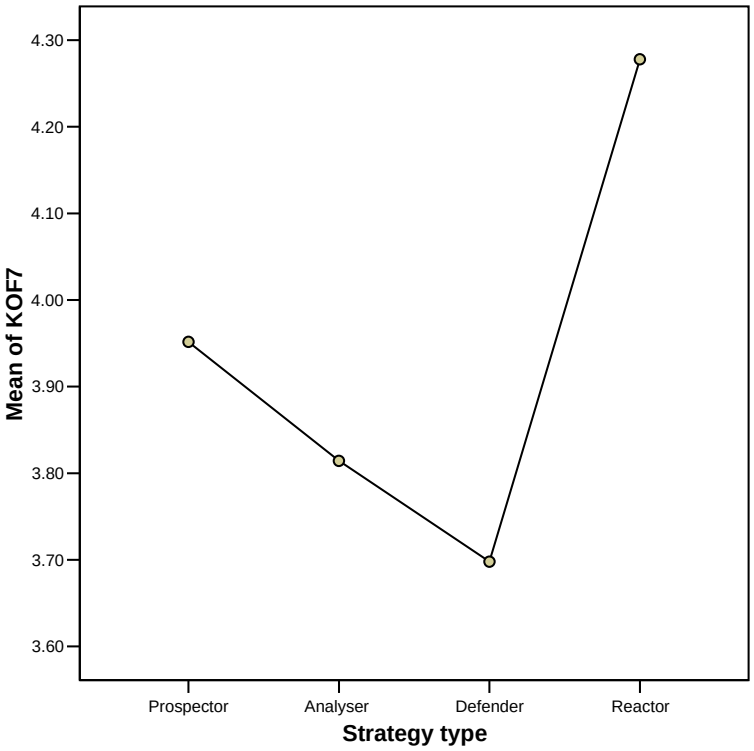
Figure 5.7: Information systems and information technology versus strategic type in Maltese organisations

Figure 5.7 shows the variance plot of information systems and technology against strategic-type for Maltese medium to large sized organisations. One should note

that the mean score for the reactor-type is greater than the defender-type and the prospector-type mean is greater than the defender-type. It seems that reactor-type organisations use ICT technologies to a greater extent than defender-type organisations in order to retrieve knowledge. It also seems that the prospector-type make relatively extensive use of information systems and technologies to tap knowledge which is in line with the Miles and Snow typology.

5.3.7 External Intelligence (KOF 7)

The external intelligence orientation factor measures the difficulty of tapping new knowledge which directly affects the organisation's line of business (p. 217) and level of focus on the organisation's knowledge management systems as regards to external issues (p. 208). No significant values were registered for this knowledge orientation factor. This finding is consistent with the degree of turbulence registered for Maltese organisations due to globalisation and competitiveness threats (Economic Policy Division 2007).



Source: Author's derived date from the survey-based questionnaire

Figure 5.8: External intelligence versus strategic type in Maltese organisations

For this knowledge orientation factor, the mean score for prospector-type is greater than analyser, and defender-type organisations (figure 5.8). However the mean scores for prospector, analyser and defender-types are less than the reactor-type. From the identified Maltese reactor-type organisations (e.g. product manufacture and services to clients) it seems that environmental scanning is an essential element to sustain the defensive mechanisms that are necessary to protect their current market position which may be in constant threat due to market globalisation and greater competitiveness.

5.4 General remarks on the seven knowledge orientation factors for Maltese medium to large-sized organisations

Analysis has shown that for the seven identified knowledge orientation factors, the prospector score was higher than the defender score. Such findings are consistent with Nonaka's (1991) model of a knowledge-creating organisation, whereby organisations that encounter turbulent markets survive by the creation of new knowledge, and adapt in a matter fast enough in respect to new technologies, services and products. High scores for the prospector-type organisation were registered for knowledge generation, personal knowledge, and formality/standardisation which resonates with Nonaka's (1991) description of a knowledge-creating company, whereby new knowledge can be created and disseminated quickly, leading towards the development of new technologies and products. However one should also note that the analyser-type was higher than the prospector-type for knowledge generation and personal knowledge. It seems that the analyser-type organisation is closer to the prospector-type of organisation (p. 205), which suggests that rather than having distinct prospector-type and analyser-type, another type, hybrid between the two types might be possible in the Maltese context. This might also lead us to question the validity of the Miles and Snow typology more broadly. In fact this reminds us of the dual nature possessed by the analyser-type technology organisations allowing them to produce products or services efficiently and keeping pace with developments engendered by prospectors (Miles & Snow 1978). The findings of this dissertation for the analyser-type sustains Olson's et al., (2005), assertion that no clear structural solution for these

organisations yet exists, because at a given time, analyser-type organisations operate in a way that is closer to defender or the prospector-type. This is a problem inherent to most typologies: their lack of a longitudinal perspective. Typologies tend to ignore the fact that organisations often go through frequent change, and therefore it is difficult to 'pigeon-hole' into one specific type.

An almost linear relationship was achieved for external intelligence and information systems/information technology components in the sequence for prospector-analyser-defender types. Moderate mean scores for prospector-type organisations were achieved for internal alignment, agility and horizontal knowledge, information systems and information technology and external intelligence components which seem to suggest that the Miles and Snow typology for the analyser-type being the hybrid between the prospector and defender-type organisation applies to knowledge generation and personal knowledge orientation factors. This is in broad agreement with management literature that knowledge management has to be linked with organisational strategy so that economic value can be created and competitive advantage sustained through knowledge generation, internal alignment and external intelligence (Zack 1999a; Maier 2007). Writers who follow the resource-based view of the organisation, and who study knowledge and strategic management integration consider knowledge as the key resource to organisations which is sustained through appropriate IT systems (Maier 2007). Thus IT networks are said to sustain knowledge resources requirements, organisational positioning, core competencies development and strategic business fields through product/service market-

combinations. For the reactor-type the lowest score was only achieved for agility and horizontal knowledge flow orientation factor which is typical for this type. For the other knowledge orientation factors this is inconsistent with the Miles and Snow typology when applied in the Maltese context.

In summary, it seems that Maltese analyser-type organisations are closer to prospector-type which suggests a hybrid type between the two strategy-types. This seems to suggest that no clear structural typology till yet exists. In addressing one of the primary outcomes of this study, the next section offers to tackle this issue by developing a knowledge orientation matrix for Maltese medium to large-sized organisations.

5.5 The development of a knowledge orientation matrix for Maltese medium to large-sized organisations

A central objective of this dissertation was to establish what factors help to align knowledge management and organisational business objectives in Maltese medium to large-sized organisations. The knowledge orientation aspect deals about such behaviours at an organisational strategic level. Whereas the Miles and Snow model deciphers the main differences between the different strategic knowledge orientation parameters, a proposed typology will be offered to reflect the Maltese scenario. The development and utility of cluster analysis for the seven knowledge orientation factors identified earlier (p. 240), led towards the identification of four significant cluster groups with statistically significant variations. From an analysis

performed from two to six cluster configurations, the four cluster group was adopted as this shows an even distribution of categorised cases (table 4.51, p. 240). Table 5.1 represents the general characteristics encountered in Maltese medium to large-sized public and private sector organisations. As Wiig (1997) had proposed, one would expect a combination of knowledge orientation factors as derived in table 4.45 (pp. 230-2). The following knowledge orientation taxonomy is being proposed which 'denotes the classification of information entities in the form of a hierarchy, according to the presumed relationships of the real-world entities that they represent' (Maier 2007: 258) (see table 4.19 and 4.45).

a) The connector-type (knowledge strategy for business strategy) resembles the internal alignment/knowledge generation knowledge orientation factors as strategic knowledge is explored and exploited (Bierly & Chakrabarti 1996; Zack 1999a).
b) The scrutinizer-type which creates value for customer orientation resembles the solitaire-type except for external intelligence knowledge orientation factor.
c) The supporter-type which focus on product leadership is mid-way between the connector and scrutinizer-type.
d) The solitaire-type is opposite to the connector-type.

The knowledge management system that this taxonomy tends to express is related to knowledge behaviours at strategic organisational level.

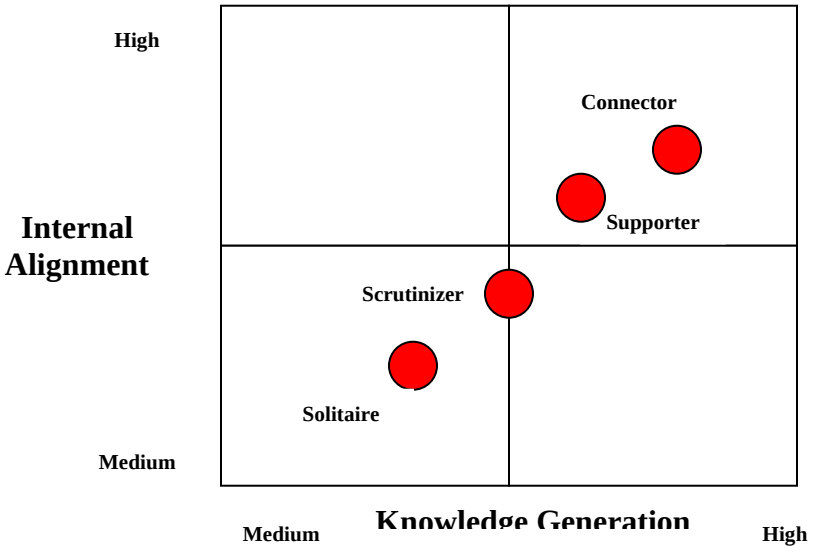
Type 1: CONNECTOR	**Operational excellence** **Competitive orientation in terms of knowledge management** In a continuous search for new reliable products, services, markets and technologies through appropriate connections. i) Overall objectives, organisation knowledge needs/requests and knowledge management practices are aligned and updated continuously so that operations are performed effectively ii) Knowledge is continuously updated through research and development iii) Knowledge contribution within the organisation is enhanced through the organisation's remuneration structure and disseminated to other employees iv) Applies ICT technologies and appropriate internal and external networks to access knowledge and documentation v) Knowledge information related to difficulties encountered, failures registered or possible mistakes that might arise are disseminated in a constructive manner vi) Utilises exit interviews so that knowledge and experience could be transmitted
Type 2: SCRUTINIZER	**Creating value for customer orientation** i) Client and industry knowledge is continuously updated and is considered of moderate importance ii) Overall objectives, organisation knowledge needs and knowledge management practices are aligned and updated continuously in order to promote the more effective performance of operations to a lesser extent iii) Information accuracy is considered essential even though it may take some time to capture iv) Attempts are made to increase levels of innovative knowledge through communication between people who possess the relevant knowledge v) Moderate investments in information systems and technology
Type 3: SUPPORTER	**Product Leadership** **Technological orientation representing a middle course in knowledge management** i) Dependent on success built on already established products. Striving to produce continuous state of the art products/services and improving organisational profitability. ii) Utilises its own ICT technologies for documentation and storage of information to a moderate extent iii) Client and industry knowledge is continuously updated and is considered important iv) Overall objectives, organisation knowledge needs and knowledge management practices are aligned and updated continuously so that operations are performed effectively to a moderate extent v) The organisation has a performance management system that is disseminated throughout the organisation with its information systems vi) Organisational training is based on the transfer of knowledge through appropriate mentoring

Type 4: SOLITAIRE	**Opposite to the connector-type** i) Little emphasis is placed on the overall objectives, organisation knowledge needs and knowledge management practices alignment so that operations are performed effectively ii) External knowledge updating through research and development is little iii) Knowledge contribution within the organisation and dissemination to other employees is achieved to the least extent iv) Applies leading edge technologies and appropriate internal and external networks to access knowledge and documentation to the least extent v) Knowledge and experience transmission is not given importance vi) Rigid operation and inward looking approach

Source: Derived from author's conclusions and analyses following table 4.19 (pp. 196-200)

Table 5.1: The creation of strategic knowledge orientation management typology for Maltese medium to large-sized public and private sector organisations

Figure 5.9 represents the strategic orientation grid for Maltese organisations.



Source: Derived from Strategic Knowledge Orientation Factor types

Figure 5.9: Strategic knowledge orientation matrix for Maltese organisations

In the development of the strategic knowledge orientation matrix, one should note that the connector idea is similar to Truch (2004) and Zack (1999a). Zack maintains that a balance between exploitation and exploration, referred to as innovators, is an important balance to maintain in a highly effective organisation. The qualitative research performed by Wiig (1997) refers to the combinations of knowledge

orientation, which were confirmed by the findings from this dissertation. In fact both agility/horizontal knowledge flow and formality/standardisation are combined factors in this knowledge orientation matrix.

A four-category typology was devised for the Maltese scenario made up of connector, scrutinizer, supporter and solitaire (figure 5.9). The connector-type focuses on operational excellence and its competitive orientation in terms of knowledge management is in the continuous search for new reliable products, services, markets and technologies through appropriate connections and appropriate remuneration structures to aid towards knowledge contribution. Investments in leading technologies are critical for this type as the retrieval of competitor knowledge is considered of utmost importance. The connector-type resembles the internal alignment/knowledge generation knowledge orientation factors as strategic knowledge is explored and exploited.

The scrutinizer-type focuses on the creation of value for customer orientation based on appropriate information accuracy retrieved from client and industry knowledge. Scrutinizer-type organisations sustain that their overall objectives, organisation knowledge needs and practices are aligned and updated. Investments in information systems and technology are moderate. The scrutinizer-type resembles the solitaire-type expect for external intelligence as innovative knowledge through appropriate communication between people is maintained in order to attain relevant knowledge.

The supporter-type focuses on product leadership based on client and industry knowledge. This type is more technologically-oriented and is dependent on successes built on already established products. This type usually embraces organisations who possess a performance management system that is disseminated throughout the organisation. Investments in information systems and technologies are usually sustained in-house to a moderate extent. The supporter-type is mid-way between the connector and scrutinizer-type.

The solitaire-type is opposite to the connector-type. Little emphasis is placed on the organisation's knowledge contribution, knowledge needs and practices. There is also little focus on retrieving external knowledge and knowledge contribution from employees is minimal. This type is characterised with rigid operations and inward-looking approach. As regards to investments in information systems and technology, this is also minimal.

The interpretation of the knowledge orientation grid (figure 5.9), has to be taken in the right context of what is the right strategic fit and the right strategic alignment between organisational business strategy and knowledge management systems. This brings forward issues related to organisational performance.

5.6 The organisational performance link with strategic-type and knowledge orientation domains

According to research by Conant et al., (1990), the Miles and Snow strategic-types of prospector, analyser and defender-type organisations perform on an equal basis and above the reactor-type. However Miles and Snow's hypothesis is not supported by the findings registered for Maltese organisations, as it was found that the mean of prospector and analyser-types is greater than the defender-type strategy at a significance level of $p<0.05$ (p. 205).

In the previous chapter, analysis was performed on the correlation between performance, strategic-types and the knowledge orientation factors (table 4.59, p. 247). It was encouraging to find that significant moderate correlations were registered, which provide a direct contribution towards knowledge orientation, strategic-type and performance relationship. It was established that for Maltese medium to large-sized organisations adopting an analyser-type strategy, the most significant knowledge orientation factor is internal alignment. This is more in line with what is usually expected of a prospector-type organisation in a knowledge-creating organisation, which also seems to suggest that the prospector and analyser-types are closely related in the Maltese environment. Miles and Snow (1978) state, that the analyser-type positions itself between the defender and the prospector-type organisations. It seems that this finding is not consistent with what is usually expected of a fast follower analyser-type as internal alignment is generally experienced at maturity in a knowledge-based organisation.

For the defender-type the most significant knowledge orientation factor is agility/horizontal knowledge flow which is typical as scanning and knowledge generation are essential components. The defender-type is predominantly driven by cost economy and efficiency gains which do not necessarily incline towards a leading-edge technology investment type. The cost-effectiveness issue plays a vital role among defender-type organisations and it may not always be logical that all types of investment lead towards better performance through better organisational efficiency and productivity for different strategy-types. This may provide an answer why different organisations with different strategic-types adopt different knowledge orientation factors so that better performance can be achieved.

For the reactor-type the most significant knowledge orientation factors were internal alignment, agility/horizontal knowledge flow and formality/standardisation (p. 247). This was a surprising result which in essence showed the level of maturity in reactor-type organisations and the higher performance levels which may be achieved. The knowledge orientation factors coined with the reactor-type calls for investments in training and people resources which may not be cost-effective.

In the categorisation of organisations considered as high and low performers, the cross-tabulation drawn earlier (table 4.56, pp. 243-4), clearly shows the variance in distribution between both groups. For high performer organisations, 22% adopt the solitaire-defender classification and 34.1% adopt the scrutinizer-analyser classification. 23.1% adopt the connector-prospector/reactor-type classification and

20.9% adopt the supporter-analyser/defender-type classification. Thus, it seems that a solitaire-defender, scrutinizer-analyser, connector-prospector/reactor, supporter-analyser/defender links are present in high performance Maltese medium to large-sized organisations, which was confirmed by the correspondence analysis (figure 4.18, p. 246). Although the sample size is relatively adequate for this research, significant variances that may give an indication of some form of pattern that search for a tighter strategic fit should be realised with more caution.

Løwendahl and Revang (1998) warn against accepting universal generic solutions when it comes to understanding organisations and strategic fit. In other words a generic fit is hardly suitable in organisations, especially when different strategic-types are adopted and which have components that are changing continuously in turbulent environmental business scenarios. This includes clients and the supplier relationships that such organisations deal with, which can hardly be visualised as stationary. Løwendahl and Revang (1998) suggest that the best environment when dealing with suppliers and clients should be fluid in nature rather than static.

The predictive power of the research model helps in understanding strategic fit better. This proposed research model comprises of the seven knowledge orientation factors, environmental turbulence and strategic-type. It was established that the model reduces random error by 12.26% (pp. 248-250). Analysis was also developed for the derivation of five and six knowledge orientation but the random error calculations were 8.96% and 11.46% respectively and were discarded. This sustains

the argument that organisational strategic alignment and organisational performance are strongly linked and agrees with research conducted by Scott-Morton (1991), Miller and Cardinal (1994), Miles and Snow (1994), Drew (1999) and Truch (2004).

In summary, for Maltese anslyser, defender and reactor medium to large-sized organisations the results achieved for internal alignment, agility/horizontal knowledge flow and formality/standardisation knowledge orientation components seems to suggest that the link between knowledge management and organisational strategy are essential features for economic value and competitive advantage to be sustained within an organisation. It seems that this is consistent with Nonaka's (1991) assertion that survival in turbulent environments is sustained through knowledge creation.

5.7 Comparison with the Miles & Snow, Hansen and Truch models

Conant et al., (1990), Abernethy & Guthrie (1994) and Truch (2004) have shown that the Miles and Snow model (1978) can be used to measure organisational strategic orientations. The strongest point in the Miles and Snow model is its' capability in addressing the ever-changing turbulent business scenario through its adaptive cycle concept. When the Miles and Snow model was conceived in the late 70's, certain aspects regarding technological developments were still in their infancy or even unthought-of at that time. In fact the information management aspect was considered to possess a minor effect in the Miles and Snow model

(1978). A case in point is the utility of the intranet, internet and extranet, which links further and facilitates communication and information flow between employees through better connectivity as mentioned previously in the literature review (p. 56-7). Analysis for Maltese organisations shows that the role played by information systems and information technology results in an important knowledge orientation factor. It is also evident that the four types exist in every industry with different variances. It seems that prospector-types are tagged with services, analyser-types are tagged with media and manufacturing industries, government services are tagged with defender-types and food-manufacturing with reactor-types. The variances, achieved between the strategic-types are as follows:

Prospector: Personal services (17.1%); Recreation services (14.3%);

Analyser: Communication (11.4%); Miscellaneous manufacturing industries (11.4%)

Defender: Government services (32.7%); Transport (16.3%)

Reactor: Food manufacturing (22.2%); Government services (16.7%).

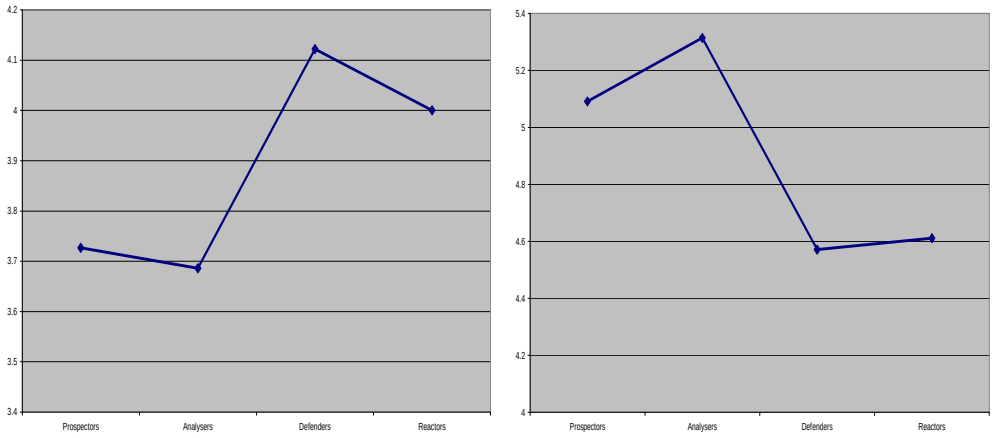
The research finding amongst Maltese organisations revealed that prospector-type perform better than the defender-type organisations, which is contrary to the Miles and Snow's model which states equal performance status between the prospector, analyser and defender strategic-types and which generally outperforms the reactor-type. An explanation as to why Maltese prospector-type organisations outperform the other strategic types could be the move of the Maltese-based economy towards a

European Union economy[36] (Europa 2008) and this transition towards a trade and knowledge-based economy is being taken advantage of by prospector-type organisations more than the other strategic-types. However this scenario might change in the long-term if the analyser and defender-types gain enough knowledge to reach maturity stage, which may enable them to keep pace with the prospector-type strategies. In fact for the Maltese scenario, certain hypotheses presented in this dissertation show that analyser-type organisations outperform the prospector-type (pp. 196-200). Sectors involved in direct production especially in the manufacturing industry continued to experience job losses, which was offset by employment opportunities growth in market service activities such as real estate, renting, business activities, community, social and personal services activities. Following a strong growth in 2006, total manufacturing turnover increased by a further 4% during the first six months of 2007 (Economic Policy Division 2007). This should be more in line with Miles and Snow's prospector-type, but seems to be addressing more the analyser and defender-types for Maltese organisations which represent 25.5% and 35.8% respectively (table 4.5, pp. 167-169) of those organisations surveyed.

The findings also challenge previous thinking on knowledge management in other ways. For example, questions are raised about Hansen's et al., conclusions about the relationship between knowledge orientation and organisational performance. COD18 and PERS19 examine approaches to training in Maltese organisations.

[36] This combines the economies of 27 member states and is generating an estimated nominal Gross Domestic Product of US$17.6 trillion in 2008 according to the International Monetary Fund. It accounts for about 31% of the world's total economic output. (Wikipedia 2008).

Figure 5.10a shows training relying on documentation and manuals, that is explicit or codified knowledge. As expected defender-type organisations score highest, as focus is maintained on internal efficiency. Although marked differences are registered between the strategic groups, they are less significant in statistical terms. Figure 5.10b shows training and knowledge transfer conducted in Maltese organisations through coaching and mentoring that is tacit or personalised knowledge. A significant result is registered with analyser-type organisations making more use of people-to-people training than prospector-type of organisations.



(a) (b)

Source: Author's derived date from survey-based questionnaire

Figure 5.10: Training performed (a) document based (b) people based in Maltese medium to large-sized organisations

From the survey held, representing 44.4% of the Maltese medium to large-sized organisations, it does not materialize that better performance is achieved if organisations adopt either a personalisation or codification strategy which

contradicts Hansen's et al., (1999) qualitative prescriptive research. Also it does not transpire that if a personalisation instead of a codification strategy is adopted or vice-versa, the business might enter into a risk. Figure 4.10 (p. 189) shows a graphical plot for the mean personalisation against the mean codification dimensions.

If Hansen's et al., (1999) assertion is correct, one would have expected a clustering of high personalisation/low codification and low personalisation/high codification for Maltese medium to large-sized organisations. On the contrary, it is evidently clear that the clustering proposed by Hansen et al., does not exist in the Maltese scenario. The Pearson correlation (table 4.14, p. 188) achieved for Maltese medium to large-sized organisations is 0.626 at a significance level $p = 0.0005$ and is more linear in nature (figure 4.10, p. 189). The findings for Maltese organisations are more in line with Tovstiga and Korot's (1998) findings as they suggest that both tacit and explicit knowledge are required to survive in today's knowledge-based competition.

The research findings in this dissertation imply that contrary to what Hansen et al., had proposed, that in order to enhance organisational performance either a personalisation or codification strategy is adopted, Maltese organisations appear to seek both personalisation (tacit) and codification (explicit) strategies. This is more in line to what Marchand (2001) had proposed, as a positive link with performance is registered when personalisation and codification strategies are adopted. Also

technological information systems advancements yield the possibility of further data mining in prospector-type organisations. Information retrieval for job effectiveness and efficiency is by far greater than in the defender-type, which sustains the argument further that prospector-type organisations adopt both personalisation and codification-type strategies.

Truch (2004) identified nine knowledge orientation factors. As regards to variance for internal alignment and knowledge generation, Maltese prospector and analyser-types are significantly greater than the defender-type organisations. The prospector and analyser-types are significantly greater than the reactor-type for agility and horizontal knowledge flow (p. 238). This agrees with Truch's (2004) framework to a certain extent as similar results were achieved for internal alignment, agility, horizontal knowledge flow, and knowledge generation. Although Truch obtained significant results for external intelligence, information systems and technology and standardisation knowledge orientation factors, no significant results were achieved for Maltese organisations. No significant results were achieved for both personal knowledge and formality knowledge orientation factors for both models.

This research serves as an eye-opener for Maltese medium to large-sized organisations who intend to adopt a codification-type strategy at the expense of personalisation-type strategies and which are in the process of formulating their knowledge management strategy.

5.8 Concluding remarks

The scope of this dissertation was to investigate the knowledge management approaches adopted by Maltese medium to large-sized organisations in relation to their business strategies and their impact on organisational performance. The findings indicate that Maltese organisations follow different strategies related to their business strategy. Knowledge orientation factors and business strategy-types combine to provide impact on the performance levels of Maltese organisations.

In this dissertation the Miles and Snow model was used to analyse Maltese organisations. The organisational performance between prospectors, analysers and defender-types, was found to vary. In fact for Maltese organisations the prospector-type organisations almost always outperformed the defender-type for the hypotheses that were sustained. Hansen's et al., model prescribes that either a personalisation or a codification strategy should be adopted to optimise performance. The Maltese scenario yielded that all Maltese organisations following different strategies, utilizing *both* codification and personalisation seemingly much to the same extent.

The seven knowledge orientation factors were discussed across the different strategic-types. Performance was found to be a direct link with some of the strategic knowledge orientation factors but with a varying degree, indicating the importance of strategic alignment on organisational performance. A predictive capability of the model that links business environment change and unpredictability, knowledge orientation that combines knowledge management strategy and implementation,

strategic orientation that address the organisation's behaviour to environment changes and strategic alignment which combines knowledge orientation, strategic-type and environment which ultimately influence performance was proposed with a reduction of random error performance of 12.26%. Cluster analysis was also used with the scope of understanding organisational knowledge orientation. A four-type classification of connector, scrutinizer, supporter and solitaire has been proposed. For Maltese high performance medium to large-sized organisations, alignment was found to exist between solitaire-defender, scrutinizer-analyser, connector-prospector/reactor, supporter-analyser/defender groups. The connector-type deals with operational excellence and competitive orientation in terms of knowledge management. This is typical of the prospector-types which are in continuous search for new reliable products, services, markets and technologies through appropriate connections (Miles & Snow 2003; Garrigós-Simón et al., 2005), but in the Maltese scenario, components related to the reactor-type are also evident. The scrutinizer-type is similar to the analyser-type where value is created for customer orientation. The supporter-type holds components pertaining to both analyser and defender-types, where product leadership is essential for organisational success built on established products (Miles & Snow 2003; Garrigós-Simón et al., 2005) . Thus it seems that the analyser-types are divided into two, those closer to the prospector-type and those closer to the defender-type. The solitaire-type is similar to the defender-type and is the direct opposite of the connector-type which is similar to the Miles and Snow typology with prospector and defender-types on opposite ends.

However this research has shown that certain elements identified for the reactor-type in the Miles and Snow typology are also present in the connector-type as well. Ultimately, the findings of the study suggest that, at least within the Maltese context, the relationship between knowledge management orientation, organisational strategy and performance is in some important ways different to that proposed in previous studies. The model discussed in this chapter outlines this relationship, and in the final chapter of the dissertation these findings will be put in their proper perspective, and further recommendations will be proposed.

Chapter 6 – Concluding remarks and possible future research

6.1 Introduction

This study set out to illuminate the relationship between organisational strategy, organisational knowledge orientation, environmental turbulence and organisational performance. In doing so, it aimed to offer a model of strategic alignment that builds on and advances previous models of knowledge management. It sought to achieve this through an empirical and predominantly quantitative study of Maltese medium and large-sized organisations. The research model (figure 3.1) focuses on a five-point framework for Maltese organisations namely:

1. The organisational performance.
2. The strategic-type that is prospector, analyser, defender and reactor in relation to the organisational environmental behaviour.
3. The level of environmental turbulence in the Maltese business scenario.
4. The development of knowledge orientation factors.
5. The strategic alignment of an organisation by linking knowledge orientation factors, environmental turbulence, strategic-type and performance.

A survey-based questionnaire was adapted from the literature (Truch 2004), with the aim to research Maltese medium to large-sized organisations. A small number from the Maltese public and private sector management were consulted before the final survey was conducted, in order to retrieve feedback on the questionnaire, the scope of which addressed a broader level across Maltese organisations ranging from

fifty employees and over (appendix 6b). Existing literature was used in order to complement the survey questionnaire which was based on components related to knowledge orientation and its relation to organisational strategic alignment, strategic-type, environmental turbulence and organisational performance.

In recent years organisations have found themselves entrenched in a knowledge-based economy. This has made management in both Maltese public and private sector organisations dependent on a high percentage of intangible assets, with knowledge being considered as one of the most important assets that an organisation can possess. This resultant philosophy is breaking new ground in the creation of new models and challenging past academic research as regards to the measurement and development of intellectual capital. Marchand et al.'s (2001) research has suggested that information management and technology practices, organisational behaviour and values are directly linked with organisational performance management. In order for superior performance to be achieved all the three above mentioned criteria should be present. This is reflected in the Maltese scenario (table 5.1).

As outlined in the literature review, this thesis builds on previous attempts to address the issue of how strategic alignment of knowledge management practices might be linked to performance. For example, Scott-Morton's (1991) research carried out by the MIT Sloan School of Management on organisational strategic alignment failed to link organisational performance with information technology

systems investment. However the MIT research carried out in the 1980s led towards a new way of addressing knowledge management of information systems related to organisational culture, structure, operating procedures as well as how business is carried out in such organisations.

Yet, despite this progress, there are still significant gaps in the current evidence base. For example studies conducted so far on this subject, except for Truch (2004), have been of a qualitative nature (Bierly & Chakrabarti 1996; Wiig 1997; Hansen et al., 1999; Zack 1999a), focusing on the organisational strategic orientations of a particular industry. This quantitative research goes beyond this focus on specific sectors, and addresses this issue for Maltese organisations and benchmarks with Miles & Snow's (1978), Hansen's (1999) and Truch's (2004) models. In fact research findings of Maltese public and private sector organisations confirm that different knowledge management approaches are usually adopted by different organisations falling in different sectors, which can be linked with different business strategies.

6.2 The contribution of this research conducted on Maltese medium to large-sized organisations

This dissertation reveals several gaps in knowledge management research that need to be addressed before we can really verify the traits of strategic alignment of knowledge management orientation in organisations. The critique, however, is not targeted at any single model or theory, but at theory building. This dissertation

introduces a set of knowledge management orientation factors to study whether strategic alignment of knowledge management orientation occurs in Maltese medium to large-sized organisations. This study provides further quantitative evidence that sustains the importance of organisational strategic alignment besides the development of a knowledge management taxonomy which provides an indication of how IT/IS investment should be addressed in order to implement an effective organisational knowledge management system.

It has been established from the findings of this study that strategic knowledge orientation varies significantly as different organisations adopt different strategic-types. This is one of the most important findings and agrees with Truch's (2004) result, as it was previously thought that a one size fits all model could have been assumed. Other important findings were that medium to large-sized organisations adopt both personalisation and codification-type strategies which refutes Hansen's et al's (1999) argument.

Hansen et al., (1999) posit that both strategies are not used equally and claim that organisations use 80% of their knowledge sharing following one strategy with the remaining 20% of the other strategy. Since a positive correlation was registered for organisations adopting both personalisation and codification types (table 4.14), this does not sustain Hansen's et al., argument (1999) that organisations explicitly use either the personalisation or codification type of strategy. Although Hansen's model explicitly states that between personalisation and codification strategies, a negative correlation exists, the findings for the survey conducted in Maltese organisations

did not sustain this argument as a positive correlation was achieved, which seems to suggest that perhaps the reality of knowledge management is more complex than such typologies imply which see them as mutually exclusive.

There were also some significant findings relating to the connection between strategic orientation and performance. For example, according to the Miles and Snow's model, reactor-type organisations perform poorly compared with the defender, analyser and prospector-types. It was found that the mean performance of the defender, analyser and prospector-types falls within the confidence interval of the reactor-type. Therefore Maltese medium to large-sized reactor-type organisations, perform at a similar level with the Maltese defender, analyser and prospector-type organisations. This does not agree with Chandler's (1962), Miles and Snow's (1978), McKee et al's (1989) and Croteau et al's (1999) assertions that the reactor-type organisation will be slow to respond to business opportunities, move towards diversification with less certainty and enthusiasm, have no specified identified strategy, and considered as ineffective performers if neither of the "pure" strategies between prospector, analyser and defender are chosen.

The findings also raise some interesting questions concerning the conventional taxonomies of strategic-type. For example, it seems that the analyser-type organisation is closer to the prospector-type organisation, which suggests that rather than having distinct prospector and analyser-types, a hybrid between the two might be possible. Another possibility might be that the analyser-type is split into a further

two categories that is prospector-analyser type and the defender-analyser type, which reminds us of the dual nature possessed by the analyser-type technology organisations allowing them to produce products or services efficiently and keeping pace with developments engendered by prospectors (Miles & Snow 1978). This might lead us to question the validity of the Miles and Snow's typology of a distinct analyser-type. Developing a hybrid between prospector and analyser-type or splitting further into a further two categories of prospector-analyser and defender-analyser sustains Olson's et al., (2005) argument that analyser-type organisations operate in a way that is closer to defender or the prospector-types.

The relevant factors that should be taken into account when developing a knowledge management strategy in Maltese medium to large-sized organisations have been presented in this dissertation. As established by other researchers, this study has continued to strengthen the argument that strategic knowledge orientation rests on the importance of strategic alignment and on a number of important knowledge orientation factors such as internal alignment, knowledge generation, agility/horizontal knowledge flow, formality/standardisation, personal knowledge, information systems and technology, and external intelligence for Maltese public and private sector organisations.

Knowledge may be viewed through the development of stages as in the Boston matrix lifecycle stages (Drew 1999). In the development of the strategic knowledge orientation matrix, Zack (1999a) maintains that a balance between exploitation and exploration, referred to as innovators, is an important balance to maintain in a

highly effective organisation. One should also note that the connector idea is similar to Truch (2004) and Zack (1999a). Truch's (2004) knowledge orientation grid is made up of networker, follower, scanner and loner. Whereas Truch (2004) maps knowledge orientation onto a grid with internal alignment and external intelligence dimensions, the dimensions used in the Maltese context were internal alignment and knowledge generation.

The strategic knowledge orientation management typology for Maltese medium to large-sized organisations is made up of a four categories. These include the connector-type which focuses on operational excellence which sustains a competitive orientation through new reliable products, services, markets and technologies, the scrutinizer-type which creates value for customer orientation through appropriate client and industry knowledge, information accuracy and strategic alignment, the supporter-type which focuses on product leadership which sustains a technological orientation representing the middle course for knowledge management and the solitaire-type which is opposite to the connector-type.

When it comes to the interpretation of the knowledge orientation grid (figure 5.9), the issue related to capital expenditure has to be taken into consideration. Although it seems logical that the best knowledge orientation strategy to be adopted is that to become a connector, this may not always be feasible and logical, especially if the organisation intends to follow a cost-focused strategy as defender-type organisations usually do. It is reasonable to assume that in order to maintain a high

score along the internal alignment-knowledge generation axes, high costs are involved. This is because maintaining this high level generally involves the alignment of organisational knowledge needs and human resources policies, an adequate performance measurement system, appropriate dissemination of information amongst staff, continuous competitor and client knowledge updating. In order for these policies and procedures to be effective they need to be supported by an adequate information technology infrastructure (Maier 2007). Based on this research study, apart from the internal alignment-knowledge generation orientation, the agility/horizontal knowledge flow orientation also needs to be addressed for immediate response to knowledge requests, coupled with overall objectives and knowledge management practices alignment, constructive dissemination of knowledge problems encountered, and the appropriate mentoring for organisational training. This resonates with Nonaka & Takeuchi's (1995) role of knowledge practitioners who constitute the embodiment of knowledge, and who act as 'walking archives'. They are in direct contact with the outside world, the latest information in market, technology or competition can be tapped, and in this respect are central to the knowledge-creation process.

Thus the selection of the connector strategy may not always be the best solution as each organisation has its own strategic intent to satisfy. We can perhaps offer the conclusion that there is no universal prescription for success in terms of achieving the right strategic fit and the right strategic alignment between the overall organisational business strategy and knowledge management systems.

6.2.1 Strategic alignment and its implications for knowledge management

Generally alignment was also found to exist between solitaire-defender, scrutinizer-analyser, connector-prospector/reactor and supporter-analyser/defender groups. This analysis provides an important insight for Maltese management who intend to invest in information technology systems and are seeking the implementation of an appropriate knowledge management system. The four-type typology indicates what kind of information systems technology is expected in relation to criteria established within the specific type. Satistical evidence shows (table 4.19) that the connector-type needs to invest greatly in leading edge information systems and technology, with the solitaire-type being the least. Moderate investment is necessary for scrutinizer-type and supporter-type (see tables 4.45 and 5.1). However the type of information systems and technology investment will also depend upon whether the organisation intends to create value for customers or whether the organisation intends to be a product leader. The criteria established within these two types will aid management in determining what type of moderate investment in information systems and technology has to be sustained.

6.2.2 The implication of a predictive model for Maltese medium to large-sized organisations

The development of a predictive model for Maltese medium to large sized organisations has several implications for those organisations which seek performance improvement through the better use of knowledge managament. It is evidently clear that IT/IS systems alone do not provide the required effective

business transformation. The predictive model has shown the importance of strategic management, information management, internal and external networking of people and organisations. The predictive model derived in this dissertation for Maltese medium to large sized organisations has shown the importance of strategic alignment between business strategies and knowledge management systems in relation to enviromental turbulence and which has continued to sustain that a one size does not fit all. The predictive model has also influenced how organisational management teams will measure intellectual capital through the identification of knowledge orientation factors within the Maltese context.

Reliability estimates the degree to which a model measures the same way each time it is used in under the same conditions with the same subjects, which was confirmed earlier using appropriate statistical analysis. Validity, on the other hand, involves the degree to which the model measures the accuracy of the measurement. The measurement scales used in the survey instrument met the requirements of the statistical analysis procedures adopted. This confirms both the reliability and validity of the proposed model in the Maltese context.

6.3 The limitations encountered in this dissertation

As was established in an earlier part of this dissertation, the 142 sample size was adequate as this represents 44.4% of the medium to large-sized Maltese organisations. For this survey-based questionnaire disseminated amongst Maltese public and private organisations, it was assumed that one respondent coming from a senior management or management position, can comment on behalf of an entire

organisation. The findings are based on a survey of single respondents with 26.8% being a subsidiary of a foreign organisation. Although it was communicated that the respondent should from part of the management team and should preferably be from the Human Resources Department, the ideal situation would have been in allowing for a multi-respondent method so that this limitation could be addressed. Another limitation was that only medium to large-sized organisations were addressed. Ideally micro and small organisations with employees less than 50 should also have been addressed but the limitation was that small enterprises generally do not have the human resources function in place within their organisational structure, with this role being adopted generally by the managing director and/or chief executive officer of the organisation in the Maltese scenario. Besides the Miles & Snow's (1978) model indicate that the typology could not be used for organisations with 25 employees or less.

Recent studies are suggesting that both societal and cultural characteristics of a nation are most likely to influence the culture of an organisation. This effects directly both the implementation and success of knowledge management implementation and initiatives, which suggests that different results might be achieved if this study is replicated in a different country (Michailova & Husted 2003; Hofstede & Hofstede 2005; Ardichvili et al., 2006; Greiner et al., 2007). Therefore it seems that organisations in different countries may possess different knowledge orientation factors, with different levels of importance. This has been experienced in Woodside et al's (1999) research, where their study was built on

work carried out by Conant et al., (1990). In fact the results between Finnish and American organisations varied, as a weak relationship was registered between strategic-types and organisational performance in Finnish enterprises. Therefore it seems that the generalisability of the findings in this research compared to other national settings may be limited and it seems more likely that the results achieved are endemic in nature. Another issue may be the differences between industries/sectors. For example what works in a manufacturing environment may not work in a professional services context. Future studies may need to pay a little more attention to this.

6.4 Recommendations for further research

Knowledge management is definitely a research area that needs further exploitation. In the Maltese business scenario, small organisations of less than fifty employees and small micro-enterprises of ten employees and less need further exploration as regards to knowledge orientation. By obtaining a larger sample, the relationships between organisational strategic-type and knowledge orientation could be examined even further especially for a particular knowledge orientation component for Maltese medium to large-sized public and private sector organisations. The idea of developing structural modelling could lead to the better understanding between the seven different knowledge orientation components and a significant foundation for future research. Factor analysis may help towards the further simplification, reduction and interpretation of the knowledge orientation questionnaire. The development of qualitative research through structured interviews, along the seven

knowledge orientation factors identified, could lead towards more practical insights such as the measurement of intellectual capital and the better understanding of knowledge orientation relationships in Maltese organisations.

6.5 General remarks and implications of this study

The survey-based measurement scales met both the comprehensive range of components that it set out to measure and the statistical analysis procedures followed. The major challenge was in achieving the adequate amount of responses from the 322 medium to large-sized Maltese organisations identified. Judging from a response rate of 44.4%, one can state that the response rate was a success when compared with response rates of other knowledge management questionnaires (Chase 1997; 2002). The majority of respondents asked for the findings of this dissertation.

This study provides an insight for Maltese medium to large-sized public and private sector organisations which aims towards business performance improvement and competitiveness through more effective knowledge management as in research conducted by Tallon & Kreamer (2000) and Guitierrez et al., (2006). Information technology investment alone is not only the key to success as there are other factors which have been identified earlier in the different category-types (tables 4.19 and 4.45 and 5.1). For example the connector-type relies on competitor knowledge, proper alignment in organisational objectives, knowledge needs and practices, knowledge contribution through appropriate remuneration structure and the utility

of exit interviews. The scrutinizer-type relies on client and industry knowledge information accuracy and communication between people. The supporter-type relies on the utilisation of its own ICT technologies, client and industry knowledge, a performance management system and organisational training based on knowledge transfer through appropriate mentoring. Even the solitaire-type identified to be the least effective compared with the other types has a certain amount of focus on organisational objectives, knowledge needs and operational practices alignment so that adequate performance is maintained, as well as external knowledge and knowledge contribution from employees.

Strategic alignment helps to ensure excellence in knowledge management systems especially in the derivation of value from intangible assets such as intellectual capital measurement and its' management. This research furthers our understanding of the strategic configuration of Maltese medium to large-sized organisations using the four-type typology through an understanding of the resource utilisation of specific resources. Considering only IT investment does not produce the necessary changes for an effective business transformation. A one size fits all is neither the answer, as knowledge management systems and practices must be aligned with both their current and future needs. In order for organisations to be competitive both business and information technology strategies need to be aligned (Luftman et al., 1999). Strategic alignment is seen to assist Maltese medium to large-sized organisations in three ways namely by achieving competitive advantage through information systems, maximising return from information technology investment

and providing appropriate reaction when new opportunities arise in the market. Thus both IT investments and organisational business objectives need to be considered simultaneously by organisations with IT investment being considered as a business value enabler. Strategic alignment will allow more critical development of information systems as well as the necessary management support besides developing the right fit between internal organisational infrastructure and external organisational positioning.

Ultimately, what this thesis has demonstrated is that by using the strategic management typology for Maltese medium to large-sized organisations (table 5.1), connector-type organisations might use and develop market strategic decision support systems. The importance of strategic alignment is less for scrutinizer and supporter-types with the least argument for strategic alignment registered for the solitaire-type. Organisations should first determine which one of the typologies best fit their current business strategy. The proposed typology can be used to monitor and propose a new strategic alignment by the re-allocation of resources in order to address a new strategic direction such as operational excellence, or value for customers or product leadership.

APPENDIX 1

Defining information orientation

Information orientation in essence shows how an organisation is able to use and manage information at its disposal and a predictor of business performance. Marchand et al., (2001) defined information orientation as follows:

Information technology practices	Comprising capability to manage IT and infrastructure appropriately, IT for operational support, IT for business process support, IT for innovation support and IT for management support.
Information management practices	Comprising capability to manage information effectively over its lifecycle, sending, collecting, organising, processing and maintaining information.
Information behaviours and values	Comprising capability to instil and promote behaviours and values amongst people to use information appropriately, such as integrity, formality, control, sharing, transparency and proactiveness.

Source: Marchand et al., (2001)

The definition of information orientation

APPENDIX 2

The formation of business strategy in an organisation

Business strategy can be seen as a balancing act between the external environmental (opportunities and threats) and internal capabilities (strengths and weaknesses) (Zack 1999a). Knowledge management strategy is analysed through the business strategy context. The strategic planning process is comprised of three major components namely, formulation (including mission, objectives setting, internal and external environment assessment and selecting strategy alternatives), implementation and control (Hopkins & Hopkins 1997; Zack 1999a). According to some writers ten schools of strategy formation positioned around two main types, that is the prescriptive and the descriptive schools were identified by Mintzberg and Lampel (1999). In their study, Mintzberg and Lampel seek whether these perspectives refer to different approaches to strategy formation or different paths of the same process. In fact they identified that organisations usually adopt a typical narrow perspective in their strategy formulation. The table below outlines the different perspectives on strategy formation processes.

PRESCRIPTIVE TYPE OF SCHOOLS	DESCRIPTION	PROPOSED BY AUTHOR	PROCESS TYPE
Planning	Strategy formulation develops towards a step-by-step procedure, strengthened by a number of techniques and checklists such as budgets and operational plans. This is linked to urban planning, systems theory and cybernetics.	Ansoff, Andrews	Formal
Positioning	Development of industry situational analyses and strategy formulated along generic positions adopted. Literature includes strategic groups, game theories, value chains etc.	Porter, Hatten, Schendel	Analytical
Design	The development and crucial fit between internal strengths and weaknesses, and external threats and opportunities. Clear and simple strategies are formulated with the aim of facilitated execution of such strategies.	Selznik, Chandler, Andrews, Newman	Conception
DESCRIPTIVE TYPE OF SCHOOLS	**DESCRIPTION**	**PROPOSED BY AUTHOR**	**PROCESS TYPE**
Cultural	Strategy formation focuses on common interest and integration based on social and cultural processes.	Rhenman, Normann, Hedberg & Jonsson	Social
Power	Typical processes include persuasion, bargaining and confrontation usually present in political decisions leading to power split in such organisations referred to as Micro Power. Macro power looks at the collective interests to formulate its strategies by influencing with its' network relationship in the broadest of senses. Focus is on self-interest and fragmentation and analyzes the foundations of the organisation.	Allison, Pfeffer, Salancik, Astley	Negotiation
Learning	Strategists are commonly found throughout the organisation. A case in point is where strategy formulation and its implementation take place simultaneously. The base discipline is chaos theory in mathematics and essentially looks at the grass roots of the organisation.	Lindblom, Quinn, Bower & Burgelman Mintzberg, Weick	Emergent
Entrepreneurial	Shifting from well planned positions towards and beyond a broader, unique and vague vision. Particular focus maintained on niche, start-up or private ownership with the leader maintaining close control over the implementation of the vision.	Schumpter Cole	Visionary
Cognitive	A constructivist creative view of strategy formulation including information processing, knowledge structure mapping and concept attainment. The cognitive school tries to look inside the process.	Simon, March	Mental
Environmental	Strategy formation depends on the degree of manoeuvrability in such diverse and turbulent environments and includes contingency planning and population ecology analysis that affect the strategic choice implied. More a hybrid between power and cognitive schools.	Hannan, Fremman Pugh & Hickson	Reactive
Configuration	The organisation is viewed along its characteristics and behaviours. Machine-type organisations endorse relative stability whereas entrepreneurship-type organisations endorse more dynamic situations. The configuration school looks at the processes holistically.	Chandler, McGill, Mintzberg, Miller, Miles and Snow	Transformation

Source: Mintzberg and Lampel (1999: 21-30)

Strategy formation types of schools

Although the tendency is to view the ten different schools of thought as referring to different processes that lead towards the formation of strategy, this issue is still in flux (Falshaw et al., 2006). Porter's (1980) definition of strategy, considers it more as deliberate and deductive, but does not discard the very existence of strategic learning. The field of strategy formation has been obsessed with planning, which was followed by generic positioning of organisations and learning organisations. In their study Mintzberg and Lampel (1999) state that the classification identifying the different types of schools is continuously evolving and new schools are emerging, endorsing different configurations. This can be more clearly observed when one looks at the resource-based theory, which is more of a combination between design and learning schools.

APPENDIX 3

The concept of 'ba'

According to Nonaka & Konno (1998) the concept of *ba*, introduced by Japanese philosopher Nishida (1958) and developed further by Shimizu (1995), serves as a support platform for the creation, sharing and utilisation of knowledge. *Ba* can be thought of as a shared mental space which can be physical, virtual or mental and where relationships can emerge. Nonaka and Konno (1998) associate *ba* as follows:

Originating *ba*	Where feelings, experiences and mental models can be shared face-to-face, after removal of barriers between the self and others. It is the place where the individual may sympathise or empathise with other individuals. Mental models provide action guidelines for the future (Bood & Postma 1997). It supports socialisation and sharing of tacit knowledge between individuals (Maier 2007).
Dialogue or interacting *ba*	Where reflecting on originating *ba* is instigated. It is defined as collective face-to-face interactions. Generally reflection occurs on an individual's mental models and skills coupled with internal reflection, further articulation and further analysis of the self. Dialogue *ba* occurs when the right mix of individuals are chosen so that knowledge conversion can take place and turns implicit to explicit knowledge (Maier 2007).
Cyber *ba*	Where monologue can take place and is where knowledge both existing and explicit can be intermingled and combined together through information and network technology such as KMS, tele-conferencing or group support systems. It is the place where collective and virtual interactions take place. Cyber *ba* targets the combination from explicit to explict knowledge (Maier 2007).
Exercising *ba*	Occurs where explicit knowledge can be converted to tacit knowledge either through appropriate in-house training or other forms of participation and continuous self-refinement (Lave & Wenger 1991). It is defined by virtual and individual interactions. Exercising *ba* synthesises the transcendence through action and turns explicit to implicit knowledge (Maier 2007).

Source: Nonaka & Konno (1998: 40-54)

The definitions of ba

Ba exists at many ontological levels. The amalgamation of different levels of *ba* leads to a greater *ba* or *basho*. Once this level of *basho* is achieved, an open knowledge system is attained whereby clients, suppliers and companies may interact and address co-innovating partnership. Only when appropriate management leadership capabilities depending on fundamental awareness of organisational dynamics will *basho* be fully utilised, as this will provide the ability to create order out of chaos developing into emerging relationships that can be utilised to their full extent.

APPENDIX 4
Knowledge Orientation Factors

Construct	Type	Measure	Variable code
Training is based on group training, with the use of automated systems to facilitate distance learning and efficiency	**Codification**	Our organisational training is based on manual-type of training	**COD18**
One-to-one mentoring training is used to facilitate the transfer of tacit knowledge	**Personalisation**	Our organisational training is based on the transfer of knowledge through appropriate mentoring	**PERS19**
Organisations recruited people who are able to tolerate ambiguity and are potential problem-solvers	**Personalisation**	Staff hired within our organisation are problem-solvers	**PERS20**
The objective of having a pay related system is to encourage the transfer and sharing of tacit knowledge with other employees	**Personalisation**	Knowledge sharing is enhanced directly by our organisational remuneration package system	**PERS21**
Networks are created when employees are transferred within an organisation	**Personalisation**	Networks are fostered by the creation of secondments with other organisations through links developed by our HR department	**PERS22**
Human resources policy and knowledge management strategy alignment	**Orientation**	Both knowledge needs of our organisation and HR policies and systems are aligned	**ORIENT23**
Investment in information technology aids towards connecting people with reusable codified knowledge	**Codification**	Our organisation utilises its own ICT technologies for documentation and storage of information	**COD24**
Investment in information technology aids towards the transferring of tacit knowledge and in the identification of employees	**Personalisation**	Knowledge within our organisation is exchanged and contact through its own ICT technologies	**PERS25**
ICT supports knowledge management with the latest leading edge technology	**Orientation**	Our IT Department (or subcontracted IT Department) utilises the latest technologies in knowledge exchange	**ORIENT26**
The most important technological goals are return on investment and efficiency	**Orientation**	Our organisation has a performance management system that is disseminated throughout the organisation with its information systems	**ORIENT27**
The degree of retrieval to which people can tap codified knowledge without contacting the person who originally created it	**Codification**	Knowledge is tapped from our organisation's database without prior consultation to the person who created it	**COD28**
The KM systems enables to track down documentation from anywhere within the organisation	**Codification**	Knowledge is tapped from our organisation's database using search facility	**COD29**
The majority of knowledge within the organisation is considered as tacit and tagged to the person who created it	**Personalisation**	A high percentage of our organisation's knowledge rests with staff within the organisation	**PERS30**
The majority of knowledge within the organisation is shared mainly through the development of contacts between people	**Personalisation**	A high percentage of our organisation's knowledge is developed to staff-to staff contact within our organisation departments/divisions/units	**PERS31**

Construct	Type	Measure	Variable code
Knowledge investment asset is sustained when reused for several times	**Codification**	The concept of knowledge re-use is used to a great extent once it is discovered for our organisation's products/services	**COD32**
Organisations see customer knowledge as an important asset	**Orientation**	Client knowledge is continuously updated within our organisation and is considered of utmost importance	**ORIENT33**
Organisations see competitor knowledge as an important asset	**Orientation**	Competitor knowledge is continuously updated within our organisation and is considered of utmost importance	**ORIENT34**
Organisations see industry knowledge as an important asset	**Orientation**	Industry knowledge is continuously updated within our organisation and is considered of utmost importance	**ORIENT35**
The use and contribution towards the organisation's knowledge database is sustained through a performance related pay system	**Codification**	Knowledge database contribution within our organisation is enhanced through the organisation's remuneration structure	**COD36**
Experts are identified through appropriate directories	**Personalisation**	Our organisation's database knowledge on experts related to our field is continuously updated	**PERS37**
Innovation is enhanced if a proper link with knowledge management exists	**Personalisation**	Innovative knowledge is increased through communication between people who possess the relevant knowledge in our organisation	**PERS38**
An organisation emphasis on capturing tacit knowledge of employees when being transferred or when leaving the organisation	**Personalisation**	Our organisation utilises exit interviews so that their knowledge and experience could be transmitted to other staff members	**PERS39**
Emphasis on accuracy of information independent on the time required to achieve	**Orientation**	Information accuracy is essential to our organisation even though it may take some time to capture	**ORIENT40**
The degree of sustaining knowledge renewal so that information does not expire and becomes useless	**Orientation**	Our organisation's knowledge management is updated continuously	**ORIENT41**
The exploration strategy adopted by an organisation that can exploit knowledge assets effectively	**Orientation**	Our organisation is well known for the creation of acquirement of new knowledge assets	**ORIENT 42**
The innovation strategy adopted by an organisation that integrated both exploitation and exploration strategies so that its' strategic objectives can be met	**Orientation**	Our organisations creation of new knowledge assets are in line with the business operations of the organisation or by selling them to other organisations	**ORIENT43**
The retrieval of information determines the effectiveness of an organisation's strategy	**Orientation**	The derivation of new knowledge which directly effects our line of business is rather difficult to tap at times, thus hindering to carry out our operations in the most effective manner	**ORIENT44**
The organisation's knowledge system are focused externally	**Orientation**	Our organisation's knowledge management systems are geared on external issues	**ORIENT45**
The organisation focuses on the provision of facilitating access of information to all its' employees through proper electronic repositories	**Codification**	Documentation access is feasible throughout our organisation through its' information systems	**COD46**

Construct	Type	Measure	Variable code
The sharing of knowledge and knowledge flow within the organisation takes place horizontally and freely	**Orientation**	Knowledge management takes place mostly horizontally in our organisation	**ORIENT47**
The people-to-documents knowledge management strategy adopted by an organisation enables proper codification, storage, dissemination and reuse of such knowledge	**Codification**	The prime objective of our organisation's management is the capturing and reuse of our knowledge through the electronic medium	**COD48**
The creation of appropriate communities of practice and appropriate infrastructure that helps to link people and aids in the transferring of tacit knowledge	**Personalisation**	Networks with experts functioning along the same business lines of our organisation is given attention by our organisation's management	**PERS49**
The risk orientation of an organisation depends on the allowance provided by an organisation's management to deviate from a set of procedures	**Orientation**	Our organisation has standard operating procedures to work with and management discourages staff from work procedures deviations	**ORIENT50**
The extent through which horizontal operational level can be maintained in an organisation	**Personalisation**	Our organisation's project teams operate along a horizontal level in the organisation	**PERS51**
The organisation embraces a culture whereby employees are requested to respond fast to requested information from other staff members	**Personalisation**	The type of culture instilled within our organisation is to respond immediately to any knowledge requests from staff members within the organisation	**PERS52**
The extent through which organisational objectives are aligned with the knowledge management of the organisation	**Orientation**	Our organisation has its overall objectives and knowledge management practices aligned so that operations are performed effectively	**ORIENT53**
The coordination of knowledge management in an organisation	**Orientation**	Our organisation has a centralised knowledge management structure and a top-down approach	**ORIENT54**
The degree to which errors are allowed as a means to serve for innovation purposes	**Orientation**	Knowledge information related to difficulties encountered, failures registered or possible mistakes that might arise are disseminated in a constructive manner without prejudice in our organisation	**ORIENT55**
The time-degree to which reflection and sharing of experiences is allowed within an organisation	**Orientation**	Knowledge creation regarding operations in our organisation are reflected upon and disseminated to other members of staff	**ORIENT56**
The degree of knowledge flow verticalisation within an organisation	**Orientation**	There is a vertical flow of knowledge management from subordinate level to management level and vice-versa	**ORIENT57**
The extent for which knowledge systems of an organisation focus on its' internal aspects	**Orientation**	The focus on knowledge management systems are on internal aspects of our organisation	**ORIENT58**
The degree of time-allocation adopted by an organisation on research and development	**Orientation**	Our organisation devotes more time on research and development than our competitors	**ORIENT59**

APPENDIX 5

The research design and validation criteria adopted

Research design refers to the strategy of the research undertaken. The logic behind it includes the organisation of research activity that is data collection, that leads to drawing general conclusions from the research undertaken (Oppenheim 2006). Good research design should enable us to draw valid inferences from the data collected in terms of association, causality and generalization. 'While any empirical test for validity is inherently problematic, the sociologist's concern for valid measurement is fundamentally more important than the issue of reliability', (Selltiz et al., 1981). Reliability and validity are technical terms which are not always easy to decipher as they can have several meanings and can be measured statistically in a multitude of ways. Validity controls all biases, which could distort research. In fact validity is how far one can be sure that the test measures what it is supposed to measure (Easterby-Smith et al., 1991; de Vaus 1996; Elasy & Gaddy 1998).

Both clarification and refinement of concepts are essential factors for meaningful discussions on measurement validity, which remains a problem, as it is difficult at times to give the proper meaning of the people's responses (de Vaus 1996). In this research this has been overcome by using different data collection techniques e.g. interviewing ten Maltese medium to large-sized public and private organisations, which should faciltate more naunced interpretations of meaning.

Four types of validity have been considered in the design of this research. These are internal validity so that causal conclusions can be drawn, external validity which is the extent to which data can be generalised, construct validity where measurement of constructs can be achieved and statistical validity which is the extent that the appropriate design and statistical methods have been used in this research.

The scope of developing reliability in this research is to minimise the errors and biases involved during research and refers to the consistency of results obtained, where one can obtain the same result on repeated occassions (de Vaus 1996; Oppenheim 2006). The three most important components related to the creation of a reliable quantitative research are, the similarity of measurements within a given time frame, the degree to which a repeated measure remains the same and the stability of measurement over a time frame (Kirk & Miller 1986). Reliability in this research is illustrated through scatter plots, with greater scatter implying lesser reliability (Elasy & Gaddy 1998). These mentioned criteria have been considered in the design stage of this dissertation as well as in the survey statistical analysis in chapter 4.

APPENDIX 6a

TRUCH'S STRATEGIC KNOWLEDGE ORIENTATION

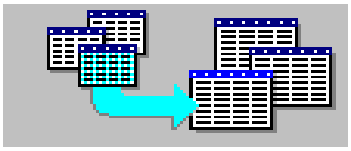
		Strongly disagree					**Strongly agree**	
18	Our training relies on documentation and manuals	1	2	3	4	5	6	7
19	People joining our company are good at problem solving in unclear situations	1	2	3	4	5	6	7
20	Our training relies on knowledge transfer through coaching or mentoring	1	2	3	4	5	6	7
21	Our remuneration systems encourage direct sharing of knowledge with others	1	2	3	4	5	6	7
22	Secondments to and from our company are used to foster people networks	1	2	3	4	5	6	7
23	Our HR policies and systems are aligned with the knowledge needs of our company	1	2	3	4	5	6	7
24	We mainly use our information and communication technologies (ICT) to access documents and data	1	2	3	4	5	6	7
25	We mainly use our information and communications technologies (ICT) to contact people and to exchange knowledge	1	2	3	4	5	6	7
26	We use leading edge information and communications technologies (ICT)	1	2	3	4	5	6	7
27	Our information systems provide comprehensive performance measures for our company	1	2	3	4	5	6	7
28	We can generally access the information that we need without having to refer to the person who created it	1	2	3	4	5	6	7
29	We can quickly find the documents that we need with a simple search in our electronic databases	1	2	3	4	5	6	7
30	A high proportion of the knowledge in our company resides within individuals	1	2	3	4	5	6	7

		Strongly disagree						Strongly agree
31	A high proportion of our internet knowledge-sharing is achieved through direct people-to-people contact	1	2	3	4	5	6	7
32	Once we have developed new knowledge we re-use it as many times as possible in our product/service	1	2	3	4	5	6	7
33	The product/service that we provide involve bringing together experts with relevant knowledge and experience	1	2	3	4	5	6	7
34	Detailed knowledge of our customers is treated as a priority and is continuously updated	1	2	3	4	5	6	7
35	Detailed knowledge of our competitors is treated as a priority and is continuously updated	1	2	3	4	5	6	7
36	Detailed knowledge of our industry or sector is treated as a priority and is continuously updated	1	2	3	4	5	6	7
37	Our remuneration systems encourage using and contributing to document databases	1	2	3	4	5	6	7
38	People joining our company are well suited to effectively follow procedures and implementing standard procedures	1	2	3	4	5	6	7
39	We have comprehensive and up-to-date shared directories of experts which provide information about their experience and current work	1	2	3	4	5	6	7
40	Innovation in our company relies on dialogues between people with relevant knowledge	1	2	3	4	5	6	7
41	Prior to leaving our company people are debriefed to ensure that their knowledge is transferred to other people within the company	1	2	3	4	5	6	7
42	Accuracy of information is important to us, even though it may be longer to achieve	1	2	3	4	5	6	7
43	We are generally expected to seek out for ourselves the information and know-how that we need to carry out our jobs effectively	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
44	The knowledge that our company relies on requires rapid and continuous refresh	1	2	3	4	5	6	7
45	We are effective at acquiring and/or creating new knowledge assets	1	2	3	4	5	6	7
46	We are effective at exploiting our knowledge assets, e.g. by utilising them ourselves, selling or disseminating them to others	1	2	3	4	5	6	7
47	The knowledge that we acquire or create is aligned to the knowledge that we either use in our main activities or sell on to others	1	2	3	4	5	6	7
48	We are frequently short of up-to-date information that is needed to carry out our work effectively	1	2	3	4	5	6	7
49	Our knowledge systems are focused on issues external to our company	1	2	3	4	5	6	7
50	Knowledge is our primary product/service	1	2	3	4	5	6	7
51	Our information systems provide access to documents generated anywhere in the company	1	2	3	4	5	6	7
52	Most of the knowledge in our company flows horizontally across the organisation at all levels	1	2	3	4	5	6	7
53	Management places emphasis on capturing knowledge in documents and storing them in electronic databases for later reuse	1	2	3	4	5	6	7
54	Management places emphasis on identifying and supporting networks of experts and people with similar job-related interests	1	2	3	4	5	6	7
55	Our company operates mainly through set procedures and people are discouraged from deviating from these	1	2	3	4	5	6	7
56	We have dedicated staff for capturing knowledge around the company and storing it in readily accessible documents and databases	1	2	3	4	5	6	7

		Strongly disagree						Strongly agree
57	Project teams operate horizontally across the company	1	2	3	4	5	6	7
58	People in the company normally respond rapidly to requests for information from colleagues	1	2	3	4	5	6	7
59	Our knowledge management practices are aligned with the overall objectives of the company	1	2	3	4	5	6	7
60	Knowledge management in our company is coordinated centrally from the top	1	2	3	4	5	6	7
61	Everyone in the company is expected to follow knowledge management procedures that are formally laid down in documents	1	2	3	4	5	6	7
62	Information about failures, errors and mistakes is shared and addressed constructively	1	2	3	4	5	6	7
63	We are generally allowed time to reflect on completed tasks and projects, and to share our experiences with our colleagues	1	2	3	4	5	6	7
64	Most knowledge in our company flows vertically from subordinate to superior and vice-versa	1	2	3	4	5	6	7
65	Our knowledge systems are focused on internal aspects of our company	1	2	3	4	5	6	7
66	In comparison to our competitors we spend more time on research and development	1	2	3	4	5	6	7

APPENDIX 6B



Knowledge Orientation Questionnaire

I am currently reading for a doctorate degree in social sciences with the University of Leicester. You are cordially invited to participate in this research being conducted on knowledge management practices in Maltese public and private medium to large sized organisations by filling in this questionnaire.

Your feedback is essential in order to draw up a clear picture on knowledge orientation amongst Maltese organisations. Kindly fill in this questionnaire. You may wish to return this questionnaire through email by sending it on cmical@maltanet.net as this questionnaire has been posted on your email address, or by using the self-addressed envelope.

Thank you for your co-operation. If you have any difficulties please phone me on 99257071. Your earliest submission of this questionnaire will be greatly appreciated.

Regards

Chris Micallef
Doctorate Research Student
University of Leicester

KNOWLEDGE ORIENTATION QUESTIONNAIRE

You are cordially invited to participate in this research being conducted on knowledge management practices in Maltese public and private medium to large sized organisations by filling in this questionnaire. Your responses will be treated as confidential and only data that has been aggregated and collated will be presented in the final version of this research.

All questions are related to the organisation you work for and not to any related parent company. For public-sector parastatal organisations, please apply this questionnaire to your appropriate division/department. As regards to competitors, please apply to other organisations of a similar nature.

If you would like to receive a copy of the results in executive summary format, please tick this adjacent box (or highlight this box using the fill colour button) accordingly.

Please fill in your contact details if you wish to receive the executive summary format of this research.

Name	
Organisation	
Address	
e-mail	

SECTION I – INFORMATION ON YOUR ORGANISATION

Please answer the following questions related to your organisation

1. Please define your Job title _____

2. What are the main activities related to your organisation?

   _____

   _____

3. What is the number of full-time employees engaged with your organisation?

   _____

4. Define your main industry sector classification/services classification (tick or highlight the adjacent box using the fill colour button)

   INDUSTRY SECTOR SERVICES CLASSIFICATION

   a) Food manufacturing industries, except beverage industries ☐

   b) Beverage Industries ☐

   c) Manufacture of textiles ☐

   d) Manufacture of footwear other wearing apparel ☐

   e) Manufacture of wood, cork, except manufacture of furniture ☐

   f) Manufacture of furniture ☐

   g) Manufacture of paper products ☐

   h) Printing, publishing and allied industries ☐

   i) Manufacture of leather and leather products except footwear ☐

j) Manufacture of rubber products ☐

k) Manufacture of chemical products ☐

l) Manufacture of metal products, except machinery and transport equipment ☐

m) Manufacture of machinery except electrical machinery ☐

n) Manufacture of electrical machinery, apparatus, appliances & supplies ☐

o) Manufacture of transport equipment ☐

p) Miscellaneous manufacturing industries ☐

q) Construction ☐

r) Electricity and Gas ☐

SERVICES CLASSIFICATION

a) Wholesale and retail trade ☐

b) Banks and other financial institution ☐

c) Insurance ☐

d) Real estate ☐

e) Transport ☐

f) Communication ☐

g) Government services ☐

h) Community and business services ☐

i) Recreation services ☐

j) Personal services ☐

5. Is your organisation a subsidiary of another organisation? **Yes** ☐ **No** ☐

SECTION II – Operating organisational environment

6. Can you please indicate, by marking ONLY one box (or highlight the adjacent box using the fill colour button if you intend to send this survey via email), the type of operating organisational environment that you are currently experiencing at your workplace.

a) Change described as unpredictable and discontinuous ☐

b) Change described as predictable and discontinuous ☐

c) Change described as fast and incremental ☐

d) Change described as slow and incremental ☐

e) There is no change taking place ☐

SECTION III – Strategic organisational orientation

Please tick one box for the questions set below

7. Compared with our competitors, the services/products for our clients are best described by one of the following statements:

a) Broad in nature, continuous product/service changing and innovative ☐

b) Mixed market conditions, stable in certain areas, innovative in others ☐

c) Fixed market conditions, focused, stability relatively ensured and well defined ☐

d) Responding to opportunities and threats in the marketplace are the order of the day ☐

8. Compared with our competitors, our organisational image is best described by one of the following statements:

a) The services/products on the market are few, selective and of high quality ☐

b) Once a thorough analysis is achieved, innovations are adopted ☐

c) In order to maintain or increase my organisation's position, market opportunities and threats are dealt with very seriously ☐

d) Creativity and innovation are two components that best describe my organisation ☐

9. Marketplace scanning and monitoring change by my organisation is best described by one of the following statements:

a) Time is spent inconsistently and haphazardly on marketplace scanning and monitoring change ☐

b) A reasonable amount of time is spent on marketplace scanning and monitoring change ☐

c) No time is spent on marketplace scanning and monitoring change ☐

d) Marketplace scanning and monitoring change takes place continuously and is considered of utmost importance. ☐

10. Compared with our competitors, demand changes is best described by one of the following statements:

a) Focus is maintained on those markets that our organisation currently serves ☐

b) Market-pressures are maintained by adopting few risks ☐

c) Aggressive entry into new markets is maintained by new products/services ☐

d) By understanding better the market that my organisation plays , my organisation's new products and services are considered only after full understanding of their strength in the marketplace ☐

11. Compared with our competitors, our organisation's commitment can be best described with one of the following statements:

a) Cost-control conscious ☐

b) Cost-control conscious with the aim of generating new products/services for new or existing markets ☐

c) Proper resources planning to maintain new products/services for new or ☐

existing markets

d) Market threats are taken seriously in order to shield the organisation's business ☐

12. Compared with our competitors, the managerial skills possessed by my organisation can be best described with one of the following statements:

a) Skills are synonymous with marketplace short term demands ☐

b) Diverse, flexible, entrepreneurial, and possess change management skills ☐

c) Specialised in particular area or areas ☐

d) Analytical approach by understanding trends and adopt product/service to meet the market needs ☐

13. Compared with our competitors, our organisation is capable of creating protection by being best described with one of the following statements:

a) Continuous development of new products/services to address the market needs ☐

b) Analysing and adopting market trends for products/services even if gauged as a moderate potential ☐

c) Analysing and adopting market trend for those products/services with strong potential ☐

d) Operations are limited to few tasks but performed well ☐

14. Our organisation's management staff can be best described with one of the following statements:

a) Product/service development or expansion into new markets/segments ☐

b) Cost and quality audit measures are top on the agenda in order to create a financially stable organisation ☐

c) Marketplace opportunities are analysed using proper techniques so that the right selection of opportunities are maintained for a secure financial position of the organisation ☐

d) Focus is maintained on those business areas/problems which mean most to our organisation ☐

15. Compared with our competitors, future planning of our organisation can be best described with one of the following statements:

a) Best possible scenario analysis and addressing those challenges of utmost importance to my organisation ☐

b) Marketplace trends and opportunity analysis are analysed to identify possible development of products/services or to tap new markets ☐

c) Marketplace problem/challenges analysed to identify possible development of my organisation's current products/services and consolidate current market position ☐

d) Analysing what our competitors long-term trends are and what they have been doing besides focussing on our organisation's product/service in order to meet our clients' needs. ☐

16. Compared with our competitors, my organisational structure can be best

described with one of the following statements:

a) Continuous changing structure with the objective of meeting market opportunities and as a problem solver ☐

b) Departmental-Divisional based functional structure ☐

c) Market oriented or structured by product/service structure ☐

d) Primarily departmental-divisional in nature but also entices a market-oriented or structured by product/service structure ☐

17. Our organisational performance can be best described with one of the following statements:

a) Highly centralised with the responsibility falling on senior management of my organisation ☐

b) Oriented towards objectives that require immediate attention ☐

c) Decentralised and engaging participation from all staff members ☐

d) Centralised in organisation's established product/service domains and participative role in new product/service areas ☐

SECTION IV –STRATEGIC KNOWLEDGE ORIENTATION

Kindly circle one number or highlight the number in red if you intend to send this survey via email (using the font button) for each statement by indicating your opinion on each of the following statement when applied to your organisation.

		Strongly disagree					**Strongly agree**	
18	Our organisational training is based on manual-type of training	1	2	3	4	5	6	7
19	Our organisational training is based on the transfer of knowledge through appropriate mentoring	1	2	3	4	5	6	7
20	Staff hired within our organisation are problem-solvers	1	2	3	4	5	6	7
21	Knowledge sharing is enhanced directly by our organisational remuneration package system	1	2	3	4	5	6	7
22	Networks are fostered by the creation of secondments with other organisations through links developed by our HR department	1	2	3	4	5	6	7
23	Both knowledge needs of our organisation and HR policies and systems are aligned	1	2	3	4	5	6	7
24	Our organisation utilises its own ICT technologies for documentation and storage of information	1	2	3	4	5	6	7
25	Knowledge within our organisation is exchanged and contact with people is maintained through its own ICT technologies	1	2	3	4	5	6	7
26	Our IT Department (or subcontracted IT Department) utilises the latest technologies in knowledge exchange	1	2	3	4	5	6	7
27	Our organisation has a performance management system that is disseminated throughout the organisation using its information systems	1	2	3	4	5	6	7
28	Knowledge is tapped from our organisation's database without prior consultation to the person who created it	1	2	3	4	5	6	7
29	Knowledge is tapped from our organisation's database using search facility	1	2	3	4	5	6	7
30	A high percentage of our organisation's knowledge rests with staff within the organisation	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
31	A high percentage of our organisation's knowledge is developed through people-to-people contact within our organisation departments/divisions/units	1	2	3	4	5	6	7
32	The concept of knowledge re-use is used to a great extent once it is discovered for our organisation's products/services	1	2	3	4	5	6	7
33	Client knowledge is continuously updated within our organisation and is considered of utmost importance	1	2	3	4	5	6	7
34	Competitor knowledge is continuously updated within our organisation and is considered of utmost importance	1	2	3	4	5	6	7
35	Industry knowledge is continuously updated within our organisation and is considered of utmost importance	1	2	3	4	5	6	7
36	Knowledge databases contribution within our organisation is enhanced through the organisation's remuneration structure	1	2	3	4	5	6	7
37	Our organisation's database knowledge on experts related to our field is continuously updated	1	2	3	4	5	6	7
38	Innovative knowledge is increased through communication between people who possess the relevant knowledge in our organisation	1	2	3	4	5	6	7
39	Our organisation utilises exit interviews so that their knowledge and experience could be transmitted to other staff members	1	2	3	4	5	6	7
40	Information accuracy is essential to our organisation even though it may take some time to capture	1	2	3	4	5	6	7
41	Our organisation's knowledge management is updated continuously	1	2	3	4	5	6	7
42	Our organisation is well known for the creation of acquirement of new knowledge assets	1	2	3	4	5	6	7
43	Our organisations creation of new knowledge assets are in line with the business operations of the organisation or by selling them to other organisations	1	2	3	4	5	6	7

		Strongly disagree					Strongly agree	
44	The derivation of new knowledge which directly effects our line of business is rather difficult to tap at times, thus hindering to carry out our operations in the most effective manner	1	2	3	4	5	6	7
45	Our organisation's knowledge management systems are geared on external issues	1	2	3	4	5	6	7
46	Documentation access is feasible throughout our organisation through its' information systems	1	2	3	4	5	6	7
47	Knowledge management takes place mostly horizontally in our organisation	1	2	3	4	5	6	7
48	The prime objective of our organisation's management is the capturing and reuse of our knowledge through its’ electronic databases	1	2	3	4	5	6	7
49	Networks with experts functioning along the same business lines of our organisation are given attention by our organisation's management	1	2	3	4	5	6	7
50	Our organisation has standard operating procedures to work with and management discourages staff from any work procedures deviations	1	2	3	4	5	6	7
51	Our organisation's project teams operate along a horizontal level in the organisation	1	2	3	4	5	6	7
52	The type of culture instilled within our organisation is to respond immediately to any knowledge requests from staff members within the organisation	1	2	3	4	5	6	7
53	Our organisation has its overall objectives and knowledge management practices aligned so that operations are performed effectively	1	2	3	4	5	6	7
54	Our organisation has a centralised knowledge management structure and a top-down approach	1	2	3	4	5	6	7
55	Knowledge information related to difficulties encountered, failures registered or possible mistakes that might arise are disseminated in a constructive manner without prejudice in our organisation	1	2	3	4	5	6	7

56	Knowledge creation regarding operations in our organisation are reflected upon and disseminated to other members of staff	1	2	3	4	5	6	7
57	There is a vertical flow of knowledge management from subordinate level to management level and vice-versa	1	2	3	4	5	6	7
58	The focus on knowledge management systems are on internal aspects of our organisation	1	2	3	4	5	6	7
59	Our organisation devotes more time on research and development than our competitors	1	2	3	4	5	6	7

SECTION V – ORGANISATIONAL PERFORMANCE

Please circle one number or highlight the number in red if you intend to send this survey via email (using the font button) for the following statements as regards to how your organisations performs in relation with its competitors

		Much worse				**Much better**
60	Rate of what may be considered your organisational global performance in the last year	1	2	3	4	5
61	Rate your rate of investment for your organisation in these last three years	1	2	3	4	5
62	Rate your sales volumes for your organisation in these last three years	1	2	3	4	5

Thank-you for completing this questionnaire

Please return the questionnaire via email using the email address shown below or by using the self-addressed envelope if this questionnaire has reached you via post to:

Chris Micallef

9, 'Casa Micallef',

Triq il-Bwieraq, N/H 2

Santa Lucia

SLC 1761

or email on **cmical@maltanet.net**

APPENDIX 7

The definitions of the four strategic types identified by Hrebiniak & Snow (1980).

Type 1	This type of organisation attempts to locate and maintain a secure niche in a relatively stable product or service area. The organisation tends to offer a more limited range of products or services than its competitors, and it tries to protect its domain by offering higher quality, superior service, lower prices, and so forth. Often this type of organisation is not at the forefront of developments in the industry-it tends to ignore industry changes that have no direct influence on current area of operation and concentrates instead on doing the best job possible in a limited area.
Type 2	This type of organisation typically operates within a broad product-market domain that undergoes periodic redefinition. The organisation values being 'first in' new product and market area even if not all of these efforts prove to be highly profitable. The organisation responds rapidly to early signals concerning areas of opportunity, and these responses often lead to a new round of competitive actions. However, this type of organisation may not maintain market strength in all of the areas it enters.
Type 3	This type of organisation attempts to maintain a stable, limited line of products or services, while at the same time moving out quickly to follow a carefully selected set of the more promising new developments in the industry. The organisation is seldom 'first in' with new products or services. However, by carefully monitoring the actions of major competitors in areas compatible with its stable product-market base, the organisation can frequently be 'second in' with a more cost-efficient product or service.
Type 4	This type of organisation does not appear to have consistent product-market orientation. The organisation is usually not as aggressive in maintaining established products and markets as some of its competitors, nor is it willing to take as many risks as other competitors. Rather, the organisation responds in those areas where it is forced to by environmental pressures.

Appendix 8: Independent Samples t-test

Group Statistics

	Management level	N	Mean	Std. Deviation	Std. Error Mean
Environmental turbulence	Management	69	3.0145	1.05011	.12642
	Senior Management	68	3.0294	1.03622	.12566
Organisational performance	Management	68	3.9265	.71896	.08719
	Senior Management	68	3.9412	.77039	.09342
Rate of investment	Management	65	3.9538	.83723	.10385
	Senior Management	64	3.7813	.98349	.12294
Sales volume	Management	66	3.9091	.75909	.09344
	Senior Management	64	3.7500	.81650	.10206
Strategy-type	Management	70	2.3857	.99699	.11916
	Senior Management	67	2.3284	1.05008	.12829

Appendix 8…(contd)

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Environmental turbulence	Equal variances assumed	.180	.672	-.084	135	.933	-.01492	.17826	-.36747	.33763
	Equal variances not assumed			-.084	135.000	.933	-.01492	.17825	-.36744	.33760
Organisational performance	Equal variances assumed	.020	.887	-.115	134	.909	-.01471	.12779	-.26745	.23803
	Equal variances not assumed			-.115	133.365	.909	-.01471	.12779	-.26746	.23805
Rate of investment	Equal variances assumed	3.318	.071	1.074	127	.285	.17260	.16073	-.14545	.49064
	Equal variances not assumed			1.073	123.224	.286	.17260	.16093	-.14594	.49114
Sales volume	Equal variances assumed	.985	.323	1.151	128	.252	.15909	.13822	-.11440	.43258
	Equal variances not assumed			1.150	126.638	.252	.15909	.13837	-.11473	.43292
Strategy-type	Equal variances assumed	.443	.507	.328	135	.743	.05736	.17489	-.28853	.40324
	Equal variances not assumed			.328	133.770	.744	.05736	.17509	-.28895	.40367

APPENDIX 9
ANOVA technique using a one-way analysis of variance between environmental turbulence and strategy-type

Descriptives

Environmental turbulence

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Prospector	35	2.7429	.88593	.14975	2.4385	3.0472	1.00	5.00
Analyser	35	3.1176	.91336	.15664	2.7990	3.4363	1.00	5.00
Defender	49	3.3673	1.01435	.14491	3.0760	3.6587	1.00	5.00
Reactor	18	2.4444	1.29352	.30489	1.8012	3.0877	1.00	5.00
Total	137	3.0221	1.04326	.08946	2.8451	3.1990	1.00	5.00

Test of Homogeneity of Variances

Environmental turbulence

Levene Statistic	df1	df2	Sig.
3.521	3	132	.017

ANOVA

Environmental turbulence

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.886	3	4.962	4.960	.003
Within Groups	132.047	132	1.000		
Total	146.934	135			

APPENDIX 9 …(continued)

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Environmental turbulence

Tukey HSD

(I) Strategic Type	(J) Strategic Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Prospector	Analyser	-.37479	.24084	.407	-1.0015	.2519
	Defender	-.62449(*)	.22135	.028	-1.2005	-.0485
	Reactor	.29841	.29010	.733	-.4564	1.0533
Analyser	Prospector	.37479	.24084	.407	-.2519	1.0015
	Defender	-.24970	.22324	.679	-.8306	.3312
	Reactor	.67320	.29154	.101	-.0854	1.4318
Defender	Prospector	.62449(*)	.22135	.028	.0485	1.2005
	Analyser	.24970	.22324	.679	-.3312	.8306
	Reactor	.92290(*)	.27566	.006	.2056	1.6402
Reactor	Prospector	-.29841	.29010	.733	-1.0533	.4564
	Analyser	-.67320	.29154	.101	-1.4318	.0854
	Defender	-.92290(*)	.27566	.006	-1.6402	-.2056

* The mean difference is significant at the .05 level.

APPENDIX 10
Reliability Analysis on organisational performance

Case Processing Summary

		N	%
Cases	Valid	131	92.3
	Excluded (a)	11	7.7
	Total	142	100.0

a Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.621	3

Item Statistics

	Mean	Std. Deviation	N
Organisational performance	3.9160	.74460	131
Rate of investment	3.8626	.90947	131
Sales volume	3.8321	.79569	131

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Organisational performance	7.6947	1.814	.534	.390
Rate of investment	7.7481	1.744	.362	.638
Sales volume	7.7786	1.897	.415	.543

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
11.6107	3.440	1.85461	3

APPENDIX 11

Detailed statistical analysis on organisational performance measure against strategic grouping variables

Tests of Normality

Mean organisational performance	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Prospector performance	.147	33	.067	.945	33	.093
Analyser performance	.134	35	.115	.946	35	.083
Defender performance	.174	50	.001	.942	50	.017
Reactor performance	.176	18	.146	.901	18	.059

a Lilliefors Significance Correction

Descriptives

			Statistic	Std. Error
Prospector performance	Mean		4.0404	.10129
	95% Confidence Interval for Mean	Lower Bound	3.8341	
		Upper Bound	4.2467	
	5% Trimmed Mean		4.0449	
	Median		4.0000	
	Variance		.339	
	Std. Deviation		.58189	
	Minimum		3.00	
	Maximum		5.00	
	Range		2.00	
	Interquartile Range		.67	
	Skewness		-.197	.409
	Kurtosis		-.735	.798
Analyser performance	Mean		4.0476	.09482
	95% Confidence Interval for Mean	Lower Bound	3.8549	
		Upper Bound	4.2403	
	5% Trimmed Mean		4.0529	
	Median		4.0000	
	Variance		.315	
	Std. Deviation		.56094	
	Minimum		3.00	
	Maximum		5.00	
	Range		2.00	
	Interquartile Range		.67	
	Skewness		-.042	.398
	Kurtosis		-.427	.778

Defender performance	Mean		3.7200	.07816
	95% Confidence Interval for Mean	Lower Bound	3.5629	
		Upper Bound	3.8771	
	5% Trimmed Mean		3.7185	
	Median		3.6667	
	Variance		.305	
	Std. Deviation		.55271	
	Minimum		2.33	
	Maximum		5.00	
	Range		2.67	
	Interquartile Range		.67	
	Skewness		-.181	.337
	Kurtosis		-.385	.662
Reactor performance	Mean		3.7037	.18649
	95% Confidence Interval for Mean	Lower Bound	3.3102	
		Upper Bound	4.0972	
	5% Trimmed Mean		3.7449	
	Median		3.6667	
	Variance		.626	
	Std. Deviation		.79120	
	Minimum		2.00	
	Maximum		4.67	
	Range		2.67	
	Interquartile Range		1.42	
	Skewness		-.326	.536
	Kurtosis		-.702	1.038

APPENDIX 12
One-way ANOVA test between organisational strategic-types

Descriptives

Mean organisational performance

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Prospector	33	4.0404	.58189	.10129	3.8341	4.2467	3.00	5.00
Analyser	35	4.0476	.56094	.09482	3.8549	4.2403	3.00	5.00
Defender	50	3.7200	.55271	.07816	3.5629	3.8771	2.33	5.00
Reactor	18	3.7037	.79120	.18649	3.3102	4.0972	2.00	4.67
Total	136	3.8799	.61353	.05261	3.7759	3.9839	2.00	5.00

Test of Homogeneity of Variances

Mean organisational performance

Levene Statistic	df1	df2	Sig.
2.243	3	132	.086

ANOVA

Mean organisational performance

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.672	3	1.224	3.427	.019
Within Groups	47.144	132	.357		
Total	50.816	135			

APPENDIX 12…(contd)
One-way ANOVA test between organisational strategic-types
Post hoc tests
Multiple Comparisons

Dependent Variable: Mean organisational performance
Bonferroni

(I) STRATEGY	(J) STRATEGY	Mean Difference (I-J)	Std. Error	Sig.	90% Confidence Interval	
					Lower Bound	Upper Bound
Prospector	Analyser	-.00722	.14501	1.000	-.3588	.3444
	Defender	.32040	.13404	.109	-.0046	.6454
	Reactor	.33670	.17511	.340	-.0879	.7613
Analyser	Prospector	.00722	.14501	1.000	-.3444	.3588
	Defender	.32762(*)	.13171	.085	.0082	.6470
	Reactor	.34392	.17334	.296	-.0764	.7642
Defender	Prospector	-.32040	.13404	.109	-.6454	.0046
	Analyser	-.32762(*)	.13171	.085	-.6470	-.0082
	Reactor	.01630	.16427	1.000	-.3820	.4146
Reactor	Prospector	-.33670	.17511	.340	-.7613	.0879
	Analyser	-.34392	.17334	.296	-.7642	.0764
	Defender	-.01630	.16427	1.000	-.4146	.3820

* The mean difference is significant at the .1 level.

APPENDIX 12…(contd)
One-way ANOVA test between organisational strategic-types
Post hoc tests
Multiple Comparisons

Dependent Variable: Mean organisational performance
Bonferroni

(I) STRATEGY	(J) STRATEGY	Mean Difference (I-J)	Std. Error	Sig.	85% Confidence Interval	
					Lower Bound	Upper Bound
Prospector	Analyser	-.00722	.14501	1.000	-.3360	.3216
	Defender	.32040(*)	.13404	.109	.0165	.6243
	Reactor	.33670	.17511	.340	-.0603	.7337
Analyser	Prospector	.00722	.14501	1.000	-.3216	.3360
	Defender	.32762(*)	.13171	.085	.0290	.6262
	Reactor	.34392	.17334	.296	-.0491	.7369
Defender	Prospector	-.32040(*)	.13404	.109	-.6243	-.0165
	Analyser	-.32762(*)	.13171	.085	-.6262	-.0290
	Reactor	.01630	.16427	1.000	-.3561	.3887
Reactor	Prospector	-.33670	.17511	.340	-.7337	.0603
	Analyser	-.34392	.17334	.296	-.7369	.0491
	Defender	-.01630	.16427	1.000	-.3887	.3561

* The mean difference is significant at the .15 level.

APPENDIX 12…(contd)
One-way ANOVA test between prospector, analyser and defender organisational strategic-types

Descriptives

Mean organisational performance

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Prospector	33	4.0364	.58514	.10186	3.8289	4.2438	3.00	5.00
Analyser	33	4.0818	.54455	.09479	3.8887	4.2749	3.00	5.00
Defender	45	3.6622	.53948	.08042	3.5001	3.8243	2.30	4.70
Total	111	3.8982	.58387	.05542	3.7884	4.0080	2.30	5.00

Test of Homogeneity of Variances

Mean organisational performance

Levene Statistic	df1	df2	Sig.
.112	2	108	.894

ANOVA

Mean organisational performance

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.248	2	2.124	6.899	.002
Within Groups	33.251	108	.308		
Total	37.500	110			

APPENDIX 12…(contd)
One-way ANOVA test between prospector, analyser and defender organisational strategic-types

Multiple Comparisons
Dependent Variable: Mean organisational performance
Bonferroni

(I) Strategic Type	(J) Strategic Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Prospector	Analyser	-.04545	.13660	1.000	-.3776	.2867
	Defender	.37414(*)	.12717	.012	.0649	.6834
Analyser	Prospector	.04545	.13660	1.000	-.2867	.3776
	Defender	.41960(*)	.12717	.004	.1103	.7288
Defender	Prospector	-.37414(*)	.12717	.012	-.6834	-.0649
	Analyser	-.41960(*)	.12717	.004	-.7288	-.1103

* The mean difference is significant at the .05 level.

APPENDIX 13
Descriptives on personalisation and codification knowledge management strategies

			Statistic	Std. Error
Prospector (Personalisation-Codification)	Mean		.3744	.10614
	95% Confidence Interval for Mean	Lower Bound	.1585	
		Upper Bound	.5904	
	5% Trimmed Mean		.3679	
	Median		.4700	
	Variance		.383	
	Std. Deviation		.61891	
	Minimum		-.92	
	Maximum		2.14	
	Range		3.06	
	Interquartile Range		.81	
	Skewness		.089	.403
	Kurtosis		.976	.788
Defender (Personalisation-Codification)	Mean		.1859	.10135
	95% Confidence Interval for Mean	Lower Bound	-.0179	
		Upper Bound	.3897	
	5% Trimmed Mean		.2042	
	Median		.2300	
	Variance		.503	
	Std. Deviation		.70945	
	Minimum		-1.67	
	Maximum		1.56	
	Range		3.23	
	Interquartile Range		1.02	
	Skewness		-.355	.340
	Kurtosis		.149	.668

APPENDIX 14
Reliability test for codification and personalisation scales

Codification scale

Case Processing Summary

		N	%
Cases	Valid	124	86.7
	Excluded (a)	19	13.3
	Total	143	100.0

a Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.624	8

Item Statistics

	Mean	Std. Deviation	N
COD18	3.8468	1.74861	124
COD24	5.3871	1.47450	124
COD28	3.2500	1.92808	124
COD29	3.9677	1.77120	124
COD32	4.6694	1.27975	124
COD36	3.3548	1.53651	124
COD46	4.8952	1.49154	124
COD48	3.5726	1.51509	124

APPENDIX 14…(contd)
Reliability test for codification and personalisation scales

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
COD18	29.0968	42.495	-.007	.685
COD24	27.5565	38.021	.286	.601
COD28	29.6935	35.418	.273	.610
COD29	28.9758	31.991	.513	.530
COD32	28.2742	40.477	.202	.620
COD36	29.5887	35.691	.400	.570
COD46	28.0484	34.957	.466	.553
COD48	29.3710	33.975	.517	.538

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
32.9435	45.403	6.73820	8

Personalisation scale

Case Processing Summary

		N	%
Cases	Valid	121	84.6
	Excluded (a)	22	15.4
	Total	143	100.0

a Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.804	13

APPENDIX 14…(contd)
Reliability test for codification and personalisation scales

Item Statistics

	Mean	Std. Deviation	N
PERS19	4.8678	1.42561	121
PERS20	4.0909	1.47761	121
PERS21	3.2645	1.55868	121
PERS22	3.1322	1.88389	121
PERS25	4.9091	1.52753	121
PERS30	5.4132	1.32709	121
PERS31	5.2314	1.17445	121
PERS37	4.1818	1.68819	121
PERS38	4.9091	1.43759	121
PERS39	3.7769	1.98950	121
PERS49	3.9421	1.59842	121
PERS51	4.1653	1.44538	121
PERS52	4.6942	1.54835	121

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PERS19	51.7107	106.274	.475	.788
PERS20	52.4876	110.252	.317	.800
PERS21	53.3140	102.851	.538	.782
PERS22	53.4463	100.133	.493	.785
PERS25	51.6694	105.906	.447	.790
PERS30	51.1653	119.322	.041	.818
PERS31	51.3471	114.862	.240	.804
PERS37	52.3967	101.241	.535	.781
PERS38	51.6694	103.906	.556	.781
PERS39	52.8017	100.727	.441	.792
PERS49	52.6364	101.450	.568	.779
PERS51	52.4132	105.361	.500	.786
PERS52	51.8843	104.370	.490	.786

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
56.5785	122.279	11.05799	13

APPENDIX 15

Correlation of knowledge orientation variables

		COD18	COD24	COD28	COD29	COD32	COD36	COD46	COD48	PERS19	PERS20	PERS21	PERS22	PERS25	PERS30	PERS31	PERS37	PERS38	PERS39	PERS49	PERS51	PERS52
COD18	Pearson Correlation	1	0.14	-0.09	-0.18	0.03	0.12	-0.08	0.10	-0.07	0.10	0.17	0.00	-0.01	-0.11	-0.03	-0.01	-0.13	-0.04	-0.01	-0.07	0.07
	Sig. (2-tailed)		0.11	0.32	0.04	0.73	0.19	0.38	0.27	0.41	0.25	0.05	0.99	0.93	0.20	0.76	0.94	0.15	0.61	0.93	0.46	0.43
	N	138.00	137.00	131.00	136.00	134.00	133.00	133.00	132.00	137.00	135.00	136.00	133.00	135.00	137.00	135.00	131.00	136.00	132.00	133.00	130.00	133.00
COD24	Pearson Correlation	0.14	1	0.05	0.15	0.27	0.13	0.26	0.20	0.21	0.12	0.17	0.12	0.59	0.06	0.21	0.18	0.29	0.21	0.27	0.25	0.32
	Sig. (2-tailed)	0.11		0.60	0.09	0.00	0.14	0.00	0.02	0.01	0.16	0.04	0.18	0.00	0.49	0.02	0.04	0.00	0.02	0.00	0.00	0.00
	N	137.00	139.00	132.00	137.00	136.00	134.00	133.00	132.00	137.00	135.00	137.00	134.00	137.00	138.00	136.00	131.00	136.00	132.00	133.00	130.00	133.00
COD28	Pearson Correlation	-0.09	0.05	1	0.53	0.00	0.12	0.12	0.19	-0.06	0.08	0.14	0.15	0.24	0.22	-0.01	-0.06	-0.05	0.02	0.17	0.19	-0.05
	Sig. (2-tailed)	0.32	0.60		0.00	0.96	0.18	0.19	0.03	0.49	0.34	0.11	0.10	0.01	0.01	0.95	0.53	0.56	0.80	0.05	0.04	0.54
	N	131.00	132.00	133.00	133.00	130.00	131.00	127.00	129.00	132.00	129.00	132.00	130.00	131.00	133.00	131.00	129.00	130.00	128.00	128.00	126.00	128.00
COD29	Pearson Correlation	-0.18	0.15	0.53	1	0.24	0.19	0.48	0.40	0.07	0.22	0.29	0.20	0.29	0.18	0.09	0.22	0.26	0.17	0.33	0.30	0.12
	Sig. (2-tailed)	0.04	0.09	0.00		0.00	0.03	0.00	0.00	0.39	0.01	0.00	0.02	0.00	0.03	0.29	0.01	0.00	0.06	0.00	0.00	0.18
	N	136.00	137.00	133.00	138.00	135.00	135.00	132.00	132.00	136.00	134.00	136.00	134.00	136.00	137.00	135.00	132.00	135.00	131.00	132.00	130.00	132.00
COD32	Pearson Correlation	0.03	0.27	0.00	0.24	1	0.15	0.13	0.10	0.33	0.12	0.18	0.20	0.34	0.15	0.50	0.18	0.38	0.22	0.20	0.24	0.34
	Sig. (2-tailed)	0.73	0.00	0.96	0.00		0.09	0.14	0.26	0.00	0.15	0.04	0.02	0.00	0.08	0.00	0.03	0.00	0.01	0.02	0.01	0.00
	N	134.00	136.00	130.00	135.00	136.00	134.00	132.00	132.00	134.00	132.00	134.00	132.00	135.00	135.00	135.00	131.00	135.00	131.00	132.00	130.00	132.00
COD36	Pearson Correlation	0.12	0.13	0.12	0.19	0.15	1	0.35	0.43	0.30	0.34	0.65	0.53	0.18	-0.17	0.02	0.54	0.34	0.39	0.43	0.33	0.18
	Sig. (2-tailed)	0.19	0.14	0.18	0.03	0.09		0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	0.80	0.00	0.00	0.00	0.00	0.00	0.04
	N	133.00	134.00	131.00	135.00	134.00	135.00	131.00	132.00	134.00	131.00	134.00	132.00	133.00	135.00	135.00	132.00	134.00	131.00	131.00	129.00	131.00

		COD18	COD24	COD28	COD29	COD32	COD36	COD46	COD48	PERS19	PERS20	PERS21	PERS22	PERS25	PERS30	PERS31	PERS37	PERS38	PERS39	PERS49	PERS51	PERS52
COD46	Pearson Correlation	-0.08	0.26	0.12	0.48	0.13	0.35	1	0.50	0.14	0.19	0.28	0.27	0.44	0.07	0.01	0.44	0.22	0.21	0.37	0.33	0.23
	Sig. (2-tailed)	0.38	0.00	0.19	0.00	0.14	0.00		0.00	0.11	0.03	0.00	0.00	0.00	0.45	0.92	0.00	0.01	0.02	0.00	0.00	0.01
	N	133.00	133.00	127.00	132.00	132.00	131.00	134.00	130.00	133.00	131.00	133.00	129.00	131.00	133.00	133.00	129.00	134.00	130.00	131.00	129.00	132.00
COD48	Pearson Correlation	0.10	0.20	0.19	0.40	0.10	0.43	0.50	1	0.16	0.11	0.37	0.22	0.33	-0.01	-0.01	0.46	0.16	0.23	0.43	0.21	0.20
	Sig. (2-tailed)	0.27	0.02	0.03	0.00	0.26	0.00	0.00		0.07	0.22	0.00	0.01	0.00	0.90	0.90	0.00	0.06	0.01	0.00	0.02	0.03
	N	132.00	132.00	129.00	132.00	132.00	132.00	130.00	133.00	133.00	130.00	132.00	130.00	131.00	133.00	133.00	130.00	133.00	131.00	131.00	129.00	131.00
PERS19	Pearson Correlation	-0.07	0.21	-0.06	0.07	0.33	0.30	0.14	0.16	1	0.16	0.31	0.24	0.27	0.06	0.26	0.29	0.48	0.22	0.40	0.36	0.46
	Sig. (2-tailed)	0.41	0.01	0.49	0.39	0.00	0.00	0.11	0.07		0.06	0.00	0.01	0.00	0.48	0.00	0.00	0.00	0.01	0.00	0.00	0.00
	N	137.00	137.00	132.00	136.00	134.00	134.00	133.00	133.00	138.00	135.00	137.00	134.00	135.00	138.00	136.00	132.00	136.00	133.00	133.00	130.00	133.00
PERS20	Pearson Correlation	0.10	0.12	0.08	0.22	0.12	0.34	0.19	0.11	0.16	1	0.36	0.39	0.13	0.10	0.13	0.18	0.18	0.25	0.25	0.27	0.17
	Sig. (2-tailed)	0.25	0.16	0.34	0.01	0.15	0.00	0.03	0.22	0.06		0.00	0.00	0.12	0.25	0.15	0.05	0.03	0.00	0.00	0.00	0.06
	N	135.00	135.00	129.00	134.00	132.00	131.00	131.00	130.00	135.00	136.00	134.00	131.00	133.00	135.00	133.00	129.00	134.00	131.00	131.00	129.00	131.00
PERS21	Pearson Correlation	0.17	0.17	0.14	0.29	0.18	0.65	0.28	0.37	0.31	0.36	1	0.59	0.28	-0.08	0.00	0.48	0.29	0.32	0.40	0.33	0.28
	Sig. (2-tailed)	0.05	0.04	0.11	0.00	0.04	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.33	0.99	0.00	0.00	0.00	0.00	0.00	0.00
	N	136.00	137.00	132.00	136.00	134.00	134.00	133.00	132.00	137.00	134.00	138.00	134.00	135.00	138.00	136.00	131.00	135.00	132.00	132.00	130.00	133.00
PERS22	Pearson Correlation	0.00	0.12	0.15	0.20	0.20	0.53	0.27	0.22	0.24	0.39	0.59	1	0.32	-0.04	0.06	0.42	0.26	0.35	0.37	0.27	0.11
	Sig. (2-tailed)	0.99	0.18	0.10	0.02	0.02	0.00	0.00	0.01	0.01	0.00	0.00		0.00	0.67	0.47	0.00	0.00	0.00	0.00	0.00	0.22
	N	133.00	134.00	130.00	134.00	132.00	132.00	129.00	130.00	134.00	131.00	134.00	135.00	133.00	135.00	133.00	129.00	132.00	129.00	130.00	127.00	130.00
PERS25	Pearson Correlation	-0.01	0.59	0.24	0.29	0.34	0.18	0.44	0.33	0.27	0.13	0.28	0.32	1	0.13	0.22	0.19	0.35	0.33	0.35	0.25	0.38
	Sig. (2-tailed)	0.93	0.00	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.12	0.00	0.00		0.12	0.01	0.03	0.00	0.00	0.00	0.01	0.00
	N	135.00	137.00	131.00	136.00	135.00	133.00	131.00	131.00	135.00	133.00	135.00	133.00	137.00	136.00	134.00	130.00	134.00	130.00	131.00	129.00	131.00
PERS30	Pearson Correlation	-0.11	0.06	0.22	0.18	0.15	-0.17	0.07	-0.01	0.06	0.10	-0.08	-0.04	0.13	1	0.34	-0.08	0.08	-0.03	-0.04	0.14	0.10
	Sig. (2-tailed)	0.20	0.49	0.01	0.03	0.08	0.04	0.45	0.90	0.48	0.25	0.33	0.67	0.12		0.00	0.35	0.34	0.72	0.67	0.12	0.24
	N	137.00	138.00	133.00	137.00	135.00	135.00	133.00	133.00	138.00	135.00	138.00	135.00	136.00	139.00	137.00	132.00	136.00	133.00	133.00	130.00	133.00

		COD18	COD24	COD28	COD29	COD32	COD36	COD46	COD48	PERS19	PERS20	PERS21	PERS22	PERS25	PERS30	PERS31	PERS37	PERS38	PERS39	PERS49	PERS51	PERS52
PERS31	Pearson Correlation	-0.03	0.21	-0.01	0.09	0.50	0.02	0.01	-0.01	0.26	0.13	0.00	0.06	0.22	0.34	1	0.02	0.35	0.16	0.08	0.10	0.17
	Sig. (2-tailed)	0.76	0.02	0.95	0.29	0.00	0.80	0.92	0.90	0.00	0.15	0.99	0.47	0.01	0.00		0.81	0.00	0.06	0.38	0.24	0.05
	N	135.00	136.00	131.00	135.00	135.00	135.00	133.00	133.00	136.00	133.00	136.00	133.00	134.00	137.00	137.00	132.00	136.00	133.00	133.00	130.00	133.00
PERS37	Pearson Correlation	-0.01	0.18	-0.06	0.22	0.18	0.54	0.44	0.46	0.29	0.18	0.48	0.42	0.19	-0.08	0.02	1	0.51	0.44	0.42	0.41	0.36
	Sig. (2-tailed)	0.94	0.04	0.53	0.01	0.03	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.03	0.35	0.81		0.00	0.00	0.00	0.00	0.00
	N	131.00	131.00	129.00	132.00	131.00	132.00	129.00	130.00	132.00	129.00	131.00	129.00	130.00	132.00	132.00	132.00	132.00	130.00	130.00	128.00	129.00
PERS38	Pearson Correlation	-0.13	0.29	-0.05	0.26	0.38	0.34	0.22	0.16	0.48	0.18	0.29	0.26	0.35	0.08	0.35	0.51	1	0.30	0.34	0.40	0.45
	Sig. (2-tailed)	0.15	0.00	0.56	0.00	0.00	0.00	0.01	0.06	0.00	0.03	0.00	0.00	0.00	0.34	0.00	0.00		0.00	0.00	0.00	0.00
	N	136.00	136.00	130.00	135.00	135.00	134.00	134.00	133.00	136.00	134.00	135.00	132.00	134.00	136.00	136.00	132.00	137.00	133.00	134.00	131.00	134.00
PERS39	Pearson Correlation	-0.04	0.21	0.02	0.17	0.22	0.39	0.21	0.23	0.22	0.25	0.32	0.35	0.33	-0.03	0.16	0.44	0.30	1	0.30	0.22	0.33
	Sig. (2-tailed)	0.61	0.02	0.80	0.06	0.01	0.00	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.72	0.06	0.00	0.00		0.00	0.01	0.00
	N	132.00	132.00	128.00	131.00	131.00	131.00	130.00	131.00	133.00	131.00	132.00	129.00	130.00	133.00	133.00	130.00	133.00	133.00	132.00	130.00	131.00
PERS49	Pearson Correlation	-0.01	0.27	0.17	0.33	0.20	0.43	0.37	0.43	0.40	0.25	0.40	0.37	0.35	-0.04	0.08	0.42	0.34	0.30	1	0.36	0.36
	Sig. (2-tailed)	0.93	0.00	0.05	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.38	0.00	0.00	0.00		0.00	0.00
	N	133.00	133.00	128.00	132.00	132.00	131.00	131.00	131.00	133.00	131.00	132.00	130.00	131.00	133.00	133.00	130.00	134.00	132.00	134.00	130.00	133.00
PERS51	Pearson Correlation	-0.07	0.25	0.19	0.30	0.24	0.33	0.33	0.21	0.36	0.27	0.33	0.27	0.25	0.14	0.10	0.41	0.40	0.22	0.36	1	0.29
	Sig. (2-tailed)	0.46	0.00	0.04	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.12	0.24	0.00	0.00	0.01	0.00		0.00
	N	130.00	130.00	126.00	130.00	130.00	129.00	129.00	129.00	130.00	129.00	130.00	127.00	129.00	130.00	130.00	128.00	131.00	130.00	130.00	131.00	130.00
PERS52	Pearson Correlation	0.07	0.32	-0.05	0.12	0.34	0.18	0.23	0.20	0.46	0.17	0.28	0.11	0.38	0.10	0.17	0.36	0.45	0.33	0.36	0.29	1
	Sig. (2-tailed)	0.43	0.00	0.54	0.18	0.00	0.04	0.01	0.03	0.00	0.06	0.00	0.22	0.00	0.24	0.05	0.00	0.00	0.00	0.00	0.00	
	N	133.00	133.00	128.00	132.00	132.00	131.00	132.00	131.00	133.00	131.00	133.00	130.00	131.00	133.00	133.00	129.00	134.00	131.00	133.00	130.00	134.00

* Correlation is significant at the 0.05 level (2-tailed).

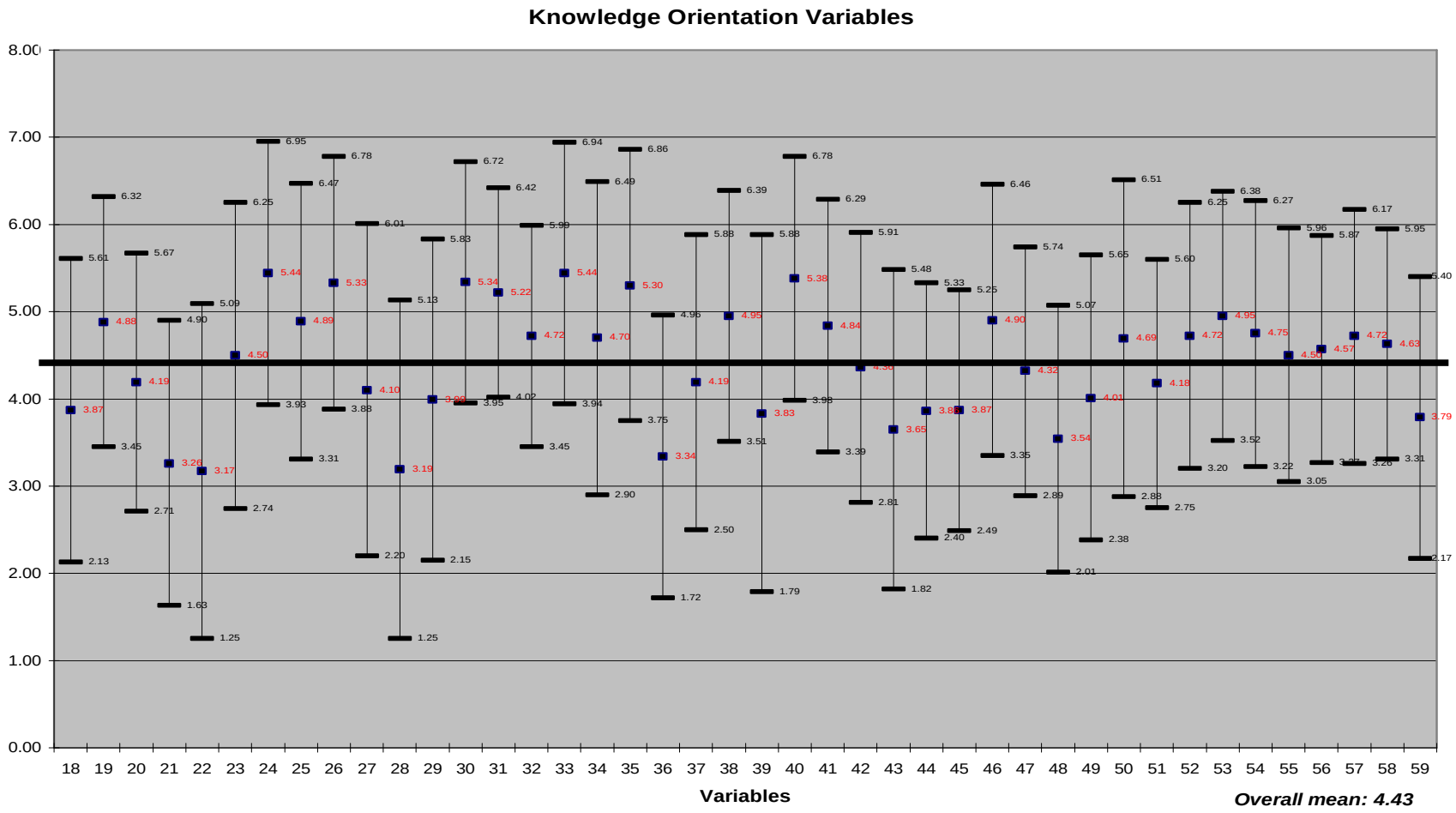
** Correlation is significant at the 0.01 level (2-tailed).

APPENDIX 16: The Kolmogorov-Smirnoff test: Tests of Normality

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
COD18	.126	138	.000	.943	138	.000
COD24	.278	139	.000	.842	139	.000
COD28	.219	133	.000	.878	133	.000
COD29	.151	138	.000	.931	138	.000
COD32	.156	136	.000	.934	136	.000
COD36	.140	135	.000	.933	135	.000
COD46	.185	134	.000	.894	134	.000
COD48	.174	133	.000	.940	133	.000
PERS19	.206	138	.000	.902	138	.000
PERS20	.141	136	.000	.950	136	.000
PERS21	.142	138	.000	.932	138	.000
PERS22	.174	135	.000	.891	135	.000
PERS25	.197	137	.000	.912	137	.000
PERS30	.245	139	.000	.855	139	.000
PERS31	.195	137	.000	.912	137	.000
PERS37	.137	132	.000	.942	132	.000
PERS38	.200	137	.000	.920	137	.000
PERS39	.131	133	.000	.911	133	.000
PERS49	.145	134	.000	.945	134	.000
PERS51	.176	131	.000	.936	131	.000
PERS52	.191	134	.000	.922	134	.000
ORIENT23	.199	137	.000	.913	137	.000
ORIENT26	.215	138	.000	.880	138	.000
ORIENT27	.145	138	.000	.923	138	.000
ORIENT33	.232	135	.000	.853	135	.000
ORIENT34	.169	128	.000	.919	128	.000
ORIENT35	.211	132	.000	.885	132	.000
ORIENT40	.226	137	.000	.901	137	.000
ORIENT41	.162	136	.000	.934	136	.000
ORIENT42	.160	136	.000	.935	136	.000
ORIENT43	.126	132	.000	.932	132	.000
ORIENT44	.158	133	.000	.946	133	.000
ORIENT45	.180	134	.000	.939	134	.000
ORIENT47	.195	133	.000	.931	133	.000
ORIENT50	.186	134	.000	.908	134	.000
ORIENT53	.220	136	.000	.908	136	.000
ORIENT54	.178	134	.000	.921	134	.000
ORIENT55	.189	135	.000	.935	135	.000
ORIENT56	.170	135	.000	.927	135	.000
ORIENT57	.174	134	.000	.937	134	.000
ORIENT58	.157	133	.000	.936	133	.000
ORIENT59	.171	131	.000	.941	131	.000

a Lilliefors Significance Correction

APPENDIX 17
Analysis showing means and standard deviations of knowledge orientation variables



APPENDIX 18
Descriptive statistics and ANOVA table for knowledge orientation factors

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
COD18	Between Groups	5.195	3	1.732	.560	.643
	Within Groups	405.354	131	3.094		
	Total	410.548	134			
PERS19	Between Groups	14.000	3	4.667	2.294	.081
	Within Groups	266.548	131	2.035		
	Total	280.548	134			
PERS20	Between Groups	2.046	3	.682	.307	.820
	Within Groups	286.315	129	2.219		
	Total	288.361	132			
PERS21	Between Groups	11.832	3	3.944	1.476	.224
	Within Groups	347.392	130	2.672		
	Total	359.224	133			
PERS22	Between Groups	3.965	3	1.322	.353	.787
	Within Groups	474.874	127	3.739		
	Total	478.840	130			
ORIENT23	Between Groups	25.074	3	8.358	2.913	.037
	Within Groups	370.129	129	2.869		
	Total	395.203	132			
COD24	Between Groups	23.076	3	7.692	3.649	.014
	Within Groups	276.139	131	2.108		
	Total	299.215	134			
PERS25	Between Groups	24.834	3	8.278	3.592	.016
	Within Groups	297.257	129	2.304		
	Total	322.090	132			
ORIENT26	Between Groups	11.333	3	3.778	1.815	.148
	Within Groups	270.555	130	2.081		
	Total	281.888	133			
ORIENT27	Between Groups	57.597	3	19.199	5.970	.001
	Within Groups	421.262	131	3.216		
	Total	478.859	134			
COD28	Between Groups	2.461	3	.820	.215	.886
	Within Groups	480.931	126	3.817		
	Total	483.392	129			

COD29	Between Groups	3.066	3	1.022	.301	.824
	Within Groups	440.815	130	3.391		
	Total	443.881	133			
PERS30	Between Groups	2.376	3	.792	.431	.731
	Within Groups	240.839	131	1.838		
	Total	243.215	134			
PERS31	Between Groups	3.645	3	1.215	.833	.478
	Within Groups	188.130	129	1.458		
	Total	191.774	132			
COD32	Between Groups	4.845	3	1.615	.988	.401
	Within Groups	209.336	128	1.635		
	Total	214.182	131			
ORIENT33	Between Groups	37.599	3	12.533	6.594	.000
	Within Groups	243.280	128	1.901		
	Total	280.879	131			
ORIENT34	Between Groups	25.897	3	8.632	2.779	.044
	Within Groups	385.220	124	3.107		
	Total	411.117	127			
ORIENT35	Between Groups	24.434	3	8.145	3.548	.016
	Within Groups	289.258	126	2.296		
	Total	313.692	129			
COD36	Between Groups	16.788	3	5.596	2.230	.088
	Within Groups	318.754	127	2.510		
	Total	335.542	130			
PERS37	Between Groups	5.734	3	1.911	.674	.569
	Within Groups	357.197	126	2.835		
	Total	362.931	129			
PERS38	Between Groups	20.352	3	6.784	3.426	.019
	Within Groups	257.380	130	1.980		
	Total	277.731	133			
PERS39	Between Groups	62.001	3	20.667	5.417	.002
	Within Groups	488.333	128	3.815		
	Total	550.333	131			
ORIENT40	Between Groups	23.111	3	7.704	4.178	.007
	Within Groups	239.695	130	1.844		
	Total	262.806	133			
ORIENT41	Between Groups	17.815	3	5.938	2.948	.035
	Within Groups	261.887	130	2.015		
	Total	279.701	133			

ORIENT42	Between Groups	14.082	3	4.694	2.009	.116
	Within Groups	303.806	130	2.337		
	Total	317.888	133			
ORIENT43	Between Groups	22.304	3	7.435	2.282	.082
	Within Groups	413.834	127	3.259		
	Total	436.137	130			
ORIENT44	Between Groups	9.423	3	3.141	1.486	.222
	Within Groups	270.638	128	2.114		
	Total	280.061	131			
ORIENT45	Between Groups	1.290	3	.430	.229	.876
	Within Groups	238.756	127	1.880		
	Total	240.046	130			
COD46	Between Groups	26.713	3	8.904	4.124	.008
	Within Groups	274.187	127	2.159		
	Total	300.901	130			
ORIENT47	Between Groups	7.335	3	2.445	1.187	.317
	Within Groups	259.442	126	2.059		
	Total	266.777	129			
COD48	Between Groups	3.289	3	1.096	.466	.707
	Within Groups	299.032	127	2.355		
	Total	302.321	130			
PERS49	Between Groups	16.065	3	5.355	2.050	.110
	Within Groups	336.927	129	2.612		
	Total	352.992	132			
ORIENT50	Between Groups	8.550	3	2.850	.859	.464
	Within Groups	424.443	128	3.316		
	Total	432.992	131			
PERS51	Between Groups	9.548	3	3.183	1.574	.199
	Within Groups	254.729	126	2.022		
	Total	264.277	129			
PERS52	Between Groups	19.859	3	6.620	2.946	.035
	Within Groups	287.618	128	2.247		
	Total	307.477	131			
ORIENT53	Between Groups	19.863	3	6.621	3.367	.021
	Within Groups	255.659	130	1.967		
	Total	275.522	133			
ORIENT54	Between Groups	6.626	3	2.209	.957	.415
	Within Groups	297.629	129	2.307		
	Total	304.256	132			

ORIENT55	Between Groups	22.730	3	7.577	3.752	.013
	Within Groups	260.519	129	2.020		
	Total	283.248	132			
ORIENT56	Between Groups	18.211	3	6.070	3.790	.012
	Within Groups	206.616	129	1.602		
	Total	224.827	132			
ORIENT57	Between Groups	15.576	3	5.192	2.534	.060
	Within Groups	262.303	128	2.049		
	Total	277.879	131			
ORIENT58	Between Groups	.685	3	.228	.127	.944
	Within Groups	230.125	128	1.798		
	Total	230.811	131			
ORIENT59	Between Groups	44.725	3	14.908	6.412	.000
	Within Groups	295.291	127	2.325		
	Total	340.015	130			

APPENDIX 19
Environmental Turbulence

Descriptives

Environmental turbulence

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Prospector	35	2.7429	.88593	.14975	2.4385	3.0472	1.00	5.00
Analyser	34	3.1176	.91336	.15664	2.7990	3.4363	1.00	5.00
Defender	49	3.3673	1.01435	.14491	3.0760	3.6587	1.00	5.00
Reactor	18	2.4444	1.29352	.30489	1.8012	3.0877	1.00	5.00
Total	136	3.0221	1.04326	.08946	2.8451	3.1990	1.00	5.00

Test of Homogeneity of Variances

Environmental turbulence

Levene Statistic	df1	df2	Sig.
3.521	3	132	.017

ANOVA

Environmental turbulence

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.886	3	4.962	4.960	.003
Within Groups	132.047	132	1.000		
Total	146.934	135			

APPENDIX 19…(Contd)
Environmental Turbulence

Multiple Comparisons

Dependent Variable: Environmental turbulence
Bonferroni

(I) Strategic Type	(J) Strategic Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Prospector	Analyser	-.37479	.24084	.732	-1.0199	.2703
	Defender	-.62449(*)	.22135	.033	-1.2174	-.0316
	Reactor	.29841	.29010	1.000	-.4786	1.0755
Analyser	Prospector	.37479	.24084	.732	-.2703	1.0199
	Defender	-.24970	.22324	1.000	-.8477	.3483
	Reactor	.67320	.29154	.135	-.1077	1.4541
Defender	Prospector	.62449(*)	.22135	.033	.0316	1.2174
	Analyser	.24970	.22324	1.000	-.3483	.8477
	Reactor	.92290(*)	.27566	.006	.1845	1.6613
Reactor	Prospector	-.29841	.29010	1.000	-1.0755	.4786
	Analyser	-.67320	.29154	.135	-1.4541	.1077
	Defender	-.92290(*)	.27566	.006	-1.6613	-.1845

* The mean difference is significant at the .05 level.

APPENDIX 20

Kaiser's criterion, the Catell scree plot and Varimax rotation

The Kaiser criterion and the Catell scree test can be used to assist in the determination of the smallest number of factors that best represents the inter-relations among the set of variables (Pallant 2001). Only factors with an eigenvalue of 1.0 or more are retained if the Kaiser criterion is adopted, which has often been critized due to the retention of too many factors (Pallant 2001). Catell's scree test through the SPSS software can plot each of the eigenvalues of the factors. Following inspection of this plot, one can decipher the point at which the shape of the curve changes its direction and becomes horizontal. Catell (1966) recommends that all factors above the break in the plot, will have to be retained as these plots provide a contribution towards the variance in the data set.

Once the plots (or factors) that have been retained are identified, the next step will be their interpretation. This is achieved through rotation, which helps in the better understanding and interpretation. Rotation can be either orthogonal which results in easier interpretations but uncorrelated that is assuming that underlying constructs are independent or oblique which although difficult to interpret allows for factors to be correlated (Tabachnick & Fidell 1996). Both orthogonal and oblique rotations result in similar results. SPSS software offers a number of rotational approaches namely, Varimax, Quartimax and Equamax for orthogonal rotation and Direct Oblimin and Promax for oblique rotation. The most commonly used is Varimax which 'attempts to minimize the number of variables that have a high loadings on each factor' (Pallant 2001: 155). For the oblique technique, the most commonly used is Direct Oblimin.

APPENDIX 21

Significant knowledge orientation factors

Knowledge Orientation Factor	Description	Prospector	Analyser	Defender	Reactor
PERS22	Networks are fostered by the creation of secondments with other organisations through links developed by our HR department			X	
COD24	Our organisation utilises its own ICT technologies for documentation and storage of information				X
PERS25	Knowledge within our organisation is exchanged through its own ICT technologies				X
COD28	Knowledge is tapped from our organisation's database without prior consultation to the person who created it			X	
COD29	Knowledge is tapped from our organisation's database using search facility		XX		
PERS31	A high percentage of our organisation's knowledge is developed to staff-to staff contact within our organisation departments/divisions/units				XX
COD32	The concept of knowledge re-use is used to a great extent once it is discovered for our organisation's products/services				X
ORIENT33	Client knowledge is continuously updated within our organisation and is considered of utmost importance	X			
ORIENT35	Industry knowledge is continuously updated within our organisation and is considered of utmost importance			X	
PERS37	Our organisation's database knowledge on experts related to our field is continuously updated				XX
PERS38	Innovative knowledge is increased through communication between people in our organisation		X		X
PERS39	Our organisation utilises exit interviews so that their knowledge and experience could be transmitted to other staff members				X
ORIENT41	Our organisation's knowledge management is updated continuously	X	X		

Knowledge Orientation Factor	Description	Prospector	Analyser	Defender	Reactor
ORIENT44	The derivation of new knowledge which directly effects our line of business is rather difficult to tap at times, thus hindering to carry out our operations in the most effective manner				**X**
ORIENT45	Our organisation's knowledge management systems are geared on external issues	**X**			
ORIENT47	Knowledge management takes place mostly horizontally in our organisation			**XX**	
PERS49	Networks with experts functioning along the same business lines of our organisation is given attention by our organisation's management				**X**
ORIENT50	Our organisation has standard operating procedures to work with and management discourages staff from work procedures deviations		**X**		
PERS52	The type of culture instilled within our organisation is to respond immeditaley to any knowledge requests from staff members within the organisation				**X**
ORIENT53	Our organisation has its overall objectives and knowledge management practices aligned so that operations are performed effectively		**X**		
ORIENT56	Knowledge creation regarding operations in our organisation are reflected upon and disseminated to other members of staff				**X**
ORIENT57	There is a vertical flow of knowledge management from subordinate level to management level and vice-versa				**X**
ORIENT58	Knowledge management systems are on internal aspects of our organisation				**X**
ORIENT59	Our organisation devotes more time on research and development than our competitors			**X**	**XX**

x $p<0.05$

xx $p<0.1$

APPENDIX 22
Varimax Rotations
Rotated Component Matrix(a) for five components extraction

Rotated Component Matrix(a)

	Component				
	1	2	3	4	5
ORIENT35	.705	.380			
ORIENT56	.656		.453		
ORIENT57	.645				
ORIENT33	.642	.306			
ORIENT41	.640	.412			
PERS38	.615		.307		
ORIENT55	.589		.438		
ORIENT40	.544				
COD32	.537				
PERS31	.526				
ORIENT34	.512	.449			
ORIENT26	.503	.326		.406	
PERS25	.497			.471	
ORIENT58	.486				
COD24	.443				
ORIENT54	.405				
COD36		.783			
PERS21		.730			
PERS22		.643			-.342
ORIENT42	.418	.641	.302		
PERS37	.309	.633			
ORIENT59		.555			
PERS39	.347	.502			
PERS49		.467	.310	.318	
ORIENT23	.423	.457	.359		-.396
ORIENT27	.315	.437		.391	
PERS30		-.380			-.316
COD18					
ORIENT47			.628		
PERS51			.587		
ORIENT50			.586		
PERS52	.461		.545		
ORIENT53	.500	.330	.530		
PERS19	.370		.442		
ORIENT43			.431		
PERS20		.327	.335		
COD29				.795	
COD28				.715	
COD48		.365		.548	

COD46	.307			.536	
ORIENT44					.675
ORIENT45		.416			.433

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 11 iterations.

Rotated Component Matrix(a) for six components extraction

Rotated Component Matrix(a)

	Component					
	1	2	3	4	5	6
COD36	.813					
PERS21	.792					
PERS22	.720					
ORIENT42	.645			.309		
PERS37	.634					
ORIENT23	.549	.378		.320		-.322
ORIENT59	.530					
PERS39	.517					
PERS49	.452		.360	.326		
ORIENT27	.451		.442			
ORIENT34	.444	.397				
PERS20	.434					
ORIENT57		.670				
ORIENT56		.657		.405		
ORIENT58		.626				
ORIENT55		.568		.413		
PERS31		.564				
PERS38	.312	.557				
ORIENT54		.531				
COD32		.509				
ORIENT40		.504				
ORIENT35	.359	.499	.455			
PERS30		.361			.358	
COD18						
PERS25			.720			
ORIENT26			.709			
COD24			.702			
COD46			.596			
ORIENT41	.406	.413	.525			
ORIENT33		.417	.453			
COD48	.368		.397		.373	.345
ORIENT50				.653		
ORIENT47				.600		
PERS52		.343		.582		
PERS51				.565		

ORIENT53	.358	.372		.554		
PERS19	.303	.326		.435		
ORIENT43	.309			.406		
COD29					.748	
COD28					.748	
ORIENT44						.691
ORIENT45	.404					.493

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 11 iterations.

Rotated Component Matrix(a) for seven components extraction

Rotated Component Matrix(a)

	Component						
	1	2	3	4	5	6	7
COD36	.795						
PERS21	.786						
PERS22	.737						
ORIENT42	.609	.317	.404				
ORIENT23	.565		.399				
PERS37	.563	.338					
PERS39	.538						
ORIENT59	.532						
PERS20	.479						
ORIENT34	.449			.302		-.358	
PERS49	.433	.367	.325				
ORIENT26		.748					
PERS25		.692			.360		
COD46		.650					
COD24		.649			.338		
ORIENT41	.368	.549	.386	.316			
COD48		.489		.324			
ORIENT35	.346	.483		.367			
ORIENT27	.431	.462					
ORIENT33		.450			.310		
PERS52			.651				
ORIENT53	.320		.649				
ORIENT50			.638				
ORIENT47			.596			.313	
PERS51			.551				
ORIENT55			.520	.465			
PERS19	.311		.486				
ORIENT43	.303		.402				
ORIENT58				.679			
ORIENT54				.643			

ORIENT56			.528	.581			
ORIENT57				.558			
ORIENT40				.440			
PERS38	.313		.366	.387	.306		
COD18				-.310			
PERS31					.761		
COD32					.584		
PERS30					.481	.357	
COD28						.759	
COD29		.313		.316		.697	
ORIENT44							.805
ORIENT45	.394						.542

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 13 iterations.
Source: Author's derived data from statistical package.

APPENDIX 23
Factor Analysis

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.807
Bartlett's Test of Sphericity	Approx. Chi-Square	2825.153
	df	861
	Sig.	.000

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